

# MWP

## **Chapter 06 Biodiversity**

### **Carrownagowan 110kV Grid Connection**

## 6. Biodiversity

### 6.1 Introduction

The Proposed Development comprises a 25 kilometers (km) long 110kV underground cable connection from the permitted Carrownagowan Wind Farm substation to the existing ESB owned 110kV substation at Ardnacrusha, County Clare which will allow the electrical energy generated from the wind farm to be exported onto the national grid. The active construction area will generally be only along a 100-200 meters (m) stretch of any roadway at any one time. The construction works are estimated to take approximately 6-8 months. During the first 4 months the cable trenches will be constructed. The second 4 months will involve sequentially opening up all joint bays.

This chapter considers the potential impacts and effects on biodiversity arising from the Proposed Development. A full description of the Proposed Development and all associated project elements is provided in **Chapter 2** Description of the Proposed Development of this Environmental Impact Assessment Report (EIAR). The assessment comprises:

- A review of the existing receiving environment.
- Prediction and characterisation of likely impacts;
- Evaluation of effects significance; and
- Consideration of mitigation measures, where appropriate.

A report for screening for Appropriate Assessment has also been prepared (**Appendix 6-1**, Volume III).

#### 6.1.1 Relevant Legislation

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

- Irish Wildlife Act 1976 to 2022
- The European Communities (Birds and Natural Habitats) Regulations 2011-2021
- EU Habitats Directive (92/43/EC)
- EU Birds Directive (2009/147/EC)
- The EU Water Framework Directive (2000/60/EC)

### 6.2 Methodology

#### 6.2.1 Scope

The objectives of the assessment were to:

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

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

#### 6.2.1.1 Study Area

The study areas for the desk review and field surveys were identified through considering the nature i.e. a linear underground cable, the size and location of the Proposed Development (mostly in the public road) and the ecological features likely, or known, to be present. The experience gained from working on similar linear infrastructure, in particular underground cables, was also used to determine that the study area chosen was both sufficiently sized and proportionate for the project.

The study area for the field surveys includes all lands within the Proposed Development as shown by the redline boundary in **Figure 6-1**. This study area was used for all terrestrial ecology surveys with the exception of badger where the study area was extended by 50 m either side of the redline boundary. Incidental sightings of birds, mammals or amphibians were noted during the field surveys. Trees or and structures that may provide suitable locations for bat roosts and potential suitable bat foraging habitat were also noted during the survey.

#### 6.2.1.2 Zone of Influence

The following were considered when identifying the potential Zone Of Influence (ZOI) of the Proposed Development:

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

#### 6.2.1.3 Consultation

The following statutory and non-statutory bodies were consulted in relation to the proposed project:

- National Parks and Wildlife Service (NPWS);
- An Taisce;
- Dept of Communications, Climate Action and Environment;
- Dept of Culture Heritage and the Gaeltacht;
- Inland Fisheries Ireland (IFI);
- Bat Conservation Ireland (BCI);
- BirdWatch Ireland; and
- Irish Wildlife Trust.

Responses can be viewed in **Chapter 1** Introduction of the EIAR.

## 6.2.2 Desktop Study

The assessment of the Proposed Development site began with a desk study of available published data on sites designated for nature conservation, other ecologically sensitive sites, habitats and species of interest in the vicinity of the proposed project. Aquatic ecological assessments in 2019, as completed for the grid connection associated with the Carrownagowan Wind Farm (permitted) were reviewed. The grid connection component of the Carrownagowan Wind Farm largely corresponds to the footprint of the Proposed Development, so field data collated in 2019 is considered relevant to the current assessment given that conditions in the intervening period remain largely unchanged, noting that field surveys for both assessments were carried out by the same ecologist and that water quality in the receiving waterbodies has not changed significantly (based on EPA biological water quality data). The desk study included a review of the following;

- Ordnance Survey Ireland (OSI) aerial photography and 1:50000 mapping;
- NPWS online datasets and literature;
- National Biodiversity Data Centre (NBDC) online mapping; and
- BCI.

## 6.2.3 Field Surveys

Ecological surveys were completed using a combination of walkover and driven surveys to provide a comprehensive overview of the baseline ecology in the study area. These multi-disciplinary surveys were carried out on the 2<sup>nd</sup> and 3<sup>rd</sup> August 2022. Following amendment and finalisation of the site layout, relevant sections of the study area were re-surveyed on 9<sup>th</sup> November 2022, 4<sup>th</sup> April and 16<sup>th</sup> June 2023. Site visits and surveys were carried out in suitable weather conditions following best practice and in the expert opinion of the author, are considered sufficient to assess all potential significant ecological effects associated with the project. Habitats were classified in-field following the Heritage Council Publication A Guide to Habitats in Ireland (Fossitt, 2000). Given that the habitats potentially affected by the Proposed Development are commonly occurring with a broad geographic distribution, specific detailed surveys for particular plant groups were not considered necessary.

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

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

### 6.2.3.1 Aquatic ecology

The survey comprised an evaluation of aquatic habitats, a fish survey, and a biotic assessment using aquatic macroinvertebrates (see **Table 6-1** and **Figure 6-1** for locations). These surveys were carried out in 2019.

**Table 6-1 Aquatic ecology and fish survey locations on watercourses draining the Proposed Development.**

Hydrometric Area/River Basin	River Catchment	Tributary - Sub-tributary / EPA Code	Stream Order	Location	EPA River Segment code	Site No.	Co-ordinate		Survey			
							X	Y	Fish habitat	Fish survey	Biochemical	Physico-chemical
27 / Coastal	Owengarney	Broadford / 27B02	2	Ballymoloney	27_1315	1	562353	670797	✓	✓		
		Broadford / 27B02 - Kilbane Stream 27K05	2	Ballymoloney	27_849	2	561986	672642	✓	✓		
		Broadford / 27B02 – Cloongaheen East 27C18	2	Ballymoloney	27_744	3	560688	672951	✓	✓		
		Broadford / 27B02	3	Track crossing ca. 1km upstream of Broadford, adjacent to R466	25_481	4	558178	672321	✓	✓	✓	✓
15 / Shannon Lower	Shannon	Glenomra Wood Stream / 25G12	3	R471 Bridge	25_3221	5	559987	665892	✓	✓		
		Blackwater (Clare) / 25B06	3	R465 Bridge, Br. d/s Killaly's Br.	25_3209	6	559336	665588	✓	✓	✓	✓





Figure 6-1 Watercourses and survey sites examined

## 6.2.4 Assessment Criteria

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

### 6.2.4.1 Evaluation

Guidance on Ecological Impact Assessment (CIEEM, 2018) recommends categories of nature conservation value that relate to a geographical framework (International, through to Local). The evaluation set out in this chapter and the assessment of the effects of the Proposed Development follows methodologies set out in 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (NRA, 2009). The guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned based on the importance of any

particular ecological receptor. The guidelines provide a basis for determination of whether any particular site, habitat, or species is of importance on the following scales:

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

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

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

The significance of an effect is determined by way of professional judgement and the use of EPA criteria for assessing impact EPA (2022). The criteria for assessing quality of impacts and significance of effects are set out in **Table 6-2**.

**Table 6-2 Criteria for assessing impacts based on CIEEM (2019) & (EPA, 2022)**

Parameter	Description
Direction (Quality)	Positive: A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral: No impacts or impact that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative: A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Magnitude	Imperceptible      An effect capable of measurement but without significant consequences.
	Not significant      An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight      An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate      An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant      An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant      An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound      An effect which obliterates sensitive characteristics
Extent	The area over which an impact occurs.
Duration	Momentary – effects lasting from seconds to minutes Brief – effects lasting less than a day Temporary – effects lasting less than a year Short-term – effects lasting 1 to 7 years Medium term – effects lasting 7 to 15 years



Parameter	Description
	Long term – effects lasting 15 to 60 years Permanent – effects lasting over 60 years
Reversibility	Irreversible impacts: permanent changes from which recovery is not possible within a reasonable time scale or for which there is no reasonable chance of action being taken to reverse it. Reversible impact: temporary changes in which spontaneous recovery is possible or for which effective mitigation (avoidance/cancellation/reduction of effect) or compensation (offset/recompense/offer benefit) is possible.
Frequency and timing	Frequency – How often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)

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

### 6.2.4.2 Significance

Significance is a concept related to the weight that should be attached to effects when decisions are made. For the purpose of EclA, a ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ or for biodiversity in general. To determine ecologically significant effects, criteria in CIEEM (2019) was used, as outlined in **Table 6-3**.

