

## 4 BIODIVERSITY

### 4.1 INTRODUCTION

This chapter describes the ecology in the environs of the proposed substation site and grid connection route and assesses the potential effects of the project on identified ecological receptors. A detailed description of the project assessed in this chapter is given in **Chapter 2 Project Description**. A Natura 2000 Appropriate Assessment Natura Impact Statement (NIS) report has also been prepared and completed for the project. This Ecological Impact Assessment was carried out with regard to the following publications:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017);
- Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater, Coastal and Marine (IEEM, 2019);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009).

#### 4.1.1 Legislation and Policy Context

The most important legislation underpinning biodiversity and nature conservation in Ireland are the:

- Wildlife Acts 1976 to 2012;
- European Communities (Birds and Natural Habitats) Regulations 2011-2015 (transposes EU Birds Directive 2009/147/EC and EU Habitats Directive 2009/147/EC, 92/43/EC);
- European Communities (Quality of Salmonid Waters) regulations (S.I. No. 84 of 1988);
- Freshwater Fish (78/659/EEC)

The Wildlife Act, 1976, is the principal national legislation providing for the protection of wildlife and the control of some activities that may adversely affect wildlife. The aims of the Wildlife Act, 1976, are to provide for the protection and conservation of wild fauna and flora, to conserve a representative sample of important ecosystems, to provide for the development and protection of game resources and to regulate their exploitation, and to provide the services necessary to accomplish such aims. A diversity of flora and fauna, rare at a national level, are protected under the provisions of the Wildlife Act 1976, as amended, and the orders and regulations made thereunder, such as the Flora Protection Order (2015).

The Habitats Directive (together with the Birds Directive) forms the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 Network of protected sites and the strict system of species protection. The Directive protects over 1000 animals and plant species and over 200 so called "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance. The Habitats Directive has been transposed into Irish law by Part XAB of the Planning and Development Act 2000, as amended. In addition, obligations of the Habitat Directive have been transposed by the European Communities (Birds and Natural Habitats) Regulations 2011, as amended.

#### 4.1.2 Consultation

The consultation carried out as part of the development of this project is outlined in Chapter 1 consultation sections 1.5.4 and 1.5.5.

### 4.1.3 Methodology

#### 4.1.3.1 Desktop Study

A desktop study was carried out to collate and review available information, datasets and documentation pertaining to the natural environment of the site and the geographical area extending away from it. The publications, datasets and resources consulted included the following:

- Ordnance Survey Ireland (OSI) aerial photography and 1:50000 mapping;
- National Parks and Wildlife Service (NPWS) online datasets and literature;
- National Biodiversity Data Centre (NBDC) online mapping;
- Bat Conservation Ireland (BCI);
- BirdWatch Ireland - online resources;
- BirdLife International – online resources;
- Irish Red Data Book for Vascular Plants (Curtis and McGough, 1988);
- Proposed Red Data List of Vascular Plants Consultation Document (Kingston, 2005);
- Teagasc Soil area maps (at NBDC online mapping);
- Geological Survey Ireland (GSI) area maps (online);
- Environmental Protection Agency (EPA) water quality data and online mapping;
- South eastern River Basin District (SERBD) datasets (Water Framework Directive);
- Inland Fisheries Ireland (IFI);
- Environmental Impact Assessment Report for Cushaling Wind Farm, MWP 19877-6005 (2019);
- Other information sources and reports footnoted or referenced.

#### 4.1.4 Database Searches and Data Requests for Previously Recorded Data

##### 4.1.4.1 National Biodiversity Centre

The study area lies within Ordnance Survey National Grid 10km Square N62. Biodiversity Maps, the online mapping resource of the NBDC<sup>1</sup>, allows users to search almost 2 million records that are retained across 80 datasets. Data analysis tools enable users to refine data base searches by selecting 1km, 2km or 10km grid squares on an interactive map. All species records retained for the selected grid square are then available for download in 'Excel' spreadsheet format.

Concise and site-specific information on species distribution in this 10km grid square and around the study area was collated from this database.

##### 4.1.4.2 National Parks and Wildlife Service

The NPWS online mapping resource allows for a search of their database for all rare/protected species records for the 10km grid square N62 that encompass the site. A data request was submitted to NPWS for records of any rare or protected flora and fauna within the 10km grid squares encompassing the subject site.

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<sup>1</sup> Available at : <https://maps.biodiversityireland.ie/Map>

#### 4.1.4.3 Hydrology: Catchment and Stream Mapping

Information on the mapping of catchments and river draining the site was retrieved from a number of online mapping resources including Ordnance Survey Ireland (OSI), Water Framework Directive (WFD), NBDC and the Environmental Protection Agency (EPA).

#### 4.1.4.4 Bats

The NBDC online mapping resource hosts the Model of Bat Landscapes for Ireland, which shows the relative landscape and habitat associations for bat species across Ireland (Refer to Lundy *et al.*, 2011). This resource was generated through analysis of the datasets contained by BCI and NPWS. The landscape resource value for bats in the 10km grid square N62 (which covers the proposed development site) was assessed utilising this resource. The NBDC online mapper includes a bat habitat suitability layer index. The index evaluation ratings range from 0 to 100 with 0 being least favourable and 100 most favourable for bats. Index evaluations are available for each individual species and an overall rating is also available for all species in combination. Permitted wind farm EIS reports and bat reports from the wider area were reviewed.

#### 4.1.4.5 Birds

Biodiversity Maps, as outlined above, as the online resources of Birdwatch Ireland (BWI) were used to assess the potential use of the site by avian fauna. Permitted wind farm EIS reports and ornithological reports from the wider area were reviewed.

### 4.1.5 Field Surveys

#### 4.1.5.1 Habitat Survey

An ecological walkover field survey was undertaken at the site on July 13<sup>th</sup> 2020 and 22<sup>nd</sup> December 2020. Habitats were categorised according to the Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). In addition to habitat identification, each habitat was assessed for its ecological significance, based on the National Roads Authority (NRA) Site Evaluation Scheme (NRA, 2009) (available in **Appendix 2-A**).

#### 4.1.5.2 Mammal Survey

A mammal survey was carried out which concentrated on the protected species Otter (*Lutra lutra*) and Badger (*Meles meles*). The habitat types recorded throughout the survey area were used to assist in identifying the fauna considered likely to utilise the area. The site was checked for tracks and signs of mammals as per Bang and Dahlstrom (2004).

Trail cameras/Camera traps were deployed at two locations outside of the footprint of the proposed project where there were signs of mammal activity. The cameras are triggered by movement and take a still image each time they are triggered. The cameras remained at these locations from 22/12/2020 until 15/01/2021.

#### 4.1.5.3 Bat Survey

A daytime bat survey was undertaken. The survey focused on the trees occurring within the site. The survey included checking for evidence of bats (droppings, staining, claw marks, visible bats).

Searches for potential roosting and foraging sites and commuting routes within the footprint of the proposed development and environs were conducted during the ecological field survey. Trees within and in the environs of the site were checked from ground level assisted by binoculars for external signs of holes, cracks, crevices and openings.

Evidence of bat roosts was documented according to 'The Bat Conservation Trust's Good Practice Guidelines (3<sup>rd</sup> edn., 2016) and in a manner consistent with best practise methodology outlined in National Road Authority's Guidelines for the Treatment of Bats during the Construction of National Road Schemes (NRA, 2006).

An evaluation was made of the quality of the habitats within the site, and the potential for these areas to support bats, taking into account:

- the extent and quality of foraging and commuting habitat within and surrounding the site e.g. woodland, well-connected and structured hedgerows and water bodies;
- the proximity of the proposed development site to areas designated for bats (Natural Heritage Areas or Special Areas of Conservation);
- the presence of buildings or other features or structures that may support or are known to support bat roosts.

#### **4.1.5.4 Birds**

During the ecological field survey, species of birds observed or heard calling were noted.

#### **4.1.6 Assessment Criteria**

This section concerns the criteria upon which evaluations of the importance of ecological features and the assessments of the ecological impact of the proposed development on these features are made, referring to relevant legislation and guidelines where available.

##### **4.1.6.1 Evaluation**

Guidance on Ecological Impact Assessment (CIEEM, 2019) 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 species/receptor. The guidelines provide a basis for determination of whether any particular site 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 are represented by habitats and species that are widespread and of low ecological significance and of 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.

Key ecological receptors (KER's) are referred to by NRA (2009) as those ecological features which are evaluated as Locally Important (higher value) or higher. The criterion used to evaluate the value of KERs has been included in **Appendix 2-A**. This evaluation scheme seeks to provide value ratings for KERs, with values ranging from internationally to locally important as described above. 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 the ecological effects on each of these KER's was assessed. Determining ecologically significant effects KERs is present in **Table 4-1**.

**Table 4-1: Determining ecologically significant effects KERs (adapted from IEEM, 2019)**

KER	Determining ecologically significant effects	Consideration should be given to whether:	Notes
Designated sites	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>
Ecosystems	Is the project likely to result in a change in ecosystem structure and function?		
KER	Determining ecologically significant effects	Notes	
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 species will vary depending on the geographical frame of reference.</li> </ul>
Species		Conservation status is determined by the sum of influences acting on	<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</li> </ul>

		the species concerned that may affect its abundance and distribution within a given geographical area.	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.
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#### 4.1.6.2 Impact Assessment EPA Criteria (2017)

The significance of an effect is determined by way of professional judgement and the use of EPA criteria for assessing impact EPA (2017). The criteria for assessing quality of impacts and significance of effects are set out in **Table 4-2**.

**Table 4-3: Criteria for assessing impacts based on CIEEM (2019) & (EPA, 2017)**

Parameter	Description	
<b>Direction (Quality)</b>	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).	
<b>Magnitude</b>	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
<b>Extent</b>	The area over which an impact occurs.	
<b>Duration</b>	<ul style="list-style-type: none"> <li>• Momentary – effects lasting from seconds to minutes</li> <li>• Brief – effects lasting less than a day</li> <li>• Temporary – effects lasting less than a year</li> <li>• Short-term – effects lasting 1 to 7 years</li> <li>• Medium term – effects lasting 7 to 15 years</li> <li>• Long term – effects lasting 15 to 60 years</li> <li>• Permanent – effects lasting over 60 years</li> </ul>	
<b>Reversibility</b>	<p>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.</p> <p>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.</p>	
<b>Frequency and timing</b>	Frequency – How often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)	



Where potential impacts on KERs 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 KERs. Proposed best practice design and mitigation measures are specifically set out and are realistic in terms of cost and practicality. Mitigation will effectively address the effects on the identified KERs. The potential impacts of the proposed development were considered and assessed to ensure that all effects on KERs are adequately addressed and no significant residual effects remain following the implementation of mitigation measures/best practice. For example, the layout which the proposed grid connection route crossed the Figile River to the east of the proposed substation and intersected an area of a possible Badger sett. The layout of the proposed grid connection route was then updated and positioned approximately 100m to the south to avoid impacts to Badgers in this area.