**Table 6-3 Determining ecologically significant effects KERs (adapted from CIEEM, 2018)**

KER	Determining ecologically significant effects	Consideration should be given to whether:	Notes
Sites Designated for Nature Conservation	Is the project and associated activities likely to undermine the conservation objectives of the site, or positively or negatively affect the conservation status of species or habitats for which the site is designated, or may it have positive or negative effects on the condition of the site or its interest/qualifying features?	<ul style="list-style-type: none"> <li>any processes or key characteristics will be removed or changed</li> <li>there will be an effect on the nature, extent, structure and function of component habitats</li> <li>there is an effect on the average population size and viability of component species.</li> </ul>	<ul style="list-style-type: none"> <li>Consideration of functions and processes acting outside the formal boundary of a designated site is required, particularly where a site falls within a wider ecosystem e.g. groundwater dependent terrestrial ecosystems can be damaged where the proposed activity impacts on the quantity or quality of groundwater that feeds these habitats. Predictions should always consider wider ecosystem processes.</li> <li>Many ecosystems have a degree of resilience to perturbation that allows them to tolerate some biophysical change. Ecological effects should be considered in the light of any information available or reasonably obtainable about the capacity of ecosystems to accommodate change.</li> </ul>
Habitats	Consideration of conservation status is important for evaluating the effects of impacts on individual habitats and species and assessing their significance	Conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area	<ul style="list-style-type: none"> <li>In many cases (e.g. for species and habitats of principal importance for biodiversity), there may be an existing statement of the conservation status of a feature and objectives and targets against which the effect can be judged. However, not all species or habitats will be described in this way and the conservation status of each feature being assessed may need to be agreed with the relevant statutory nature conservation body and set out in the EclA. The conservation status of a habitat or</li> </ul>



KER	Determining ecologically significant effects	Consideration should be given to whether:	Notes
			species will vary depending on the geographical frame of reference.
Species		Conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.	<ul style="list-style-type: none"> <li>When assessing potential effects on conservation status, the known or likely background trends and variations in status should be taken into account. The level of ecological resilience or likely level of ecological conditions that would allow the population of a species or area of habitat to continue to exist at a given level, or continue to increase along an existing trend or reduce a decreasing trend, should also be estimated.</li> </ul>

### 6.2.4.3 Cumulative Effects

Potential cumulative impacts of the Proposed Development in combination with other developments and activities have been assessed. A cumulative impact arises from incremental changes caused by other past, present or reasonably foreseeable actions together with the Proposed Development. The list of cumulative developments considered in the EIAR is provided in **Appendix 1-5**, Volume III,.

### 6.2.5 Limitations

The Proposed Development is linear and 25km long, mainly along public roadways. All areas directly affected could be accessed. It is considered that there were no constraints to the surveys, as the surveys were coordinated, carried out in suitable weather conditions and focused on areas of potentially suitable habitat for protected flora and fauna species.

### 6.2.6 Project Team

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

## 6.3 Baseline Environment

### 6.3.1 Sites Designated for Nature Conservation

Sites designated for nature conservation within the ZOI of the Proposed Development are illustrated in **Figure 6-3**. Sites designated for nature conservation within the ZOI of the Proposed Development are listed in **Table 6-4**, along with their qualifying features and distance from the Proposed Development.

Special Areas of Conservation (SAC) are designated under the Conservation of Natural Habitats and of Wild Fauna and Flora Directive 92/43/EEC (“Habitats Directive”). Special Protection Areas (SPA) are classified under Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (“Birds Directive”). The European Communities (Birds and Natural Habitats Regulations 2011 (S. I. No. 477 of 2011) transpose the Habitats Directive and the Birds Directive.

Slieve Bernagh Bog SAC is one the two SACs considered within the ZOI as it lies adjacent to the northern section of the Proposed Development site. The other SAC considered within the ZOI is Glenomra Wood SAC as it is intersected by the Proposed Development.

No SPA sites, including RAMSAR<sup>1</sup> sites, have been included in the ZOI due to the nature of the Proposed Development and the separation distance. For example, the nearest SPA is the River Shannon and River Fergus SPA located 4.8km south-west of the Proposed Development. There is no reasonably foreseeable means by which any indirect impacts could affect the special conservation interests (SCI) of this site, noting that the only such potential mechanism is via water quality degradation. There are no Nature Reserves within the ZOI. The nearest such site is Caher (Murphy) Nature Reserve, located north-east of Lough Greaney in north Co. Clare.

Sites of National Importance in the Republic of Ireland are Natural Heritage Areas (NHA) and proposed Natural Heritage Areas (pNHA). Proposed NHA (pNHA) were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. Prior to statutory designation, pNHA are subject to limited protection while under the Wildlife Amendment Act (2000) NHA are legally protected from damage from the date they are formally proposed for designation.

Doon Lough NHA has been selected for peatland habitats, this site lying ca. 1.4km to west of the Proposed Development. These habitats would not be affected with regard to the size, scale and duration of the Proposed Development.

The sites within the ZOI are listed in **Table 9-4**, presented in **Figure 6-3** and discussed in more detail below.

### **Slieve Bernagh Bog SAC**

Slieve Bernagh Bog SAC comprises three areas. The Proposed Development is nearest to the southern component of the SAC, which extends from Lough Avullig, in the west, to Moylussa, in the east, and is dominated by mountain blanket bog of varying peat depth and condition. There will be no direct impacts on this SAC as the Proposed Development is outside the bog. The closest part of the Proposed Development to Slieve Bernagh Bog SAC is in the townland of Killokennedy where the SAC lies >5 m to the south of the existing road/track. Cable installation will occur largely within the corridor of the road/track which lies to the west of the SAC.

### **Glenomra Wood SAC and pNHA**

The Proposed Development site is within the road curtilage which currently bisects the SAC from east to west. Approximately 350m of the public road is encompassed within the SAC boundary.

The Old Oak Woodland habitat occurs immediately adjacent to the public road in this location and there is no obvious road verge. The identified threats and pressures for this SAC are grazing and installation of electricity and phone lines, which require tree felling and clearance of understory vegetation. There will be no requirement for tree felling or clearance of understory vegetation. There is no capacity in the road verge to facilitate installation of joint bays or for parking and storing of construction equipment. For that reason all works will be within the footprint of the road and existing passing bays and entrances will be used for joint bays and parking.

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<sup>1</sup> Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat – international treaty for the sustainable use and conservation of wetlands

A review was undertaken of the NPWS Habitat Directive Article 17 datasets. The Annex I habitat is old sessile oak woods with *Ilex* and *Blechnum* of the British Isles, within Glenomra Wood SAC. The section of the Proposed Development within Glenomra Wood SAC is located on a public road, so there will be no requirement for removal or any disturbance of this Annex I habitat.