#### **4.1.6.3 Cumulative Impacts**

Potential cumulative impacts of the proposed development in combination with other developments 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 cumulative developments considered include those that have planning permission, are under construction or are operational in the area. The cumulative impact of industry, commercial and residential properties in the greater area are also considered. The list of cumulative developments considered for this chapter are provided in **section 4.3.4** below.

#### **4.1.6.4 Residual Impacts and Significance of Effects**

After assessing the impacts of the proposed development and taking account of measures to avoid and mitigate ecological impacts, assessment of the residual impacts was undertaken to determine the significance of their effects on KERs. Any residual impacts that will result in effects that are significant, as well as proposed enhancement measures, are factors considered against ecological objectives (legislation and policy) in determining the conclusion.

Significance is a concept related to the weight that should be attached to effects when decisions are made. For the purpose of EclA, 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for KERs or for biodiversity in general. In broad terms, significant effects encompass impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution).

Significance of effects were considered and qualified with reference to an appropriate geographic scale. Significant effects encompass impacts on the structure and function of defined sites and ecosystems. Consideration of conservation status is important for evaluating the effects of impacts on individual habitats and species and assessing their significance. To determine ecologically significant effects, criteria in CIEEM (2019) was used, as outlined in **Table 4-3**.

#### **4.1.7 Statement on Limitations and Difficulties Encountered**

Limitations to methodologies, procedures, equipment and knowledge can arise during the course of an ecological assessment. Some limitations may be foreseen and can be accounted for while others may not be apparent until the actual assessment has taken place. Certain areas of scrub were inaccessible due to dense vegetation along some hedgerows. Where there appeared to be any animal activity camera traps were set up to determine if there was activity from potential KERs.

The information provided in this EIAR chapter accurately and comprehensively describes the baseline ecological environment; provides an accurate prediction of the likely ecological effects of the

proposed development; prescribes mitigation as necessary; and, describes the residual ecological effects. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines. No limitations in the scope, scale or context of the assessment have been identified at a level that affects the selection of KERS.

## 4.2 RECEIVING ENVIRONMENT

### 4.2.1 Designated Sites

The designated areas within 15km of the proposed development are illustrated in **Figure 4-1**. These sites are listed in **Table 4-4**, along with their qualifying features, distance to the proposed development, and an assessment as to whether an ecological pathway exists between the proposed development and each designated site. The designated sites within 15km of the proposed development are considered being within the ZOI. It is considered that designated areas beyond 15km are outside the ZOI of the proposed development.

**Table 4-4 Natura 2000 Sites within 15km of the proposed development**

Designated Site	Qualifying features of conservation interest	Distance from the proposed development site
The Long Derries, Edenderry SAC (000925)	<p><b>Habitat</b></p> <ul style="list-style-type: none"> <li>- Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]</li> </ul>	5.2km to the northeast of the proposed development site.
River Barrow & River Nore SAC (002162)	<p><b>Habitats</b></p> <ul style="list-style-type: none"> <li>- Estuaries [1130]</li> <li>- Mudflats and sandflats not covered by seawater at low tide [1140]</li> <li>- Reefs [1170]</li> <li>- <i>Salicornia</i> and other annuals colonising mud and sand [1310]</li> <li>- Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>) [1330]</li> <li>- Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</li> <li>- Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260]</li> <li>- European dry heaths [4030]</li> <li>- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]</li> <li>- Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220]</li> <li>- Old sessile oak woods with Ilex and <i>Blechnum</i> in the British Isles [91A0]</li> <li>- Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</li> </ul> <p><b>Species</b></p> <ul style="list-style-type: none"> <li>- <i>Vertigo moulinsiana</i> (Desmoulin's whorl Snail) [1016]</li> <li>- <i>Margaritifera margaritifera</i> (Freshwater pearl mussel) [1029]</li> <li>- <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092]</li> </ul>	14.3km to the south of the proposed development site and 21.3km via hydrological route.



Designated Site	Qualifying features of conservation interest	Distance from the proposed development site
	<ul style="list-style-type: none"> <li>- <i>Petromyzon marinus</i> (Sea lamprey) [1095]</li> <li>- <i>Lampetra planeri</i> (Brook lamprey) [1096]</li> <li>- <i>Lampetra fluviatilis</i> (River lamprey) [1099]</li> <li>- <i>Alosa fallax fallax</i> (Twaite shad) [1103]</li> <li>- <i>Salmo salar</i> (Atlantic salmon) [1106]</li> <li>- <i>Lutra lutra</i> (Otter) [1355]</li> <li>- <i>Trichomanes speciosum</i> (Killarney fern) [1421]</li> <li>- <i>Margaritifera durrovensis</i> (Nore pearl mussel) [1990]</li> </ul>	

#### 4.2.1.1 Sites of International Importance

Special Areas of Conservation (SACs) and candidate Special Areas of Conservation (cSACs) are protected under the European Union (EU) 'Habitats Directive' (92/43/EEC), as implemented in Ireland by Part XAB of the Planning and Development Act 2000, and as amended. Special Protection Areas (SPAs) and candidate Special Protection Areas (cSPAs). There are no SPAs within 15km of the proposed project.

A Screening for Appropriate Assessment for the proposed development concluded that the project could have a significant effect on one SAC: River Barrow and River Nore SAC. In the NIS, an evaluation was undertaken to determine which of the qualifying interests of the SAC potentially lie within the ZOI of the project. It was considered that Salmon, White clawed crayfish, Brook lamprey, Otter and Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitriche-Batrachion vegetation were in the ZOI. The NIS concluded that, provided recommended mitigation measures were implemented in full, the project will not result in adverse residual impacts on the River Barrow and River Nore SAC. It is noted that the mitigation measures in the NIS correspond to mitigation outlined in this chapter, as relevant to water quality protection and qualifying interests of the River Barrow and River Nore SAC.

##### 4.2.1.1.1 The Long Derries, Edenderry SAC

The Long Derries, Edenderry SAC (000925) is located 5.2km to the northeast of the proposed development site. It consists of terrestrial habitats, namely Semi-natural dry grasslands and Scrubland facies on calcareous substrates, which also comprises Orchid rich calcareous grassland (6210) that grades into peat land. The site has been selected a Special Area of Conservation (SAC) for the aforementioned habitats listed on Annex I/II of the E.U. Habitats Directive. These habitats are home to rare/annexed species of flora and fauna such as the red data book species the Blue fleabane (*Erigeron acer*) and the Green winged orchid (*Anacamptis morio*), as-well as Nightjar (*Caprimulgus europaeus*), a rare species listed in Annex I of the E.U. Birds Directive, which has been known to breed on the site. Partridge (*Perdix perdix*), an endangered bird species in Ireland is known from the site also. Badgers are known to have setts along some of the mature hedgerows in the site.

##### 4.2.1.1.2 River Barrow and River Nore SAC

The River Barrow and River Nore SAC (002162) is comprised of freshwater stretches of the Barrow and Nore River catchments, as far upstream as the Slieve Bloom Mountains and as far downstream as the Creadun Head in Waterford, which encompasses some salt water (tidal and estuary) elements. The site passes through a total of 8 Counties; Offaly, Kildare, Laois, Carlow, Kilkenny, Tipperary, Wexford and Waterford. This SAC is approximately 14.3km south of the proposal site. Both rivers pass over

areas of Old Red Sandstone (along the Slieve Bloom Mountains), Carboniferous Shale and Sandstones, as-well as some Limestone. The site is a Special Area of Conservation (SAC) selected for a number of habitats and/or species listed on Annex I/II of the E.U. Habitats Directive. This includes a variety of coastal, riparian and terrestrial habitats, flora and fauna. Other habitats which occur within the River Barrow and River Nore SAC include; Wet grassland, Marsh, Reed swamp, Improved grassland, Arable land, Quarries, Coniferous plantations, Deciduous woodland, Scrub and Ponds. All of the aforementioned are protected within the River Barrow and Nore SAC including a further 17 Red Data Book species.

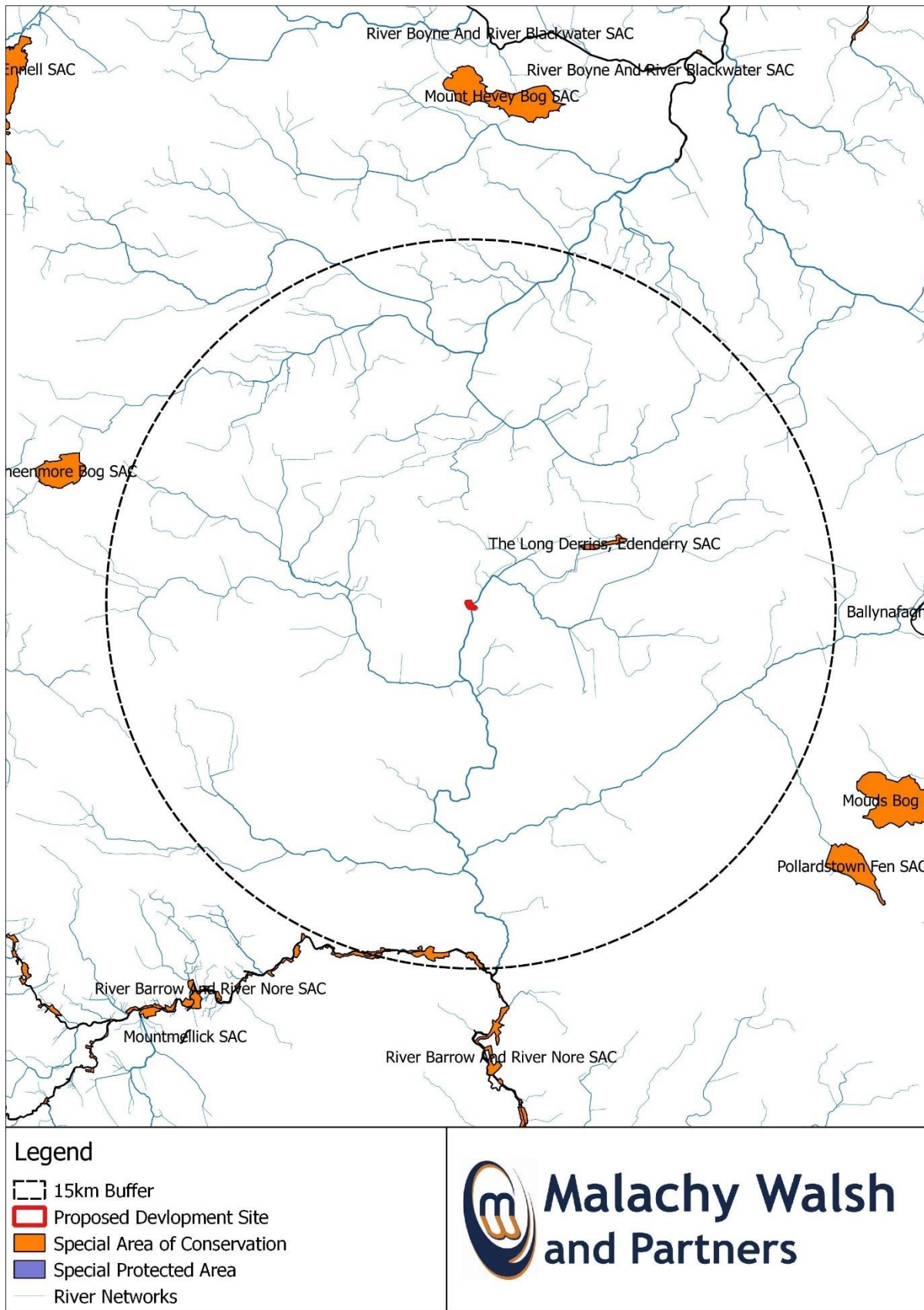


Figure 4-1 Special Areas of Conservation within 15km of the proposed development.

4.2.1.2 Sites of National Importance

In Ireland, sites of National importance are termed Natural Heritage Areas (NHA) and Proposed Natural Heritage Areas (pNHA). While the Wildlife (Amendment) Act 2000 has been passed into law,

pNHAs will not have legal backing until the consultative process with landowners has been completed. This process currently remains ongoing.

There are two pNHA and three NHAs within 15km of the proposed development site. The Grand Canal pNHA which lies 4.7km north of the site and the Long Derries, Edenderry pNHA lies 5.2km northeast of the site. Black Castle Bog NHA lies 7.6km northwest of the site, Carbury Bog NHA lies 11.6km northeast of the site and Daingean Bog NHA 14.7km west of the site. These sites are illustrated in **Figure 4-2** and information on the sites is presented in **Table 4-5**.

**Table 4-5: Sites of National Importance within 15km of the proposed development**

Name and Site Code	Features of Interest	Distance from the proposed development site
Grand Canal pNHA (02104)	The Grand Canal is a man-made waterway linking the River Liffey in Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species <sup>2</sup> .	The proposed development is 4.72km south of the pNHA.
Long Derries, Edenderry pNHA (000925)	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) important orchid sites.	The proposed development is 5.2km to the southwest of this pNHA.
Black Castle Bog NHA (000570)	Peatlands	The proposed development is 6.70km southeast of this pNHA.
Carbury Bog NHA	Peatlands	Subject site is 11.6km southwest of this pNHA.
Daingean Bog NHA (00220033)	Peatlands	Subject site (substation) is 14.7km east of this pNHA.

<sup>2</sup><http://www.kildare.ie/CountyCouncil/Planning/DevelopmentPlans/AthyTownDevelopmentPlan2012-2018/DraftAthyTownDevelopmentPlan2012-2018/13.%20Natural%20Heritage%20and%20Biodiversity.pdf>



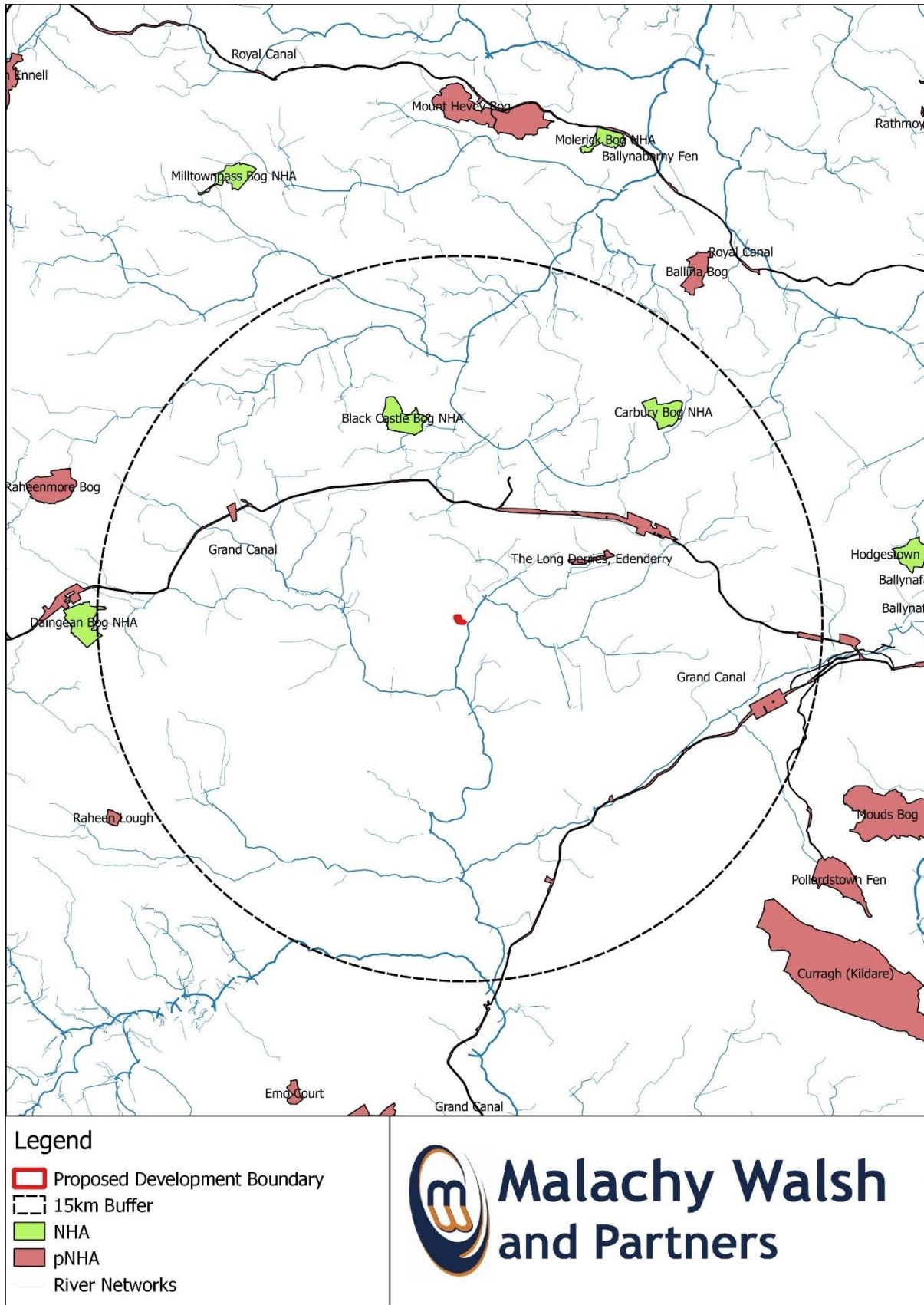


Figure 4-2 NHAs and pNHAs located within 15km of the proposed development.

4.2.1.3 Additional Sites

The Convention on Wetlands of International Importance especially as Waterfowl Habitat, more commonly known as the Ramsar Convention, was ratified by Ireland in 1984 and came into force for Ireland on 15 March 1985. Ireland presently has 45 sites designated as Wetlands of International

Importance, with a surface area of 66,994 hectares. There are no Ramsar sites with 15km of the proposed development site.

The Important Bird and Biodiversity Areas (IBAs) Programme, overseen by Birdlife International, aims to identify, conserve and protect those areas throughout the world considered to be of the greatest significance to bird populations. Bird Life International has produced a compendium of Important Bird Areas (IBAs) in Europe. The IBA programme of BirdWatch Ireland is a worldwide initiative aimed at identifying and protecting a network of critical sites of importance for birds. There are 105 IBA's on the island of Ireland in which the majority support wintering water birds. There are no IBAs within 15km of the proposed development site.

## 4.2.2 Habitats and Flora

### 4.2.2.1 Overview

This section of the Biodiversity chapter presents the results of the findings obtained from the desk study and field assessment, which provide a detailed description of the habitats encountered and present at the proposed development site. The proposed Kilcumber Bridge 110kV substation and grid connection route are situated 6km southwest of Edenderry Town, Co. Offaly. Habitats of local Importance (higher value) and greater at the proposed development site are included as KERs. The range of habitats identified within the proposed development site is described below (see **Plates 1-4**).

The proposed substation site spans two fields of 'Improved agricultural grassland GA1' with associated 'Hedgerows WL1', 'Scrub WS1' and 'Drainage ditches FW4' forming field boundaries. Some of the wetter parts of the field close to the drainage ditches had species indicative to 'Wet grassland GS4', such as Rushes (*Junus spp.*), Yellow iris (*Iris pseudacorus*), Silverweed (*Potentilla anserina*) and Meadow sweet (*Filipendula ulmaria*). Species found in hedgerows and scrub were Hawthorn (*Crataegus monogyna*), Gorse (*Ulex europaeus*), Holly (*Ilex aquifolium*), Bramble (*Rubus fruticosus agg.*), Ivy (*Hedera helix*), Ash (*Fraxinus excelsior*), Hazel (*Corylus avellana*), and Willows (*Salix spp.*). The proposed grid connection route runs in a south-easterly direction and crosses the Figile River and three additional fields of Improved agricultural grassland. The Figile River is categorised as 'Lowland/Depositing river FW2' and flows in a north to south direction. Beyond the hedgerow and scrub to the east of the proposed substation site is a rough track leading from the R401 in a north to south direction to an Improved agricultural grassland. This track sits between the hedgerow to the east and the vegetation lining the Figile River. Cattle poaching was evident in some of the fields, under some of the hedgerows and along part of the drainage ditch to the south of the proposed substation location.

In the surrounding area outside of the proposed development site, the habitat types comprise mostly of 'Improved agricultural grassland GA1' and 'Wet grassland GS4'. Extending away from the site to the west and south further to the east are large areas of 'Cutover bog PB4' and 'Conifer Plantations WD4'. Just northeast of the proposed development site is Edenderry power station which is classed as 'Buildings and artificial surfaces BL3' habitat.

There were no invasive species observed at the subject site and the immediate surrounds during the ecological walkover. The plant species recorded during the walkover survey and habitat map for the site are shown in **Appendix 2-B**. Additional plates are provided in **Appendix 2-C**.