**Table 6-4 Sites Designated for Nature Conservation within the ZOI.**

Designated Site	Qualifying features of conservation interest	Distance from the site
<b>SAC Sites</b>		
Slieve Bernagh Bog SAC	Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] European dry heaths [4030] Blanket bogs (* if active bog) [7130]	Adjacent to the Proposed Development site (northern section)
Glenomra Wood SAC (001013)	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]	Grid connection intersects SAC along public road

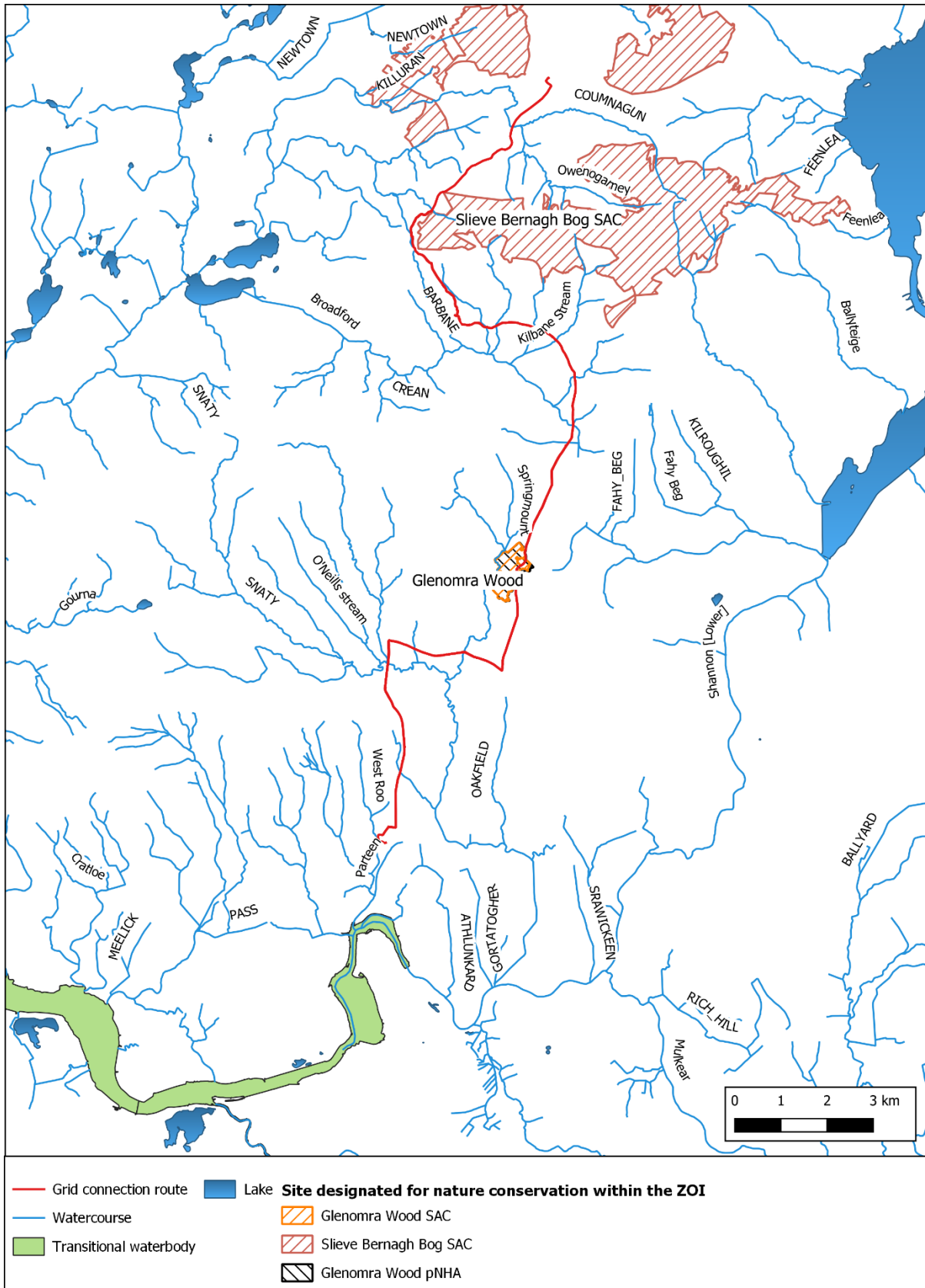


Figure 6-2 Sites designated for nature conservation within the ZOI of the Proposed Development site

### 6.3.2 Habitats

The Proposed Development runs under the public road from the permitted Carrownagowan substation to the substation at Ardnacrusa. The proposed works will be largely confined to existing access tracks and public roads, with the exception of short sections of recently felled woodland, degraded blanket bog and agricultural lands at the northern extent of the Proposed Development site. Roadside maintenance is obvious throughout, with drains being deepened and roadside hedgerows being cut back, this practice reducing ecological value.

#### 6.3.2.1 Upland blanket bog (PB2)

The Proposed Development traverses approximately 40m of peatland classified as upland blanket bog in the northern section of the Proposed Development site, south of permitted T1 location. The area affected is largely surrounded by conifer plantation until this woodland was recently felled. An access track bounds this area of bog to the north. It slopes down to the west where it is bounded by an area of harvested commercial forestry. This portion of bog was previously drained and as such, the hydrological regime of this peatland has been significantly altered by forestry and other developments and it is degraded example of bog habitat. An area of ca. 200m<sup>2</sup> (40m X 4m) of this habitat will be directly affected. It is evaluated as being of local importance (higher value).

#### 6.3.2.2 Buildings and artificial surfaces (BL3)

At the northern extent of the Proposed Development, an access track (BL3) is installed within conifer plantation (WD4) and peatland (PB) within the permitted wind farm site. To the south, the access track lies within agricultural grassland (GA1). From the access track, the Proposed Development will be installed mostly within the network of local and regional roads which are classified as buildings and artificial surfaces. These habitats are bounded by hedgerow (WL1), treeline (WL2), and improved grassland (GA1).



**Plate 6-1 Artificial surface (road), grassy verges and treeline within and next to the Proposed Development (left). Recently felled woodland and upland blanket bog intersected by the Proposed Development (right).**

#### 6.3.2.3 Conifer plantation (WD4)

Conifer plantation comprising sitka spruce *Picea sitchensis* occurs near the northern end of the Proposed Development. This woodland occurs on peatland where the hydrological regime has been negatively affected by drainage and is species poor. This habitat is evaluated as being of local importance (lower value).

#### 6.3.2.4 Recently felled woodland (WS5)

Sitka spruce woodland has been clear-felled occurs along a section of the northern extent of the Proposed Development. Approximately 50 m of the grid connection is located within this habitat. Some young



Rhododendron plants were recorded in this habitat. This habitat is commonly occurring with a low diversity of floral species is evaluated as being of local importance (lower value).

#### 6.3.2.5 Hedgerow (WL1) / treeline (WL2)

The general landscape of the study area is dominated by agricultural grassland pasture associated with hedgerows and treelines. These habitats comprise linear strips of, often with frequent trees (mostly whitethorn *Crataegus monogyna* and ash *Fraxinus excelsior*) which typically form field or property boundaries. This habitat is evaluated as being of local importance (higher value).

#### 6.3.2.6 Grassy verges (GS2)

Some grassy verges (GS2), up to 1m wide line the public road network where the Proposed Development occurs on local roads. This habitat is common throughout Ireland, it is regularly disturbed and is evaluated as being of local importance (lower value).

#### 6.3.2.7 Earth banks (BL2)

Earth banks are a common type of field boundary in many parts of Ireland. Constructed from local materials such as peat, earth, gravel or stone, these narrow linear ridges are often bordered by drainage ditches. Most were completely vegetated and feature elements of a range of grassland, hedgerow and scrub. This habitat is regularly disturbed by maintenance and is evaluated as being of local importance (lower value).

#### 6.3.2.8 Eroding/upland river (FW1)

The Proposed Development crosses a number of stream and river crossings. These watercourses are fast flowing and of high gradient so are classified as eroding/upland rivers. The northern proportion of the Proposed Development site lies within the Broadford River catchment. The southern extent of the Proposed Development occurs within the Blackwater (Clare) River catchment. The largest tributary of the Blackwater River is the 3<sup>rd</sup> order Glenomra Wood Stream (EPA Code: 25G12) which joins the Blackwater River from the north. The Proposed Development will traverse the River Blackwater (Clare) (EPA Code: 25M03) near Trough Bridge, and the stream near Ahnagor Bridge (EPA Code: 27B02), the Cloonconry Beg stream (EPA Code: 27C17), the Kilbane Stream (EPA Code: 27K05) and the Kilbane stream (EPA Code: 27K13). The fluvial habitats crossed by the Proposed Development are evaluated as being of local importance (higher value).

#### 6.3.2.9 Improved agricultural grassland (GA1)

This habitat occurs in fields adjacent to and within the Proposed Development site. This habitat occurs throughout Ireland, is species-poor and intensively managed. This habitat is evaluated as being of local importance (lower value).

### 6.3.3 Invasive Alien Species

Searches of the NBDC for Invasive species was carried out for any documented records of non-native plant species listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015).

Documented records of High Flora Impact species in R67 include curly waterweed (*Lagarosiphon major*), Canadian waterweed (*Elodea canadensis*), Nuttall's waterweed (*Elodea nuttallii*) and Japanese knotweed (*Fallopia japonica*). Records of Medium Flora Impact species listed on the Third Schedule include water fern (*Azolla filiculoides*) and Himalayan knotweed (*Persicaria wallichii*).

Documented records of High Flora Impact species Regulation (Ireland) in R57 include Japanese knotweed and Indian balsam (*Impatiens glandulifera*). Records of Medium Flora Impact species listed on the Third Schedule include Himalayan knotweed and *Rhododendron ponticum*.

#### 6.3.3.1 Field Survey Results

Five species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011, (as amended) were recorded within the study area, namely Himalayan knotweed, *Rhododendron*, Japanese knotweed, cherry laurel (*Prunus laurocerasus*) and giant rhubarb (*Gunnera tinctoria & manicata*).

Japanese knotweed, Himalayan knotweed and giant rhubarb occur in hedgerows, roadside verges, watercourse banks and areas of disturbed ground bounding the Proposed Development. **Figure 6-4** shows the locations of invasive species identified during surveys. These locations are provided in **Table 6-5**.

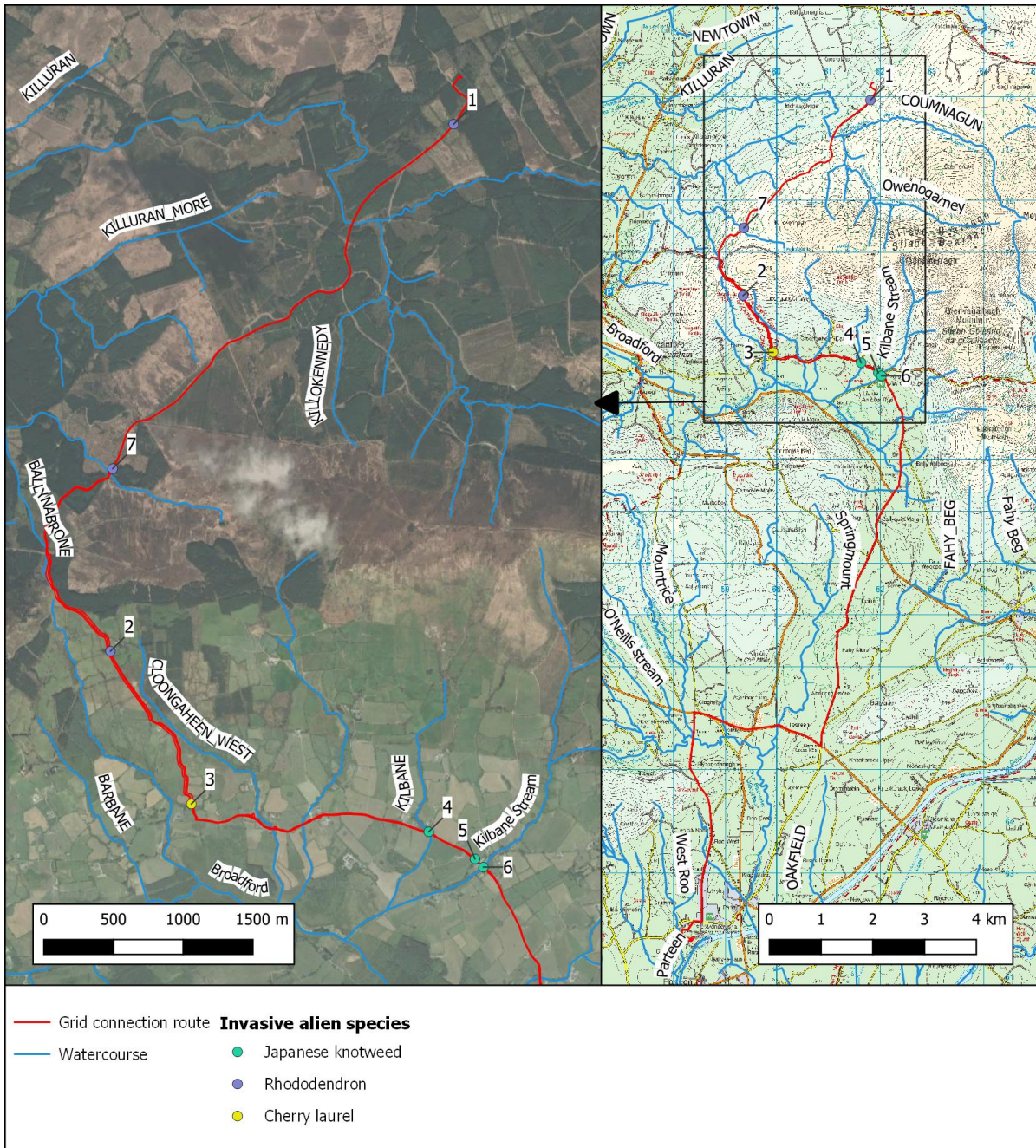


Figure 6-3 Invasive species survey results

Table 6-5 Invasive species survey results

Site	Species	Comments	X	Y
1	Himalayan Knotweed	Stand size is ca. 10m X 15m, located at junction towards northern end of the site, in footprint of substation. This stand was growing on a slightly raised mound.	561881	678177
1	Rhododendron	Infestation on both sides of access track. Mature dense stand going down into ravine on northern side of access track. 10m X 20m, 4 plants on southern side of road.	561771	677972
2	Rhododendron	Mature tree recently flailed	559309	674193

Site	Species	Comments	X	Y
3	Cherry laurel	Mature tree	559890	673097
4	Japanese Knotweed	Set back from north side of road by ca. 2m. Stand ca. 3m x 2m	561592	672897
5	Japanese Knotweed	Adjacent to north side of road along a length of ca. 10m	561924	672702
6	Japanese Knotweed	Boths sides of road adjacent to watercourse	561985	672644
7	Rhododendron	Some young plants in line with the cable route through recently felled woodland (WS5)	559325	675502

## 6.3.4 Mammals

### 6.3.4.1 Desk Study

Information received from the NPWS data request for rare and protected species was reviewed. A number of protected native mammal species are recorded from the hectads overlapping the Proposed Development (see Table 6-6 Table 6-6below).

Table 6-6 Non-volant mammal records in the study area (source NBDC).

Species name	Common name	10km grid square (portion of Proposed Development site within square)				Level of protection
		R57 (northwest)	R67 (northeast)	R56 (southwest)	R66 (southeast)	
<i>Lutra lutra</i>	Otter	✓	✓	✓	✓	Annex II & IV, Wildlife Acts
<i>Meles meles</i>	Badger	✓	✓	✓	✓	Wildlife Acts
<i>Martes martes</i>	Pine marten	✓	✓	✓	✓	Annex V, Wildlife Acts
<i>Mustela erminea subsp. hibernica</i>	Stoat	✓	✓	✓		Wildlife Acts
<i>Mustela vison</i>	Mink		✓	✓	✓	Not protected - Invasive Species
<i>Sciurus vulgaris</i>	Red Squirrel	✓	✓	✓	✓	Wildlife Acts
<i>Lepus timidus subsp. hibernicus</i>	Irish Mountain hare	✓	✓	✓	✓	Wildlife Acts
<i>Erinaceus europaeus</i>	Hedgehog		✓	✓	✓	Wildlife Acts
<i>Myodes glareolus</i>	Bank vole	✓	✓	✓	✓	Not protected - Invasive Species
<i>Sorex minutus</i>	Pygmy Shrew	✓	✓	✓	✓	Wildlife Acts
<i>Sus scrofa</i>	Wild Boar		✓	✓		Not protected - Invasive Species
<i>Cervus elaphus</i>	Red Deer		✓			Wildlife Acts
<i>Dama dama</i>	Fallow Deer	✓	✓	✓	✓	Wildlife Acts

### Field Study

Badger setts were not recorded within the study area. Evidence of badger activity, in the form of snuffle holes, was detected at the northern extent of the Proposed Development where the Proposed Development traverses agricultural land. No other evidence of badger was recorded within 50m of the Proposed Development in this



area so it was considered that dwellings of this species did not occur within the ZOI. There is ample habitat for pine marten and red squirrel in the wooded areas that occur at the northern extent of the Proposed Development and at Glenomra Wood. However, there were no signs of either species recorded within the study area. There was no evidence of otter recorded within the study area. The streams crossed by the Proposed Development site are not considered suitable for breeding and / or foraging otter as they are small watercourses that are not likely to support fish in numbers that would make it energetically feasible for hunting otter. The Blackwater River is crossed by the Proposed Development and is considered likely to be used by foraging otter as it holds a good stock of fish. Likewise, stoat and hare are likely to occur in the environs of the Proposed Development site but no direct observations or evidence of same was recorded.