Plate 1: Improved agricultural grassland



Plate 2: Figile River (downstream view)



Plate 3: Hedgerow/scrub east of site



Plate 4: Drainage ditch southwest of site

#### 4.2.2.2 Improved Grassland Habitat (GA1)

Improved agricultural grassland is the dominant habitat within the proposed development site. This habitat classification applies to intensively managed/highly modified grassland such as agricultural grassland. As this habitat type is highly modified it offers little in the way of floral biodiversity. The main floral species found here include grasses (dominant), Common nettle (*Urtica dioica*), Plantains (*Plantago spp.*), Clovers (*Trifolium spp.*), Creeping buttercup (*Ranunculus repens*), Ragwort (*Senecio jacobaea*), Dandelion (*Taraxacum spp.*), Thistles (*Cirsium arvense*, *C. vulgare*) and Docks (*Rumex spp.*).

#### 4.2.2.3 Hedgerows (WL1) and Scrub (WS1)

Hedgerows with areas of scrub occur along the field boundaries. Hedgerows were typically of low stature (<5-6 m) and dominated by Hawthorn, Blackthorn (*Prunus spinosa*) and Ash. Other tree and shrub species observed were mature Hazel, Willows, and Holly. Bramble is frequent in the ground layer, along with Ivy, Herb-Robert (*Geranium robertianum*), Common nettle and various fern species such as Harts-tongue (*Asplenium scolopendrium*) and Bracken (*Pteridium aquilinum*). Scrub was typically <4m in height and includes species such as Gorse, Bramble and Hawthorn.

#### 4.2.2.4 Drainage Ditches (FW4)

Within the proposed development site, there is a network of small man-made water channels, which are categorised as drainage ditches. They occur along field boundaries of 'Agricultural improved

grassland GA1' with one running south-westerly through the centre of the site and connects with a drainage ditch running from the north and subsequently discharges to the Figile River.

#### 4.2.2.5 Wet Grassland (GS4)

Wet Grassland habitat occurs along the fringes of drainage ditches. This habitat is associated with the low-lying land adjacent to the Figile River where it forms a mosaic with Improved agricultural grassland (GA1). A number of species were observed; Rushes, Yellow iris, Silverweed, Meadow sweet, Willowherb (*Chamerion angustifolium*), Purple moor grass (*Molinia caerulea*), Cowslip (*Primula veris*), Herb-Robert, Chickweed (*Stellaria media*), Ivy, Holly, Horse tail (*Equisetum spp.*) and Vetch (*Vicia sativa spp.*).

#### 4.2.2.6 Lowland/Depositing River (FW2)

The 4<sup>th</sup> Figile River (EPA Code: 14F01) is situated ca. 70m east of the proposed substation. The proposed grid connection route is to cross the Figile River to the southeast via an overhead line. This river flows south until it meets the River Barrow downstream of the subject site. The EPA Hydrotool shows that mean flow in the stretch of the Figile River at Kilcumber Bridge is 1.25 m<sup>3</sup>/s and 95%ile flow is 0.101m<sup>3</sup>/s (hydrometric station 14016), where the 30%ile river flow has been taken as the mean river flow. The Figile River increases significantly in size as it flows south of the proposed development site. From Kilcumber Bridge, it flows for ca. 22km before meeting the River Barrow. Along this reach, it is fed by the Daingean and Slate Rivers as well as other smaller tributaries.

The stretch of the Figile River upstream of the River Barrow is also a 4<sup>th</sup> order watercourse. Using the EPA Hydrotool, it is estimated that this part of the river has a 95%ile flow of 1.026m<sup>3</sup>/s and an average flow of 10.517m<sup>3</sup>/s. The drainage area of the Figile River upstream of the Barrow confluence is 622.7km<sup>2</sup> and a total watercourse length of 322.9km drains this area (drainage density of 0.5 km/km<sup>2</sup>). These watercourses have a mean slope of 1.4%. Soils in this part of the Barrow catchment are mostly peat (52.5%), with well drained soils and poorly drained accounting for 30.2% and 13.2% of the soils in this subcatchment respectively. In O'Reilly's exhaustive account of the rivers of Ireland (O'Reilly, 2004), the Figile River is described as a watercourse that flows almost entirely through bog. O'Reilly (2004) notes that peat silt can be a problem in the Figile River.

**Table 4-6** below summarises flow data returned by Hydrotool and statistically shows how the river increases in volume on its journey to the River Barrow.

**Table 4-6: Hydrotool flow data and catchment characteristics at selected locations in the Figile and Barrow Rivers.**

	Figile at Kilcumber Bridge	Figile upstream of the Barrow confluence	Barrow upstream of the Figile confluence
Mean / 30%ile flow (m <sup>3</sup> /s)	1.25	10.517	7.586
95 %ile flow (m <sup>3</sup> /s)	0.101	1.026	0.525
Catchment area (km <sup>2</sup> )	86.1	622.7	436.1
Drainage density (km/km <sup>2</sup> )	0.8	0.5	0.9
Slope (%)	0.8	1.4	2.9
Peat (% of catchment)	76.3	52.5	30.1
Average Annual Rainfall (mm/yr)	831	832	947

Note: 30%ile river flow has been taken as the mean river flow, as in MacCarthaigh (1997).

The 95%ile flow of the Figile River increases from 0.101m<sup>3</sup>/s at Kilcumber Bridge to 1.026m<sup>3</sup>/s upstream of the River Barrow confluence (upstream catchment area of 622.7km<sup>2</sup>), representing an increase of ca. 10 times. The corresponding increase using the mean flow is close to 8.5. The catchment areas of the Figile River upstream of Kilcumber Bridge and Figile River upstream of the Barrow confluence are 86.1km<sup>2</sup> and 622.7km<sup>2</sup> respectively (differing by a factor of 7.2), which is comparable to the difference in flows in these parts of the river.

The Figile River is a highly modified channel, typically trapezoidal in cross-section. Land gradient in the study area is considerably low. A feature absent from the study area, as would be expected to co-exist alongside natural lowland depositing river corridors to varying distances into the adjoining floodplain was large areas of fringing reedbeds. The absence of such habitat is attributed to the abrupt discontinuity of river corridor with adjacent habitats. The sudden severance of the watercourses in the study area from the terrestrial environs is caused by deepening of channels and resultant artificially high banks.

During the walkover surveys in 2020 good quality riparian scrub cover was observed along the banks of the Figile River just south of Kilcumber Bridge. The physical characteristics of the Figile River at Kilcumber Bridge is provided in **Table 4-7**, based on a survey in 2019. Floating aquatics in the study area included Water lily (*Nymphaeaceae*), Pondweeds (*Potamogeton* spp.) and Water-starworts (*Callitriche* spp.).

**Table 4-7:** Physical of the Figile River at Kilcumber Bridge 2019.

Physical Characteristics	Kilcumber Bridge
Width (m)	5
Mean Depth (cm)	40
Max Depth (cm)	65
Rock (%)	25
Cobble (%)	40
Gravel (%)	30
Peat (%)	5
Bank height (m)	1.5
Bank Slope (°)	80
Bank Cover (%)	100
Canopy Cover (%)	30
Riffle (%)	25
Glide (%)	45
Pool (%)	30
In-stream vegetation (%)	50
<i>Cladophora</i> spp. Abundance	Moderate growths
Siltation	Moderate
Macrophyte growth	Luxuriant

During the 2019 study, large deposits of peat sediment occur within and along the banks of the Figile River. The water quality of this river was seen to be affected by surrounding anthropogenic activities based on land-use, namely peat extraction, milling and agriculture.

#### 4.2.2.7 Protected flora

A search of the National Biodiversity Data Centre (NBDC) website was conducted with a focus on records of flora recorded from hectad N62, encapsulating the proposed development. Records for protected flora from hectad N62 are listed in **Table 4-8**. Basil thyme (*Clinopodium acinos*), Blue fleabane, Red hemp-nettle (*Galeopsis angustifolia*), Green-winged orchid, Alder buckthorn (*Frangula*

*alnus*), Large White moss (*Leucobryum glaucum*) and Round-leaved wintergreen (*Pyrola rotundifolia* subsp. *Rotundifolia*) (have been previously recorded).

Basil thyme and Red hemp-nettle are listed on the Flora Protection Order 2015 and also listed in the Irish Red Data Book (Curtis and McGough 1988). Blue fleabane, Green-winged orchid, Alder buckthorn and Round-leaved wintergreen are all listed in the Irish Red Data Book (Curtis and McGough 1988). None of the aforementioned species were recorded during the current surveys. Large White Moss *Leucobryum* has a fairly broad ecological range, but the most common habitats are acidic woodland and mires, from wet heath through to valley mires, raised bogs and even fens. Some hummocks in woodland can be massive and colonized by other bryophytes and vascular plants.

There are no suitable habitats within the proposed development site for rare and protected flora - they would not occur given the exclusively artificial character of the surrounding grassland environs. Therefore, these species are not selected as key ecological receptors.

**Table 4-8: Records of species protected under the Flora Protection Order 2015, and Red listed Species.**

Common Name	Scientific Name	Status
Basil thyme	<i>Clinopodium acinos</i>	Flora Protection Order, Red List
Blue fleabane	<i>Erigeron acer</i>	Red List
Red hemp-nettle	<i>Galeopsis angustifolia</i>	Flora Protection Order, Red List
Green-winged orchid	<i>Orchis morio</i>	Red List
Alder buckthorn	<i>Frangula alnus</i>	Red List
Large white moss	<i>Leucobryum glaucum</i>	Annex V, WA1976-2012
Round-leaved wintergreen	<i>Pyrola rotundifolia</i> subsp. <i>rotundifolia</i>	Red List

#### 4.2.2.8 Non-native / Invasive flora

NBDC records of non-native invasive species listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) and previously recorded in hectad N62 are listed in **Table 4-9**.

**Table 4-9: Third Schedule Non-native Invasive Species previously recorded in hectad N62**

Common Name	Scientific Name
Douglas Fir	<i>Pseudotsuga menziesii</i>
Japanese knotweed	<i>Fallopia japonica</i>
Nuttall's waterweed	<i>Elodea nuttallii</i>
Spanish bluebell	<i>Hyacinthoides hispanica</i>
Sycamore	<i>Acer pseudoplatanus</i>

#### 4.2.3 Fauna

This above section describes the existing environment at and within the environs of the proposed development site.

##### 4.2.3.1 Non-Volant Mammals

NBDC online records for protected non-volant fauna from hectad N62 encapsulating the proposed development are listed in **Table 4-10**. Habitats for all species occur within the proposed development site. These species are considered to occur, or at least occasionally use the site. Badger and Otter are considered to occur on the site and are discussed in the following sections.