Badger, pine marten, stoat, hare, red squirrel and other animals known to occur in the wider area (as per desk study) are evaluated as being of local importance (lower value) in the context of the Proposed Development site. While these animals likely utilise/traverse the Proposed Development site occasionally, it is of no particular importance to this group of fauna.

### 6.3.5 Birds

#### 6.3.5.1 Desk study

The bird records for those species of highest conservation concern from the 10km grid squares where the Proposed Development will be located are presented in **Table 6-7**.

**Table 6-7 Records of bird species of highest conservation concern in the study area (from the Bird Atlas 2007-11, Balmer et al., 2013)**

Species	Winter Atlas 07-11 Hectad R57/R67	Breeding Atlas 07-11 Hectad R57/R67	Conservation Status
Hen harrier	Present	Probable	Annex I EU Birds Directive
Peregrine falcon	Absent	Probable	Annex I EU Birds Directive
Corncrake	Absent	Present	Annex I EU Birds Directive, BOCCI Red Listed
Whooper swan	Present	Absent	Annex I EU Birds Directive
Golden plover	Present	Absent	Annex I EU Birds Directive, BOCCI Red Listed
Dunlin	Present	Absent	Annex I EU Birds Directive
Lapwing	Present	Absent	BOCCI Red Listed
Curlew	Present	Absent	BOCCI Red Listed
Redshank	Present	Absent	BOCCI Red Listed
Goldeneye	Present	Present	BOCCI Red Listed, SCI of SPA within Zone of Influence
Tufted duck	Present	Probable	BOCCI Red Listed, SCI of SPA within Zone of Influence
Pochard	Present	Absent	BOCCI Red Listed



Species	Winter Atlas 07-11 Hectad R57/R67	Breeding Atlas 07-11 Hectad R57/R67	Conservation Status
Shoveler	Present	Absent	BOCCI Red Listed
Black-headed gull	Present	Present	BOCCI Red Listed
Herring gull	Absent	Present	BOCCI Red Listed
Woodcock	Present	Absent	BOCCI Red Listed
Red grouse	Present	Probable	BOCCI Red Listed
Kingfisher	Present	Probable	Annex I EU Birds Directive
Common tern	Absent	Confirmed	Annex I EU Birds Directive
Grey wagtail	Present	Confirmed	BOCCI Red Listed
Meadow pipit	Present	Confirmed	BOCCI Red Listed

### 6.3.5.2 Field study

The treeline and hedgerow habitats, as well the wooded areas adjacent to the Proposed Development provide feeding and nesting habitats for birds. The undersides of the bridges along the route provide dry conditions, and birds may also use these areas for nesting. Birds recorded during the survey on the 14<sup>th</sup> April 2023 of the Proposed Development site included the following species robin (*Erithacus rubecula*), wren (*Troglodytes troglodytes*) goldcrest (*Regulus regulus*), great tit (*Parus major*), grey heron (*Ardea cinerea*), common starling (*Sturnus vulgaris*) and raven (*Corvus corax*).

The habitat suitable for breeding birds is limited to adjacent hedgerow, treeline and scrub as most of the habitat within the Proposed Development is road and track. Avifauna are evaluated as being of local importance (lower value).

## 6.3.6 Amphibians and Reptiles

### 6.3.6.1 Desk Study

There are a number of records of common frog (*Rana temporaria*) within the 10 km grid squares covering the Proposed Development site. There is a single record of Smooth Newt (*Lissotriton vulgaris*) made within the 10km grid square R66 (NBDC, 2020).

### 6.3.6.2 Field Surveys

There are no habitats within the study area suitable to support breeding amphibians and reptiles. However, the drainage ditches running along the edge of some forest roads do offer some suitable breeding habitat for common frog.

This group is evaluated as being of local importance (lower value).

## 6.3.7 Invertebrates

### 6.3.7.1 Desk Study

NBDC holds records of marsh fritillary *Euphydryas aurinia* butterfly in the study area, a species listed under Annex II of the EU Habitats Directive. There is no suitable marsh fritillary habitat along the Proposed Development route.

There are no records of white-clawed crayfish *Austropotamobius pallipes* in the study area. This species is not expected to occur in the watercourses draining the Proposed Development, considering the siliceous underlying geology.

### 6.3.7.2 Field Study

Macroinvertebrates recorded during biological sampling on representative watercourses draining the Proposed Development during August 2019 are presented in **Appendix 6-2**. The EPA carried out biological monitoring at various locations, including the Owenagarney and Blackwater Rivers in the study area in 2019 and 2021 respectively. The water quality ratings achieved (good – high) are consistent with the macroinvertebrates results in **Appendix 6-2**, so it can be expected that the benthic communities in the receiving watercourse are broadly similar to those recorded in the 2019 study. This group is evaluated as being of local importance (higher value).

## 6.3.8 Fish

### 6.3.8.1 Desk Study

Two sites were electric fished on the Broadford River as part of the Water Framework Directive (WFD) surveillance monitoring programme in rivers 2013 (Kelly *et al.* 2014)<sup>2</sup>, this watercourse draining the northern extent of the Proposed Development. One of these site located ca. 600m upstream of Doon Lough and another at Broadford village.. Six fish species were recorded in the Broadford River (Doon Lough) site. Gudgeon was the most abundant species recorded, followed by salmon *Salmo salar*, perch *Perca fluviatilis*, brown trout *S. trutta*, three-spined stickleback *Gasterosteus aculeatus* and minnow *Phoxinus phoxinus*. Three fish species were recorded in Broadford River (Broadford Village) site during the 2013 survey. Brown trout was the most abundant species recorded, followed by salmon and European eel..

### 6.3.8.2 Field Study

**Table 6-9** gives the habitat rating of the Broadford and Blackwater Rivers and the Glenomra Wood Stream, which were examined with reference to salmonid habitats. The other streams in the study area are generally too small to be of any significant importance to fish, many which dry out during the summer after spells of dry weather. The larger watercourses in the study area (Counnagun and Springmount Streams, Broadford and Blackwater Rivers) are evaluated as being of local importance (higher value) as they have the capacity to continuously support fish. The smaller watercourses are evaluated as being of local importance (lower value) as they are ephemeral in nature (prone to drying out).

**Table 6-8 Habitat rating at the sites examined on selected watercourses draining the Proposed Development site.**

Sub-catchment	Site	Watercourse	Spawning		Nursery		Holding	
			Habitat grade1	fluvial cover2 (≈%)	Habitat grade1	fluvial cover2 (≈%)	Habitat grade1	fluvial cover2 (≈%)
Owengarney	4	Broadford	2-3	20	2-3	45	3-4	30
	5	Glenomra Wood Stream	1-2	15	2	50	3	20
Annacarriga	6	Blackwater	1	10	1-2	60	2-3	25

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

<sup>2</sup> [http://wfdfish.ie/wp-content/uploads/2013/08/SHIRBD\\_rivers\\_report\\_2013.pdf](http://wfdfish.ie/wp-content/uploads/2013/08/SHIRBD_rivers_report_2013.pdf)

<sup>1</sup>Grade 1 is optimal habitat and habitat quality reduces with increases in Grade (Grade 4 = poor)

<sup>2</sup>Fluvial cover relates to river substrate under water and available to fish

## 6.4 Identification and Evaluation of Key Ecological Receptors

The habitats and associated flora, fauna and other ecological features or resources identified in **Section 6.4** are now evaluated on the basis of their local, national and international conservation importance using the evaluation criteria described in **Section 6.2.4.2** above. Secondly, on the basis of these evaluations an assessment will then be made as to which of these habitats or species are considered sensitive ecological receptors that may be effected upon during the proposed construction, operation or decommissioning phase of the project.

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

### 6.4.1 Designated Sites

With regard to European Sites, a screening for appropriate assessment was prepared, to determine, on the basis of a preliminary assessment and objective criteria, whether the Proposed Development, alone or in-combination with other plans or projects, could have significant effects on a Natura 2000 site in view of the site’s conservation objectives. The screening for appropriate assessment report concluded that it can be excluded, on the basis of objective information, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on a European site.

NHAs or pNHAs not considered as KERS, and will not be considered further. Considering the Features of Interest these sites protect, they have been excluded from further assessment due to distance and lack of connectivity to the Proposed Development. Where the NHA and pNHA sites are covered within the same boundary line of the European Sites, the potential for effects are assessed in the report for appropriate assessment screening. The selection of sites designated for nature conservation in the ZOI of the Proposed Development as KERS is provided in **Table 6-9**.

**Table 6-9 Selection of sites designated for nature conservation in the ZOI of the Proposed Development as KERS**

Site designated for nature conservation	Distance from designated site to Proposed Development	KER (Yes/No)	Assessment of pathways for Effect/Rationale for exclusion
Slieve Bernagh Bog SAC	Adjacent to the Proposed Development site (northern section)	No	<p>Not considered likely to be impacted by the Proposed Development. The QI’s of this SAC are Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010], European dry heaths [4030] and Blanket bogs (* if active bog) [7130]. There will be no removal of QI habitat from the SAC. These habitats within the SAC are located upslope of the Proposed Development so there is no potential for surface water emissions to impact on habitats within the SAC.</p> <p>The ground between the Proposed Development and Slieve Bernagh Bog SAC has already been cleared of topsoil (peat) and denuded down to the parent material. The Proposed Development will be highly unlikely to have any further negative influence on the hydrology of the bog. It is important to note also that within the SAC, the nearest peat habitat to the proposed grid connection route is ca. 10m, as some of the peat has been removed. It is concluded that there will be no hydrological changes to any peat habitats within the SAC and therefore, the conservation status of habitats of conservation</p>

Site designated for nature conservation	Distance from designated site to Proposed Development	KER (Yes/No)	Assessment of pathways for Effect/Rationale for exclusion
			value in the SAC will not be adversely affected by the Proposed Development.
Glenomra Wood SAC and pNHA	Within the Proposed Development site	No	<p>Not considered likely to be impacted by the Proposed Development. The Proposed Development site is within the road curtilage which currently bisects the SAC from east to west. Approximately 350m of the public road is encompassed within the SAC boundary. The SAC is delineated by a fence line separating the woodland from the public road. Any interaction between the construction works and the roadside vegetation will be incidental and will not have the potential to cause a significant effect to the conservation of area, composition, structure or function of the QI woodland habitat as identified in the site Conservation Objectives. Works will be contained within the curtilage of the road, and there will be no encroachment into the woodland habitat beyond the fence-line boundary.</p> <p>The Glenomra Wood stream located c.480m to the west which is separated from the road by the woodland and agricultural lands, drains the SAC. As the grid route will be constructed along the public road, the existing drainage regimes associated with the SAC will not be altered and there will be no pollution pathways to this watercourse from the grid route works to the east. There will be no spatial overlap with QI habitats or associated habitats/species of the SAC.</p> <p>It is concluded that the potential for significant habitat loss/alteration effects, disturbance/displacement effects, habitat or species fragmentation effects or water quality/resource effects on this SAC can be excluded.</p>

### 6.4.2 Habitats

Table 6-10 presents an evaluation of the importance value of the habitats identified within the receiving environment of the subject site, and rationale for inclusion, or exclusion as a KER.

**Table 6-10 Evaluation of habitats within the study area**

Habitat type	Ecological value relative to study area (NRA, 2009)	Key Ecological Receptor (Y/N)	Rationale
Eroding/upland river (FW1) (larger watercourses: Coumnagun and Springmount Streams, Broadford and Blackwater Rivers)	Local importance (higher value)	Yes	Potential for runoff and water quality impacts via preferential flow pathways. Supports some aquatic species of high conservation importance, habitat not common in the local context
Eroding/upland rivers (FW1) (smaller/ephemeral watercourses)	Local importance (lower value)	No	Prone to drying out, unstable benthic community
Buildings and artificial surfaces (BL3)	Local importance (lower value)	No	Artificial habitat of limited biodiversity value
Improved agricultural grassland (GA1)	Local importance (lower value)	No	Modified and intensively managed habitat. Species-poor
Grassy verges (GS2)	Local importance (lower value)	No	Modified and intensively managed habitat. Species-poor
Earth banks (BL2)	Local importance (lower value)	No	Modified and intensively managed habitat. Species-poor.

Habitat type	Ecological value relative to study area (NRA, 2009)	Key Ecological Receptor (Y/N)	Rationale
Conifer plantation (WD4)	Local importance (lower value)	No	Modified and intensively managed habitat. Species-poor
Hedgerow (WL1) / treeline (WL2)	Local importance (higher value)	Yes	Supports some species of high conservation importance, potentially including bats and protected non-volant mammals
Upland blanket bog (PB2)	Local importance (higher value)	Yes	Proposed Development will have direct impacts on this habitat of Intrinsic of high conservation importance
Oak woodland (WN1)	International Importance	No	Habitat not affected
Mixed broadleaved / conifer woodland (WD2)	Local importance (higher value)	Yes	Supports some species of high conservation importance, potentially including protected non-volant mammals

### 6.4.3 Fauna

Table 6-11 presents an evaluation of the importance value of the fauna identified within the receiving environment of the subject site, and rationale for inclusion, or exclusion as a KER.

Table 6-11 Evaluation of habitats within the study area

Species	Legislative Protection	Evaluation	Key Ecological Receptor	Rationale
European Otter ( <i>L. lutra</i> )	Wildlife Acts, Annex II & IV of EU Habitats Directive	Local Importance (Higher value)	Yes	The species was not recorded on site but likely uses the Broadford and Blackwater Rivers within the ZOI. This species is dependent on fish which require good water quality, an attribute potentially affected at the local level by the works proposed.
Birds	Wildlife Acts	Local Importance (lower value)	No	No particularly important nesting habitat of birds, Birds adjacent to the Proposed Development are considered habituated to on-going activities associated with roads.
Aquatic macroinvertebrates	Various	Local Importance (higher value)	Yes	Potential for runoff and water quality impacts via preferential flow pathways. Support fish in some watercourses draining the Proposed Development site.
Brown trout ( <i>S. trutta</i> )	None	Local Importance (higher value)	Yes	Species present in the larger watercourses draining the Proposed Development, prey item for otter and heron
Salmon	Annex II of EU Habitats Directive	Local Importance (higher value)	No	Species present in the larger watercourses draining the Proposed Development, outside the ZOI
Other fish populations: minnow ( <i>P. phoxinus</i> ), 3-spine stickleback	None	Local Importance (lower value)	No	Common species present in the larger watercourses draining the Proposed Development



#### 6.4.4 Invasive alien species

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

### 6.5 Assessment of Impacts and Effects

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

#### 6.5.1 Construction Phase

The construction phase of the Proposed Development could result in:

- Temporary alteration of habitats during the installation of ducting;
- Indirect impacts due to increased noise and vibration causing disturbance, and or displacement effects of small mammals as a result of construction activities;
- Indirect water quality impacts on surface waters with negative effects Pollution of rivers and streams; and
- Spread of invasive species.

##### 6.5.1.1 Habitats

###### Habitat Loss

The Proposed Development will be mainly confined to existing forestry track and the public road network, except where it will traverse degraded upland blanket bog, conifer plantation, recently felled woodland and habitats associated with agriculture at the northern extent of the Proposed Development route.

Upland blanket bog habitat that was found to be degraded will be lost along a stretch of no more than 40 m. This loss is not considered significant in the context of the already degraded condition of habitats and ongoing commercial forestry operations within and surrounding this area.

It is possible that the roots of some trees could be damaged by trenching. This could affect the health and growth rates of trees that constitute hedgerow / treeline habitats.

There is potential for loss of treeline habitat turning north at chainage 17500m for a maximum for 30 m; however, this can be avoided through design.