**Table 4-10:** Records of protected non-volant fauna for N62.

Common Name	Scientific Name	Level of Protection
Otter	<i>Lutra lutra</i>	Annex II, IV, WA <sup>3</sup> 1976-2012
Irish hare	<i>Lepus timidus hibernicus</i>	Annex V, WA 1976-2012
Pine martin	<i>Martes martes</i>	Annex V, WA 1976-2012
Badger	<i>Meles meles</i>	WA 1976-2012
Red squirrel	<i>Sciurus vulgaris</i>	WA 1976-2012
Hedgehog	<i>Erinaceus europaeus</i>	WA 1976-2012
Eurasian pygmy shrew	<i>Sorex minutus</i>	WA 1976-2012

#### 4.2.3.2 Otter

Otter are found throughout Ireland and tend to occupy linear territories along watercourses and are rarely found far away from water. This species is listed as one of the qualifying interests of the River Barrow and River Nore SAC (002162) designation. The River Barrow and River Nore lie just south of the Boyne Catchment. During Rapid Assessment Surveys, which focused on 8 hydrometric areas as part of the National Otter Survey of Ireland 2010/12 (Reid *et al*, 2013), the Boyne catchment had the third highest level of Otter occurrence (72.8%) during the spot-checking technique deployed. There was an increase in incidence between the Rapid Assessment Surveys conducted during 2008 from 57.9% and 2010 to 67.1%, suggesting an increasing population for this area (Reid *et al*, 2013). This species is listed under Annex II of the EU Habitats Directive and under Annex II of the Berne Convention; it is also a legally protected species under the Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000).

Otters do utilise the Figle River upstream of the proposed site. During previous aquatic surveys carried out on the river in September 2019 an Otter spraint was found (MWP, 2019). While Salmon are not found in this river, or occur in very low densities, fish species such as Stone loach (*Barbatula barbatula*) and White-clawed crayfish do occur, which provide a potential food source for Otter.

#### 4.2.3.3 Badger

Badger distribution is widespread throughout Ireland and their preferred habitats are a mixture of areas to forage and seek cover which include, pasture grasslands, hedgerows, and areas of scrub and woodland (Small, 1995). This nocturnal species is very sociable and live in small groups called 'clans' and occupy territories. Clans live in dens known as setts. Setts usually consist of a number of entrances and exits, tunnels and chambers which have been dug out by the badgers. Their claws are well-adapted for digging tunnels and also for foraging. These are opportunist omnivores will eat mostly anything they find. Their diet includes fruit, plants, small invertebrates, fungi and even carrion. Badger eyesight is relatively poor, so they rely more on their sense of smell and hearing for foraging and sensing danger (Small, 1995). Badger is listed under Annex III of the Berne Convention and it is also a legally protected species under the Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000).

During the site visit on 22<sup>nd</sup> December two locations outside of the footprint of the proposed development showed signs of mammal activity, see Plates 5 and 6. **Plate 5** shows one of two openings observed during the visit. There was a worn path and old spoil heap underneath the fallen leaf litter leading to both openings which indicated this may be an active sett. **Plate 6** shows a worn path leading into dense cover of scrub. The opening into the scrub appeared large enough to accommodate a Badger passing through.

<sup>3</sup> Wildlife Act 1976-2012



Plate 5. Suspected active Badger sett



Plate 6. Mammal tracks leading into dense scrub

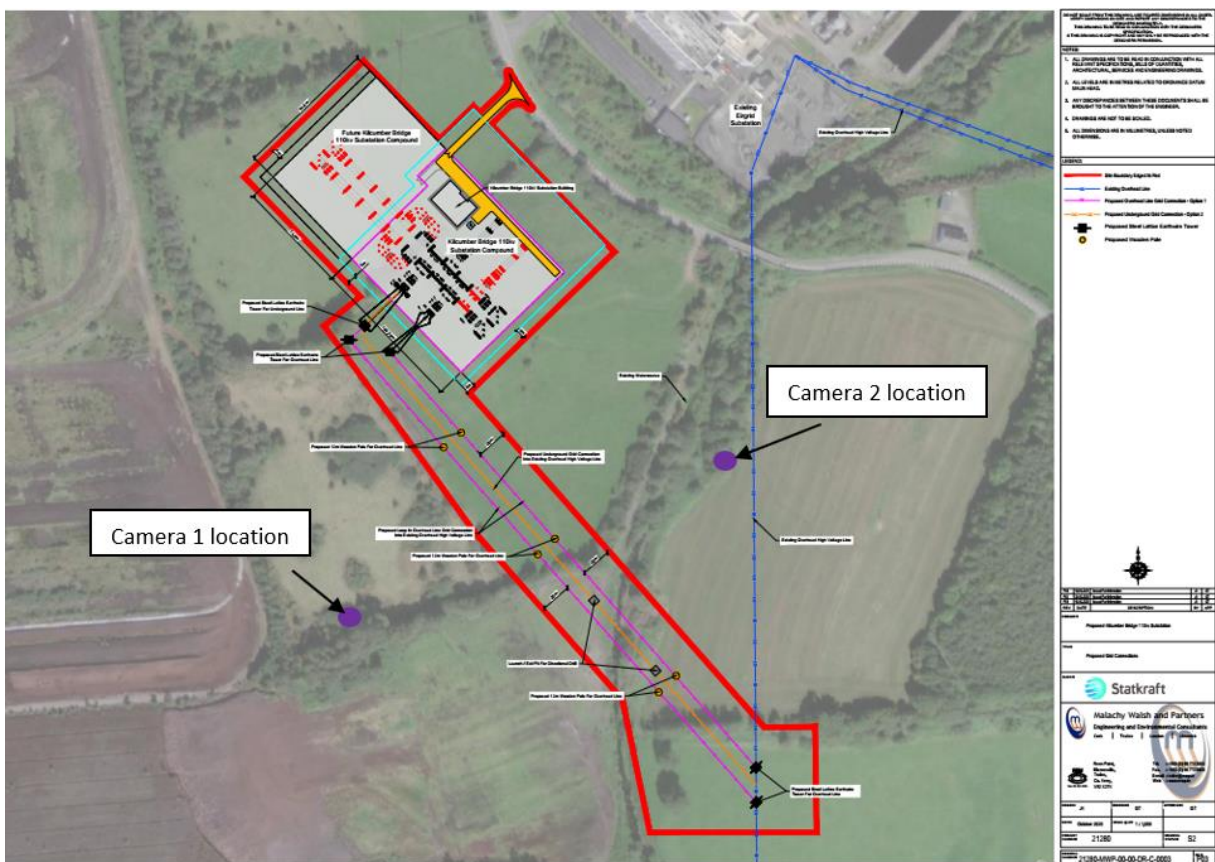


Figure 4-3. Locations of cameras

The images from both trail cameras deployed during December 2020-January 2021 revealed Badger activity almost every night. Most of the activity at camera 1 location was of a single Badger but on a few occasions two Badgers were seen together (see **Plate 9**). From the images captured it was evident this suspected sett is in use quite regularly at this location. On both visits to camera 1 location (to set up and remove the camera) there was evidence of activity but no signs of new excavations or fresh spoil heaps or old bedding left outside either openings. Due to the lack of fresh spoil heap or old bedding it is most likely this is an annexe sett rather than a main sett. At camera location 2 the badger activity consisted of a lone badger entering the scrub and emerging on a number of occasions (see **Plate 10**). It is unlikely this area of scrub has a main sett or annexe sett within it but may be used more for foraging. Additional images captured are presented in **Appendix 2-C**.





Plate 7. Two badgers at camera 1 location



Plate 8. Badger emerging from scrub at camera location 2

#### 4.2.3.4 Irish hare

Irish hare has a widespread distribution in Ireland and can be found in a number of habitats which include coastal grasslands, salt marshes, upland and lowland pastures<sup>4</sup>. This is listed under Annex V of the EU Habitats Directive and under Annex III of the Berne Convention; it is also a legally protected species under the Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000). Irish hare was not observed during any of the walkover surveys. Throughout the period the trail cameras were left out, Irish hare was recorded one night at camera 1 location only (See **Plate 9**).

#### 4.2.3.5 Fox

Fox (*Vulpes vulpes*) has widespread distribution in Ireland and can be found in a number of habitats such as woodlands and grasslands and also in urban areas. Foxes have a varied diet which ranges from rabbits, small mammals, birds, insects plant species and carrion (Looney, 2001). This species is not protected under the under the Wildlife Acts. This species. Fox was not observed during any of the walkover surveys. Throughout the period the trail cameras were left out, Fox was recorded on a few occasions at both camera locations (See **Plate 10**).



Plate 9. Irish hare at camera location 1

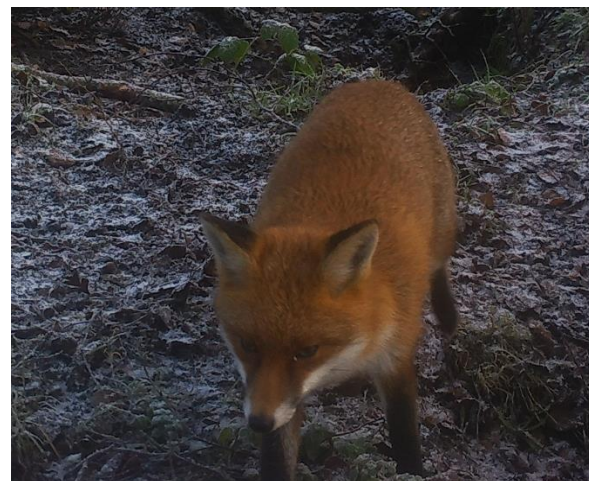


Plate 10. Fox at camera location 1

<sup>4</sup> [https://www.conserveireland.com/mammals/irish\\_hare.php](https://www.conserveireland.com/mammals/irish_hare.php)

4.2.3.6 Bats

4.2.3.6.1 Publicly available information

NBDC online records for bats from hectad N62 encapsulating the proposed development are listed in Table 4-11, below.

Table 4-11: Records of bats in the 10km grid square N62

Common Name	Scientific Name	Level of Protection
Brown Long-eared Bat	<i>Plecotus auritus</i>	Annex IV, WA1976-2012
Daubenton’s Bat	<i>Myotis daubentonii</i>	Annex IV, WA1976-2012
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	Annex IV, WA1976-2012
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	Annex IV, WA1976-2012

The National Biodiversity Data Centre (NBDC) maps landscape suitability bats based on Lundy *et al.* (2011). The maps are a visualisation of the results of the analyses based on a ‘habitat suitability’ index. The index ranges from 0 to 100 with 0 being least favourable and 100 most favourable for bats. Table 4-12 gives the suitability of the study area for the bat species found in Ireland (based on NBDC) along with their Irish Red List Status (from Marnell *et al.*, 2009). The overall suitability of the region for bats is 21.56 so is assessed as less favourable for bats. The suitability index is highest for Common pipistrelle (38), Soprano pipistrelle (33), Leisler’s bat (*Nyctalus leisleri*) (33) and Brown long-eared bat (27).