A summary of potential effects on habitats is given in **Table 6-12, Section 6.5.1.4.**

##### 6.5.1.2 Fauna

Noise disturbance is not considered to be significant in the context of the construction works. Terrestrial fauna utilising the habitats adjacent to the Proposed Development are accustomed to vehicular traffic and agricultural activities. In addition, the hedgerows and treelines occurring along the route are subject to maintenance and will not be removed to facilitate the construction of the Proposed Development. A summary of potential effects on fauna is given in **Table 6-12, Section 6.5.1.4.**

### 6.5.1.3 Water Quality and Aquatic fauna

As stated in **Chapter 2** Description of the Proposed Development, surface water runoff and discharges from construction working areas are likely during construction, although overall the quantity of surface runoff would not change as a result of the construction work. It is noted that the exposed in-situ subsoil along the proposed trench route will be contained within the trench and therefore the potential for erosion and transport by water and wind action is low. Nonetheless, the Proposed Development involves excavation and soil movement so has the potential for suspended solids contamination of surface waters. Rainfall during excavation can cause runoff laden with fine sediment to be carried into watercourses. This can affect aquatic life by reducing the quality and availability of fluvial habitats of aquatic fauna, including spawning and rearing habitat for fish, impairing the ability of fish to find food items and displacement of aquatic organisms into less suitable areas. A summary of potential effects on aquatic fauna is given in **Table 6-12**.

### 6.5.1.4 Summary of Effects

**Table 6-12** below provides a summary of the predicted effects for the KERs identified which are the most ecologically valuable at the Proposed Development site.

**Table 6-12 Summary of Effects (Pre-Mitigation)**

Receptor	Construction Phase Effects (without mitigation)
<b>Habitats</b>	
Eroding/upland rivers (FW1)	<ul style="list-style-type: none"> <li>• Short-term Moderate Negative Effects as a result of impairment of water quality</li> <li>• Reversible</li> </ul>
Hedgerow-Treeline (WL2)	<ul style="list-style-type: none"> <li>• Effects are assessed as Short-term Moderate Negative, related to habitat alteration</li> <li>• Reversible</li> </ul>
Upland blanket bog (PB2)	<ul style="list-style-type: none"> <li>• Effects are assessed as Short-term Moderate Negative, related to habitat alteration</li> <li>• Reversible</li> </ul>
Mixed broadleaved / conifer woodland (WD2)	<ul style="list-style-type: none"> <li>• Effects are assessed as Short-term Moderate Negative, related to habitat alteration</li> <li>• Reversible</li> </ul>
<b>Flora</b>	
Invasive Alien Species	<ul style="list-style-type: none"> <li>• Importation and spread of this group represents potential habitat loss / alteration and water quality effects. Impact is assessed as Permanent Moderate Negative</li> <li>• Reversible</li> </ul>
<b>Fauna</b>	
Otter	<ul style="list-style-type: none"> <li>• Habitat Loss effects on otter are assessed as Short-term Imperceptible Negative.</li> <li>• Direct and indirect disturbance and displacement effects assessed as a Short-term Slight Moderate Negative Effect.</li> <li>• Reversible</li> </ul>
Aquatic macroinvertebrates	<ul style="list-style-type: none"> <li>• Indirect disturbance and or displacement effects as a result of poor water quality Effects/habitat degradation are assessed as Short-term Moderate Negative.</li> <li>• Reversible.</li> </ul>
Brown trout ( <i>S. trutta</i> )	<ul style="list-style-type: none"> <li>• Indirect disturbance and or displacement effects as a result of poor water quality Effects/ habitat degradation are assessed as Short-term Moderate Negative.</li> <li>• Reversible.</li> </ul>

### 6.5.2 Operational Phase

Some interference with habitats may be required during the operational phase if repairs are required. Impacts on habitats and fauna during the operational phase will be less in scale and magnitude as any such works will be shorter in extent. Habitat interference effects are assessed as temporary, negative and of slight significance.

### 6.5.3 Do-Nothing

The Proposed Development will be built almost entirely within the artificial surfaces and adjacent managed habitats encompassing roads, tracks and associated verges, with installation of a short length of cable through a tract of bog.

It is likely that the land immediately surrounding the northern extent of the Proposed Development site will continue to be used for commercial forestry operations and that the grassland habitats in the wider environment will continue to be farmed for grass and dairy/beef production.

It is likely the existing road network will be maintained and continue to function as a road in the future.

### 6.5.4 Cumulative Impacts and Effects

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

#### 6.5.4.1 Projects

The works for the Proposed Development will overlap with the wind farm works for the Carrownagowan Wind Farm which has been granted permission.

A search for other projects was carried out focussing on the areas close to the Proposed Development, and also at planning applications made in the nearest settlement areas including Bodyke, Broadford, Tuamgraney, Scarriff, Ogonnoloe, Killaloe and Ardnacrusha. The findings of the searches are provided in **Appendix 1-5**, Volume III.

The projects in the surrounding areas relate largely to agricultural sheds and shed extensions, dwelling houses and extensions to dwelling houses, attic conversions, installation of domestic wastewater treatment systems, installation of photovoltaic for domestic purposes, garages, demolitions and retention permission applications. Such minor domestic and agricultural development will not introduce cumulative effects due to the nature, scale and dispersed locations of these applications. These applications will not introduce complex or significant issues, and are therefore not considered any further in the cumulative assessment.

The Proposed Development has the potential to interact with the proposed Fahey Beg Wind Farm Development Grid Connection in two locations and in one location within Ardnacrusha with the Drummin Solar Farm Grid Connection (**Figure 1-2** and **1-3**, **Chapter 1**).

As outlined in **Chapter 1**, each project that progresses with a grid connection located within the public road network will have to apply to the local authority for a Road Opening Licence, where timelines will be agreed, and connections sequenced. Early engagement with the local authority will allow them to decide on how the sections of public road are managed during the laying of the UG grid trenching, so as to avoid disruption. In the event that the Fahy Beg UG Grid and the Carrownagowan UG Grid works need to be done at similar times within the public road network then the Local Authority through the Road Opening Licence process will agree the best solution. The solution may be to close a short section of road and do a traffic diversion, or it may dictate each developer stagger the duration of the overlap on the public road so as to control and manage impacts locally; thereby avoiding any significant cumulative effects.

Any interaction with these developments and the Proposed Development within Ardnacrusha substation will be controlled by the Ardnacrusha Eirgrid Station Manager who will implement their own traffic management measures thereby avoiding potential cumulative impacts.

#### 6.5.4.2 Plans

The project was considered in combination with other plans in the area that could result in significant cumulative effects on KERs. Other plans considered include:

- Clare County Development Plan 2017-2023 (As Varied)
- Clare County Council (2017). Clare Wind Energy Strategy
- Shannon International River Basin Plan (Water Framework Directive).

Projects arising from the Clare County Development Plan (CDP), and successors to the CDP, will be subject to AA/EIA. Therefore, unless projects can be provided for in line with the CDP, in-combination effect with the Proposed Development is not predicted. Strategic Environmental Assessment (SEA) and Habitat Directive Assessment (HAD) have been carried out in relation to the Clare CDP and have incorporated the Wind Energy Strategy and associated SEA and HDA reports.

No significant cumulative effects are predicted with the plans listed above because of the temporal and geographical scale of the Proposed Development, effects are assessed as imperceptible negative.

## 6.6 Mitigation Measures

### 6.6.1 Design

The Proposed Development is almost entirely confined to the existing road network, diverging slightly from it at water course crossings, at some joint bay locations and where its length is shortened by a more direct route where it crosses fields and commercial forestry near its northern extent. This mitigation by design effectively limits, and avoids along most of the Proposed Development, intrusion into ecologically sensitive habitats by having its footprint located on largely artificial habitats and habitats of low value (roads and associated verges). It is acknowledged that some treelines and hedgerows occur adjacent to the road network used to facilitate the Proposed Development, and the potential exists for damage to tree roots via excavation. This impact is not considered significant however because the ground beneath roads is usually compacted and thus, not well penetrated by roots.

The active construction area will generally be only along a 100-200m stretch of any roadway at any one time. This feature of the Proposed Development will ensure that the scale of any impacts will be minor, especially considering its linear character.

Site management controls as set out in the Construction Environmental Management Plan (CEMP) Volume III, **Appendix 2-2** will significantly decrease the risk of water quality impacts. These controls pertain to excavation works which include suspending earth movement activities during periods of prolonged rainfall events, removing all materials excavated from trenching to an appropriate licenced facility, implementing drainage and associated pollution control measures on each section of road trenching prior to the start of works on each day and undertaking regular road cleaning during wet weather to maintain clean surfaces.