Table 4-12: Bat suitability index for the study area

Common name	Scientific name	Suitability index	Irish red list status
All bats	-	21	-
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	38	Least Concern
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	33	Least Concern
Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>	0	Least Concern
Daubenton’s bat	<i>Myotis daubentonii</i>	22	Least Concern
Brown long-eared bat	<i>Plecotus auritus</i>	27	Least Concern
Leisler’s bat	<i>Nyctalus leisleri</i>	33	Near Threatened
Natterer’s bat	<i>Myotis nattereri</i>	23	Least Concern
Whiskered bat	<i>Myotis mystacinus</i>	16	Least Concern
Nathusius’ pipistrelle	<i>Pipistrellus nathusii</i>	2	Least Concern

A search for records of bat activity and roosts within a 10km radius of the study area was conducted using the Bat Conservation Ireland database. A number of records have been recorded within 10km of the proposed works: roosts (5), transects (5), ad-hoc observations (11). The results of the database search are provided below in

Table 4-13.

Table 4-13: BCI data within a 10km radius of the proposed development site

Survey Type	Hectad/ details	Species recorded	Survey
Roost	Carbury, Clonsat; Co. Kildare	Roost type: Unknown Species Brown Long-eared Bat (Droppings)	A survey for bat roosts in Church of Ireland Churches
	Disused Church Rahan, Edenderry, Co. Kildare	Roost type: Unknown Species: Unidentified bat droppings	EIA survey – (Scott Cawley)
	Jonestown House, Edenderry, Co. Offaly	Roost type: Unknown Species: Unidentified bat	Buildings At Risk Grant, The Heritage Council

Survey Type	Hectad/ details	Species recorded	Survey
Roost	Morrissey Residence. Rhode, Co. Offaly	Roost Type: Unknown Species: Soprano Pipistrelle species	Bats in Houses Project
	Richard and Sarah Tyrell, Coolcor Carbury, Co. Kildare	Roost type: Unknown Species: Brown Long-eared Bat (Droppings)	EIAR Survey
Transect	5 No. Transects consisting of multiple individual surveys	Daubenton's Bat, Leisler's Bat, Soprano Common Pipistrelle, Unidentified bat	BC Ireland Car Based Bat Monitoring Scheme, All Ireland Daubenton's Bat Waterway Survey
Other Observations	11 No. observation from multiple surveys	Daubenton's Bat, Leisler's Bat, Soprano Pipistrelle, Common Pipistrelle, Unidentified Pipistrelle, Natterer's Bat, Brown Long-eared Bat	BATLAS 2010

#### 4.2.3.6.2 2018 and 2019 Bat surveys

The 2018 and 2019 bat surveys carried out by for the then proposed and now permitted Cushaling wind farm (MWP, 2019). The turbine locations are distributed to the northeast and east of the proposed Kilcumber Bridge 110kV substation. The data showed that there was variable level of usage amongst bats. A number of surveys were carried out at the site and will be discussed in the sections below.

##### Transect Surveys

A transect route was driven which included the portion of road along the road to the north of the proposed development site. The two species of bat were recorded during the transect surveys were Soprano pipistrelle and Common pipistrelle.

##### Static Detector Surveys

In 2019 static monitors were placed in various parts of the proposed and now permitted Cushaling wind farm site. One detector was placed in the northern extent of the proposed site where there are hedgerows along the agricultural field boundaries. Static detector surveys show comparative use of different parts of the site over a given period when all other factors are the same. This allows for an assessment of the importance of different features for bats. Most frequently recorded were Soprano pipistrelle and Common pipistrelle and less frequently recorded were Leisler's bat, Brown long eared bat and *Myotis* species. Pipistrelle species were found to be strongly associated with features such as hedgerows and with activity dropping significantly over more open habitat.

#### 4.2.3.6.3 2020 Bat Survey

##### Daytime roost suitability survey

A daytime bat survey was carried out along the route on the 13<sup>th</sup> July 2020. The survey focused on the trees within the subject site. The survey included checking for evidence of bats (droppings, staining, claw marks, bat fly pupae presence, visible bats). Trees within the site were checked for holes, cracks, crevices and openings. Inspections were carried out from ground level for external signs of damage, or evidence of the presence of holes or cavities.

Some of the mature trees within the site had some cracks and crevices and some of the hedgerows had ivy cover which may be potential roost sites. Hedgerows, treelines and the Figle River are linear features that provide a high degree of connectivity and good foraging habitat within the site and the surrounding area.

#### 4.2.3.7 Birds

NBDC online records for bird records from hectad N62 encapsulating the proposed development are listed in **Table 4-14**.

**Table 4-14: Records for bird records from hectad N62**

Common Name	Scientific Name	Level of Protection
Barn Owl	<i>Tyto alba</i>	Red-listed, WA 1976-2012
Barn Swallow	<i>Hirundo rustica</i>	Amber-listed, WA 1976-2012
Black-headed gull	<i>Larus ridibundus</i>	Red-listed, WA 1976-2012
Common grasshopper warbler	<i>Locustella naevia</i>	Amber-listed, WA 1976-2012
Common kestrel	<i>Falco tinnunculus</i>	Amber-listed, WA 1976-2012
Common kingfisher	<i>Alcedo atthis</i>	Amber-listed, Annex I EU Birds Directive, WA 1976-2012
Common linnet	<i>Carduelis cannabina</i>	Amber-listed, WA 1976-2012
Common pheasant	<i>Phasianus colchicus</i>	Green-listed, Annex II and Annex III EU Birds Directive, WA 1976-2012.
Common sandpiper	<i>Actitis hypoleucos</i>	Amber-listed, WA 1976-2012
Common Snipe	<i>Gallinago gallinago</i>	Amber-listed, Annex II and Annex III EU Birds Directive, WA 1976-2012
Common starling	<i>Sturnus vulgaris</i>	Amber-listed, WA 1976-2012
Common swift	<i>Apus apus</i>	Amber-listed, WA 1976-2012
Common wood pigeon	<i>Columba palumbus</i>	Green-listed, Annex II and Annex III EU Birds Directive, WA 1976-2012
Corn crane	<i>Crex crex</i>	Red-listed, Annex I EU Birds Directive, WA 1976-2012
Eurasian curlew	<i>Numenius arquata</i>	Red-listed, Annex II EU Birds Directive, WA 1976-2012
Eurasian teal	<i>Anas crecca</i>	Amber-listed, Annex II and Annex III EU Birds Directive, WA 1976-2012
Eurasian tree Sparrow	<i>Passer montanus</i>	Amber-listed, WA 1976-2012
Eurasian woodcock	<i>Scolopax rusticola</i>	Amber-listed, Annex II and Annex III EU Birds Directive, WA 1976-2012
European golden Plover	<i>Pluvialis apricaria</i>	Red-listed, Annex I, II and III EU Birds Directive, WA 1976-2012
Grey partridge	<i>Perdix perdix</i>	Red-listed, Annex II and Annex III EU Birds Directive, WA 1976-2012
Hen harrier	<i>Circus cyaneus</i>	Amber-listed, Annex I EU Birds Directive, WA 1976-2012
House martin	<i>Delichon urbicum</i>	Amber-listed, WA 1976-2012
House sparrow	<i>Passer domesticus</i>	Amber-listed, WA 1976-2012
Little egret	<i>Egretta garzetta</i>	Green-listed, Annex I EU Birds Directive, WA 1976-2012
Little grebe	<i>Tachybaptus ruficollis</i>	Amber-listed, WA 1976-2012
Mallard	<i>Anas platyrhynchos</i>	Green-listed, Annex II and Annex III EU Birds Directive, WA 1976-2012
Merlin	<i>Falco columbarius</i>	Amber-listed, Annex I EU Birds Directive, WA 1976-2012
Mute swan	<i>Cygnus olor</i>	Amber-listed, WA 1976-2012

Common Name	Scientific Name	Level of Protection
Northern lapwing	<i>Vanellus vanellus</i>	Red-listed, Annex II EU Birds Directive, WA 1976-2012
Northern wheatear	<i>Oenanthe oenanthe</i>	Amber-listed, WA 1976-2012
Rock pigeon	<i>Columba livia</i>	Green-listed, Annex II EU Birds Directive, WA 1976-2012
Sand martin	<i>Riparia riparia</i>	Amber-listed, WA 1976-2012
Sky lark	<i>Alauda arvensis</i>	Amber-listed, WA 1976-2012
Spotted flycatcher	<i>Muscicapa striata</i>	Amber-listed, WA 1976-2012
Stock pigeon	<i>Columba oenas</i>	Amber-listed, WA 1976-2012
Water rail	<i>Rallus aquaticus</i>	Amber-listed, WA 1976-2012
Whinchat	<i>Saxicola rubetra</i>	Amber-listed, WA 1976-2012
Whooper swan	<i>Cygnus cygnus</i>	Amber-listed, Annex I EU Birds Directive, WA 1976-2012
Yellowhammer	<i>Emberiza citrinella</i>	Red-listed, WA 1976-2012

#### 4.2.3.7.1 Site visits 2020

Birds encountered during the walkover surveys are listed in **Table 4-15** along with their conservation status (Colhoun & Cummins, 2013) and EU protection under the EU Birds Directive. One Buzzard was seen briefly to south of the site flying over agricultural grassland. A number of Swallows (*Hirundo rustica*) were seen flying and swooping low to the ground and along drainage ditches. Flocks greater than ten Starlings were seen a number of times to the west of the site. All other remaining species were either seen in small numbers or only heard calling.

**Table 4-15: Birds observed during walk over surveys**

Common Name	Scientific Name	Level of Protection
Buzzard	<i>Buteo buteo</i>	Green-listed, WA 1976-2012
Chaffinch	<i>Fringilla coelebs</i>	Green-listed, WA 1976-2012
Goldfinch	<i>Carduelis carduelis</i>	Green-listed, WA 1976-2012
Skylark	<i>Alauda arvensis</i>	Amber-listed, WA 1976-2012
Starling	<i>Sturnus vulgaris</i>	Amber-listed, WA 1976-2012
Swallow	<i>Hirundo rustica</i>	Amber-listed, WA 1976-2012
Wood pigeon	<i>Columba palumbus</i>	Green-listed, WA 1976-2012, Annex II and Annex III under EU Birds Directive
Wren	<i>Troglodytes troglodytes</i>	Green-listed, WA 1976-2012

#### 4.2.3.7.2 Trail cameras 2020/2021

Birds were also detected on the trail cameras (listed in Table 4-1 **Table 4-16**). Overall, there were three Green-listed species, two Amber-listed species and one Red-listed. All species listed are common and widespread and were recorded as individuals apart from Starling. **Plate 11** (below) shows a single Jay on the ground at camera location 1 and **Plate 12** (below) shows a flock of Starling flying past camera location 2.

**Table 4-16: Bird species captured on trail cameras**

Common Name	Scientific Name	Level of Protection
<b>Camera location 1</b>		
Blackbird	<i>Turdus merula</i>	Green-listed, WA 1976-2012
Jay (Eurasian)	<i>Garrulus glandarius</i>	Green-listed, WA 1976-2012
Robin	<i>Erithacus rubecula</i>	Amber-listed, WA 1976-2012
Woodcock	<i>Scolopax rusticola</i>	Red-listed, WA 1976-2012, Annex II and Annex III under EU Birds Directive



Common Name	Scientific Name	Level of Protection
<b>Camera Location 2</b>		
Starling	<i>Sturnus vulgaris</i>	Amber-listed, WA 1976-2012
Robin	<i>Erithacus rubecula</i>	Amber-listed, WA 1976-2012
Wood pigeon	<i>Columba palumbus</i>	Green-listed, WA 1976-2012, Annex II and Annex III under EU Birds Directive



Plate 11. Jay at camera location 1



Plate 12. Starlings at camera location 2

#### 4.2.3.8 Terrestrial Macroinvertebrates

NBDC online records for terrestrial macroinvertebrates from hectad N62 encapsulating the proposed development are listed in **Table 4-17**.

**Table 4-17: Terrestrial macroinvertebrates from hectad N62**

Common Name	Scientific Name	Conservation Status
Dark green fritillary	<i>Argynnis aglaja</i>	Vulnerable
Dingy skipper	<i>Erynnis tages</i>	Near threatened
Gatekeeper	<i>Pyronia tithonus</i>	Near threatened
Grayling	<i>Hipparchia semele</i>	Near threatened
Large heath	<i>Coenonympha tullia</i>	Vulnerable
Marsh fritillary	<i>Euphydryas aurinia</i>	Vulnerable, EU Habitats Directive - Annex II
Small heath	<i>Coenonympha pamphilus</i>	Near threatened
Wall	<i>Lasiommata megera</i>	Endangered
Gipsy cuckoo bee	<i>Bombus (Psithyrus) bohemicus</i>	Near threatened
Large red-tailed bumble bee	<i>Bombus (Melanobombus) lapidarius</i>	Near threatened
Moss carder-bee	<i>Bombus (Thoracomus) muscorum</i>	Near threatened
Heath snail	<i>Helicella itala</i>	Vulnerable
Lesser bulin	<i>Merdigera obscura</i>	Endangered
Tree snail	<i>Balea (Balea) perversa</i>	Vulnerable

During the site visit July 2020 Common field grasshopper (*Chorthippus brunneus*) was observed in the long grass fringing a drainage ditch. On ragwort within the agricultural grassland a number of Cinnabar moth (*Tyria jacobaeae*) caterpillars were observed on a few occasions. Small heath butterfly (*Coenonympha pamphilus*) was seen on a number of occasions.



#### 4.2.3.9 Fish

##### 4.2.3.9.1 Salmon

The Atlantic salmon is an anadromous species. Every six years, Member States of the European Union are required to report on the conservation status of all habitats and species listed on the annexes of the Habitats Directive as required under Article 17 of the Directive. Following a period of public consultation Ireland submitted these status assessments to the European Commission in June 2013. Salmon are present throughout the Barrow catchment including the Figile sub-catchment. The Salmon Conservation Limit (CL) in any river is the number of spawning salmon required to maintain a sustainable population and is used to indicate the number of salmon in a river system above which a harvestable surplus can be considered.

The Figile River among other tributaries is probably a significant contributor of Salmon to the River Barrow. The River Barrow is a highly modified (canalised river) and the lower reaches of the river are navigable. There is little salmonid spawning habitat in the main channel of the Barrow, with areas downstream of weirs probably most important in this regard. The best spawning areas for lampreys and salmonids are considered to occur at the end of pool/glide habitats downstream of weirs on the Barrow main channel. At these locations, substrates of aerated gravels provide suitable conditions for ova development. Due to the generally suboptimal spawning and nursery salmonid present in the main channel of the River Barrow, it is considered that the tributaries of the River Barrow are important with regard to salmon stocks in the main channel and within the area designated as part of the Natura 2000 network. The reach of the Figile River adjacent to the proposed development is generally unsuitable for salmonid spawning, this is due to the slow flowing nature of the river in the reach adjacent to the proposed development site. Areas of the Figile River downstream of the proposed development are likely more important in terms of salmon spawning.

The decline of Salmon in Irish Rivers can be largely attributed to overfishing and a decline in water quality, nationally, due to anthropogenic activities that negatively impact the physical, biological and chemical characteristics of water bodies. Whilst Salmon are listed as one of the key conservation objectives of the River Barrow and River Nore SAC, the Figile River is not a designated Salmonid River.

The Atlantic salmon is listed under Annexes II and V of the EU Habitats Directive and Appendix III of the Bern Convention. The overall conservation status for this species is considered 'Unfavourable - Inadequate' (NPWS, 2019).

Salmon were not recorded during surveys carried out on river in 2019 (MWP, 2019). This may be attributed also to the effects of anthropogenic activities such as peat extraction and milling, and local agriculture from the surrounding lands on the Figile River.

##### 4.2.3.9.2 Lampreys

The Barrow River is regarded as a suitable spawning and nursery area for Lampreys (NPWS 2012). It is known from netting surveys that River lamprey (*Lampetra fluviatilis*) occur in the upper tidal Barrow in the spring (CFB unpublished data). Both Sea lamprey (*Petromyzon marinus*) and River lamprey recorded throughout the catchment. However, the degree of upriver penetration and the size of population involved are not known and they were not found in all Rivers of the SAC. This data is based on Irish Wildlife Manuals No. 21 'The status and distribution of lamprey and shad in the River Barrow SAC' (King and Linnane, 2004). Sea lamprey and River lamprey are likely to be confined to the lower reaches of the River Barrow. Lampreys show a preference for gravel-dominated substratum for

spawning, and mainly silt and sand-dominated substratum for nursery habitat (Harvey and Cowx, 2003). Maitland (2003) notes that most spawning of Lampreys occurs where there is some water flow through the substrate, conditions that occur below weirs in the study area and not at near / proposed works locations.

Sea lamprey and River lamprey are anadromous species, spending part of their life cycle in the marine environment and returning to natal watercourses to spawn. Sea and River lampreys are poor swimmers and cannot jump or climb (Reinhardt *et al.*, 2009), so will have significant difficulty getting past the main stem weirs on the River Barrow, including the lower weir at St. Mullins. Spawning of River lampreys starts when the water temperature reaches 10–11°C, usually in March and April (Morris and Maitland 1987). The Sea lamprey usually spawns in late May or June, when the water temperature reaches at least 15°C (Maitland, 2003). The Sea Lamprey is the largest of the Irish lampreys. In the NPWS Irish Wildlife Manuals No. 21 (King, 2006), the Sea lamprey is indicated as occurring as far upstream as Carlow on the main channel of the River Barrow. It is considered that these lampreys were most likely Brook lampreys (*Lampetra planeri*), taking account of the distance from the tide and the number of weirs on the river downstream. King (2006) notes the presence of River / Brook lampreys in the Barrow upstream of Portarlinton.

Sea lamprey is listed in Appendix II of the Habitats Directive listed in Appendix III of the Bern Convention. The overall conservation status for Sea lamprey in Ireland is considered to be 'Bad' and habitat status 'Inadequate' (NPWS, 2019). River lamprey is listed in both Appendices II and IV of the Habitats Directive and listed in Appendix III of the Bern Convention. The overall conservation status for River lamprey is 'Unknown' and habitat status 'Favourable' (NPWS, 2019).

The Brook lamprey is the smallest of the three lamprey species native to Ireland and it is the only one of the three species that is non-parasitic and spends all its life in freshwater (Maitland & Campbell 1992). The spawning season of Brook lampreys starts when the water temperatures reach 10–11°C (Maitland, 2003). This usually occurs in March/April. King (2006) gives the distribution of the three species of lampreys in the River Barrow and River Nore cSAC and found Brook lampreys to be widely distributed in the main channel of the River Barrow. The main threats to the Brook lamprey population are the pollution of surface waters, dredging of and the removal of sediment (which lamprey inhabit), bait digging by anglers also poses a significant threat to the species.

Brook lamprey is listed in Appendix II of the Habitats Directive and listed in Appendix III of the Bern Convention. The overall conservation status is evaluated as being of 'Favourable' nationally and habitat status also 'Favourable' (NPWS, 2019).

During the aquatic surveys in 2019, five sites were surveyed on the Figile River, all upstream of Kilcumber Bridge. Brook lamprey ammocoetes were recorded at Site 2, Site 3 and Site 4. Spawning areas for Brook lamprey in the Figile River are sparse within and adjacent to the proposed development site.

Brook lamprey are considered the only species of Lamprey present in the Figile River taking into account the presence of numerous weirs in the River Barrow, and the swimming capabilities of anadromous Sea and River lampreys.

#### 4.2.3.9.3 Other fish

During surveys carried in 2019 in the Figile River, a number of fish were captured during biological sampling and electric fishing. Stone loach (*Barbatula barbatula*), Minnow (*Phoxinus phoxinus*), Three-spined stickleback (*Gasterosteus aculeatus*) and Nine-spined Stickleback (*Pungitius pungitius*) were captured during biological sampling. Sticklebacks occur in some drainage ditches as well as in the Figile River. During the electrical fishing surveys Brown trout (*Salmo trutta*), Stone loach, Minnow, Perch (*Perca fluviatilis*), Dace (*Leuciscus leuciscus*), Pike (*Esox Lucius*), Roach (*Rutilus rutilus*), Gudgeon (*Gobio gobio*), Minnow, Brook lamprey and Three-spined Stickleback were recorded.