The option of underground directional drilling (HDD) and over-bridge in road solutions to cross watercourses avoids the requirement for instream works. This means there will be no direct interactions with any watercourse,

so that fluvial habitats will not be disturbed by machinery, and watercourses will not need to be diverted, or sections of streams /rivers dried out to enable trenching.

## 6.6.2 Construction Phase

The mitigation measures set out in the sections below will be incorporated into a CEMP for the Proposed Development (**Appendix 2-2**, Volume III). The CEMP will be finalised and implemented by the appointed contractor. The implementation of proposed mitigation measures, environmental commitments, as well as the monitoring and supervision of these measures will be managed through the CEMP. The implementation of the proposed mitigation measures, monitoring and follow-up arrangements and management of any potential impacts, will be managed through the CEMP.

Construction method statements will be prepared prior to commencement of construction and incorporated into the CEMP.

### 6.6.2.1 Water Quality

The main potential for water quality impacts is during the construction phase during excavation of trenches, where loose and exposed soils are at risk of being transported to watercourses during wet periods.

While site management controls will reduce the potential for water pollution, additional measures will be deployed to minimise erosion and runoff from excavated areas. This will be achieved as follows:

- Prior to commencing work on each 100-200m stretch, observe the slopes for any potential problems and preferential pathways. Notice where there could be affected areas adjacent to the site and plan accordingly - it may be necessary to install silt fencing or straw wattles to slow water and catch sediment where there is potential for site runoff to nearby watercourses.
- Disturb as little area as possible and excavate only one section of the site at a time where feasible. Backfill each section at the end of each day upon completion of the installation of the cable.
- There will be no storage of excavated soils or other materials along the route.
- All excavated material from the trenches and joint bay excavations site will be removed immediately to the licensed facility, so there will be no potential for erosion of overburden from this excavated material.
- Undertake road cleaning at the end of each day at a minimum and more frequently if necessary.
- Once excavation of an area is complete along roads/tracks, completion the final surface dressing or dense bituminous macadam (DBM) as soon as possible.

During directional drilling, any spoil collected at either end of the bore will be within a dedicated sump. All excavated material containing bentonite will be removed from site and brought to an authorised waste facility.

### 6.6.2.2 Habitats

Specific mitigation measures relating to the potential impacts identified include:

- The area of degraded upland blanket bog that will be directly impacted (lost) at the northern extent of the Proposed Development site will be minimised by marking out the area where works area to take place with stakes and fencing to prevent access beyond this area.
- Spoil from excavations will not be deposited on peatland. It will be managed as outlined in **Chapter 2**.



- There is potential for loss of treeline habitat turning north at chainage 17500m for a maximum for 30 m. Where there is scope for the Proposed Development to avoid mature trees within treeline habitat such opportunities will be taken.

### 6.6.2.3 Invasive Species

Two Invasive alien species (IAS) listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011, (as amended) were recorded within the study area: Japanese Knotweed (*Fallopia japonica*) and Rhododendron. One stand of Giant Rhubarb (*Gunnera tinctoria*) was observed in the proximity of the Proposed Development and two stands of Himalayan Knotweed, but both of these are outside of the study area. Cherry laurel (*Prunus laurocerasus*) was recorded at a single location within the study area.

Where IAS occur at one side of the road along the Proposed Development, the cable will be installed at the roadside opposite the IAS.

The management of Rhododendron, Cherry laurel and the Japanese Knotweed will be subject to containment measures as outlined in the Invasive Alien Species Management Plan (IASMP) in **Appendix 6-3**, Volume III.

### 6.6.3 Operational Phase

No further mitigation is required at operation stage.

#### 6.6.3.1 Maintenance

Mitigation as outlined for construction phase will apply for any maintenance activities. Protocols as set out in the CEMP prepared for construction activities will also be followed.

## 6.7 Residual Effects

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

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

below provides a summary of the predicted residual impacts for the KERs identified which are the most ecologically valuable at the Proposed Development site.

**Table 6-12 Predicted residual impacts for the KERs**

Receptor	Construction Phase Effects (without mitigation)	Operational Phase Effects (without mitigation)	Mitigations (Construction Phase)	Residual Effects
<b>Habitats</b>				
Eroding/upland rivers (FW1)	<ul style="list-style-type: none"> <li>• Short-term Moderate Negative Effects as a result of impairment of water quality</li> <li>• Reversible</li> </ul>	No effect	<ul style="list-style-type: none"> <li>• Avoidance</li> <li>• Water quality controls (as per Section 6.7.2.2)</li> </ul>	Potential for Short-term Slight to Imperceptible Negative Effects
Hedgerow-Treeline	<ul style="list-style-type: none"> <li>• Effects are assessed as Short-term Moderate</li> </ul>	No effect	<ul style="list-style-type: none"> <li>• Avoidance</li> </ul>	Potential for Short-term Imperceptible Negative Effects

Receptor	Construction Phase Effects (without mitigation)	Operational Phase Effects (without mitigation)	Mitigations (Construction Phase)	Residual Effects
	<ul style="list-style-type: none"> <li>Negative, related to habitat alteration</li> <li>Reversible</li> </ul>			
Upland blanket bog (PB2)	<ul style="list-style-type: none"> <li>Effects are assessed as Short-term Moderate Negative, related to habitat alteration</li> <li>Reversible</li> </ul>	No effect	<ul style="list-style-type: none"> <li>Minimising the footprint</li> <li>Reinstatement of habitat</li> </ul>	Potential for Short-term Imperceptible Negative Effects
Mixed broadleaved / conifer woodland (WD2)	<ul style="list-style-type: none"> <li>Effects are assessed as Short-term Moderate Negative, related to habitat alteration</li> <li>Reversible</li> </ul>	No effect	<ul style="list-style-type: none"> <li>Avoiding and minimising vegetation removal.</li> </ul>	Potential for Imperceptible Negative Effect.
<b>Flora</b>				
Invasive Alien Species	<ul style="list-style-type: none"> <li>Importation and spread of this group represents potential habitat loss / alteration and water quality effects. Impact is assessed as Permanent Moderate Negative</li> <li>Reversible</li> </ul>	No effect	<ul style="list-style-type: none"> <li>Avoiding stands of IAS</li> </ul>	Short-term Imperceptible Negative Effects
<b>Fauna</b>				
Otter	<ul style="list-style-type: none"> <li>Habitat Loss effects on otter are assessed as Short-term Imperceptible Negative.</li> <li>Direct and indirect disturbance and displacement effects assessed as a Short-term Slight Moderate Negative Effect.</li> <li>Reversible</li> </ul>	No effect	<ul style="list-style-type: none"> <li>Water quality controls</li> </ul>	Short-term Imperceptible Negative Effects
Aquatic macroinvertebrates	<ul style="list-style-type: none"> <li>Indirect disturbance and or displacement effects as a result of poor water quality impacts/habitat degradation are assessed as Short-term Significant Negative.</li> <li>Reversible.</li> </ul>	No effect	<ul style="list-style-type: none"> <li>Water quality controls</li> </ul>	Short-term Imperceptible Negative Effects
Brown trout ( <i>S. trutta</i> )	<ul style="list-style-type: none"> <li>Indirect disturbance and or displacement effects as a result of poor water quality impacts/ habitat degradation are assessed as Short-term Moderate Negative.</li> <li>Reversible.</li> </ul>	No effect	<ul style="list-style-type: none"> <li>Water quality controls</li> </ul>	Short-term Imperceptible Negative Effects

## 6.8 Summary

Identified effects during the construction phase are regarded as 'Short-term' and range from Moderate Negative (in the case of habitats and less sensitive fauna) to Significant Negative (in the case of sensitive aquatic macroinvertebrates and salmon). There will be no further changes to the environment during operation phase so effects during the operation phase are none. Residual effects on biodiversity including effects on designated sites, habitats, flora, fauna and water quality are not considered significant provided mitigations and best practice methodologies are employed during the construction phase.

Provided that the Proposed Development is constructed in accordance with the design, best practice and mitigation that is described within this application, significant effects on KERS are not anticipated at any geographical scale, or on any of the Key Ecological Receptors.

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

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