Fish are dependent on good water quality for a variety of reasons, including a constant oxygen and stable food supply. An array of physico-chemical water quality parameters dictates the water chemistry and biological water quality of a waterbody, and therefore the dependent aquatic ecosystem. The range of pH suitable for fisheries, for example, is considered to be 5.0-9.0, though 6.5-8.5 is preferable (EPA, 2001). The Freshwater Fish (78/659/EEC) is one of the most important of all the earlier Directives in that its quality requirements have been applied widely in various contexts, notably in Water Quality Management Plans. The Directive classifies fresh waters as either salmonid (S) or cyprinid (C), the former being of such quality as to support game fish and the latter being of a lesser quality but satisfactory for coarse fish. Accordingly, there is a dual range of standards, those for salmonid waters obviously being rather stricter than the quality requirements for cyprinid waters. For example, salmonid fish will begin to be affected as Dissolved Oxygen levels drop to around 50% saturation; cyprinid fish are likewise affected at levels in the vicinity of 30% (EPA, 2001). While the Figile River supports mainly coarse fish it also supports Brown trout and Salmon are likely present in areas downstream of the proposed development

#### 4.2.3.10 Aquatic Macroinvertebrates

##### 4.2.3.10.1 Freshwater pearl mussel

The proposed development is located in the Barrow catchment, an area identified as a Freshwater pearl mussel (*Margaritifera margaritifera*) sensitive area and classified as a Catchment with previous records of, but current status unknown. Freshwater pearl mussel (FPM) are among the longest-living invertebrates. This species is under increasing pressure from a number of sources and are continuing to decline and classified as Endangered on the IUCN Red List of Endangered Species.

The Ecological Quality Ratio for macroinvertebrates is given as  $\geq 0.85$  for the high status/good status boundary in the Surface Water Regulations (SWR) (2009), therefore the FPM Objectives (2009) requirement for an EQR  $\geq 0.90$  relates to 'high status' watercourses i.e. Q4-5 & Q5, as per the EPA Q-rating system. Regarding the ecological quality objectives for FPM habitat, the Figile River within and adjacent to the proposed development site channel fails on the all criteria with respect to ecological quality objectives for FPM habitat listed in DoEHLG (2009) i.e. the following elements: macroinvertebrates, macroalgae and siltation.

Lucey (1993) gives the distribution of FPM in southern Irish rivers and streams. This study area encompassed Hydrometric Areas 11 to 24. The proposed development is located in Hydrometric Area 14 (Barrow). The distribution of FPM given in Lucey (1993) for the River Barrow is within the distribution given in NPWS (2013). Tributaries of the Barrow, Nore and Suir River were examined for *Margaritifera margaritifera* and *M. m. Durrovensis* from June to August 1991 (Moorkens *et al.*, 1992). Rivers surveyed included the Figile, Cushina, Lerr and Greese in the upper Barrow catchment. Of the 79 rivers surveyed, only four were found to have living freshwater pearl mussels. Two of these rivers

were in the Barrow catchment: the Mountain River and the Ballymurphy River. There are three FPM populations in the Barrow catchment within the River Barrow and River Nore cSAC (002162). FPM populations recorded from the River Barrow sub-basin are restricted to three tributaries of the Barrow in Co. Carlow; the Aughavaud, Ballymurphy and Mountain Rivers.

It is noted in Moorkens *et al.* (1992) that alteration in a river's flow regime, such as that caused by drainage for forestry or agriculture, may result in summer flows being insufficient to support FPM. The same can be said of drainage carried out for harvesting of peat. A large proportion of rivers in the study area have soft substrates deemed unsuitable for FPM, beds of these rivers thought to be influenced by peat runoff from peat harvesting, suspended solids from ploughed lands and diffuse enrichment from agricultural activities, all known pressures on FPM (Moorkens, 1999).

This species is and are listed under Annex II and IV of the EU Habitats Directive and it is also a legally protected species under the Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000). The overall conservation status for the FPM is 'Bad' and habitat status also 'Bad' (NPWS, 2019).

FPM were not recorded during the aquatic sampling surveys conducted in the Figile River in May 2019 and are not considered present in this watercourse. Substrate siltation and poor hydromorphological condition are the primary reasons for this evaluation. There are therefore no pathways identified by which this species may be affected by the proposed development. Dedicated surveys for this species were not considered necessary and this species is not included as a KER.

#### **4.2.3.10.2 Duck mussel**

Duck mussel (*Anodonta anatina*) is typically a lowland species (Kerney, 1999) and has a relatively widespread distribution over most of lowland Ireland except the extreme west and north<sup>5</sup>. Its habitat in Ireland is lowland lake, slow moving rivers and canals. Microhabitat for this species in Ireland comprises muddy or silty beds in areas of still or slow flow. There are a total of 31 Irish non-marine molluscan species that either have a threat status or with important Irish populations (Moorkens, 2006), including Duck mussel. The IUCN status of *A. anatina* is 'Vulnerable' (Byrne *et al.*, 2009) and its threat status is 'Vulnerable' (Moorkens, 2006).

Duck mussel was recorded during the aquatic sampling surveys conducted in the Figile River in 2019.

#### **4.2.3.10.3 White-clawed crayfish**

The White-clawed crayfish (*Austropotamobius pallipes*) is the largest non-marine invertebrate found in Ireland. Adults can grow to approximately 11cm in length. It is also a relatively long-lived species with a maximum life of 10 years. Globally this species is confined to south and west Europe including Ireland. In its continental range White-clawed crayfish is found most commonly in headwater streams. In Ireland it occurs in small and medium-sized lakes as well as rivers and streams and this is considered to be due to the lack of competition from other crayfish species.

White-clawed crayfish are widespread in Irish lowland lakes and rivers which are underlain by Carboniferous limestone, or its derivative - glacial drift (Reynolds, 1998). The River Barrow and River Nore cSAC is stronghold for White-clawed crayfish (Demers *et al.*, 2005). The species is present in both the Figile River and the River Barrow as outlined by the NPWS mapping in the cSAC Conservation

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<sup>5</sup> <https://www.npws.ie/sites/default/files/publications/pdf/RL2.pdf>

Objectives (NPWS, 2011). There has been an improvement or no deterioration in the in the range and habitat quality and population of White-clawed crayfish in Ireland. As the greatest threat to the species is from disease and introduction of alien species and this is as likely in the future as now, the overall trend is considered stable. Crayfish are recognized as being tolerant of moderate pollution levels and are classed as Group C organisms in the EPA Q-Value biotic index. Records for White-clawed crayfish are shown on the Biodiversity Ireland database and are part of the EPA biological water quality monitoring data records. Freshwater crayfish require adequate lime in the water (relatively hard water with a pH of 7 or above), high dissolved oxygen, and an absence of organic pollution (Reynolds, 1998). As the White-clawed crayfish is an aquatic species any changes to water quality will impact the species.

Crayfish plague (*Aphanomyces astaci*) kills White-clawed crayfish and is the principal cause of decline in Britain and parts of Europe. There have been five cases of Crayfish Plague since 2015 confirmed in Ireland affecting the Erne/Bruskey Co Cavan, River Suir Co. Tipperary, River Deel Co. Limerick, Lorrha River Co. Tipperary and the River Barrow at Carlow. Large numbers of dead freshwater crayfish were reported in the River Barrow in the stretch from Carlow to Graigue-managh. It was confirmed using DNA analysis that the cause of death was Crayfish Plague<sup>6</sup>.

The threat from disease introduction is severe and not likely to disappear and as a result future prospects are considered inadequate. The key objective is to maintain the Ireland's status as free of both non-native species and the Crayfish plague disease.

This species is evaluated as being of overall 'Bad' conservation status nationally (NPWS, 2019). This species is a protected species under the EU Habitats Directive Annex II and Annex V, as well as under the Irish Wildlife Acts (2000).

White-clawed crayfish were recorded in the Figile River during the 2019 surveys and can be expected to occur in the reach crossed by the proposed development.

#### 4.2.3.11 Amphibians and Reptiles

There are two land dwelling reptiles in Ireland, the Common lizard (*Zootoca vivipara*) and Slow worm (*Anguis fragilis*). These two reptiles have not been recorded in the hectad N62 where the proposed development occurs neither were encountered during the site visits.

There are only three species of amphibians in Ireland and two of them have been recorded in the hectad N62 where the proposed development occurs, the Smooth Newt (*Triturus vulgaris*) and Common Frog (*Rana temporaria*). These species are widespread in Ireland have similar habitat requirements such as areas of standing bodies of water. Smooth newt is protected under the Irish Wildlife Acts (2000). Common frog is evaluated as being of overall 'Favourable' conservation status nationally and habitat status also 'Favourable' (NPWS, 2019). This species is a protected species under the EU Habitats Directive Annex V, as well as under the Irish Wildlife Acts (2000).

Neither the Smooth Newt nor Common Frog were recorded during the site visits in 2020. It is likely that Common Frog occurs as this species was frequently encountered during 2019 surveys at Cushaling

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<sup>6</sup> <https://www.fisheriesireland.ie/Press-releases/crayfish-plague-spreads-to-river-barrow-and-water-users-are-urged-to-follow-biosecurity-advice-to-contain-outbreak.html>

(MWP, 2019). As there are small areas of Wet grassland and Drainage ditches within the proposed development site it is possible that both Smooth newt and Common frog are present.

#### 4.2.3.12 Non-native fauna

NBDC records of non-native invasive species listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) and previously recorded in hectad N62 are listed in **Table 4-18** below:

**Table 4-18: NBDC records of non-native invasive species listed under the Third Schedule of the European**

Common Name	Scientific Name
Freshwater shrimp	<i>Gammarus pulex</i>
Common Garden Snail	<i>Cornu aspersum</i>
Keeled Slug	<i>Tandonia sowerbyi</i>
American Mink	<i>Mustela vison</i>
Grey Squirrel	<i>Sciurus carolinensis</i>
European Rabbit	<i>Oryctolagus cuniculus</i>
Fallow Deer	<i>Dama dama</i>
Greater White-toothed	<i>Crocidura russula</i>
Feral Goat	<i>Capra hircus</i>

#### 4.2.3.13 Water Quality

The study area is located in the South Eastern River Basin District. The EPA produced an integrated water quality report for the south eastern river basin district in 2014 (EPA, 2014). This assessment presents the latest monitoring data, an assessment of the data and a focus on key issues that affect water quality in the South Eastern River Basin District. The main catchments are the Barrow, Nore and Suir catchments but there are also many smaller catchments.

In the Figile Water Management Unit Action Plan, pressures / risks to water quality are listed and include nutrient sources (94% of TP is diffuse, with 56% from agriculture and 30% from unsewered properties), point pressures (12 WWTP including Rathangan, Clonbullogue and Daingean) and agriculture<sup>7</sup>.

The most significant stressor of the Figile River in the study area is likely to result from peat silt from surrounding bogs. The water quality in this river is likely affected by surrounding peat extraction and milling. Due to ongoing peat harvesting there are extensive areas of denuded bogs exposed to pluvial runoff. It was evident from the site visit in 2019 that large quantities of peat silt are deposited in the river. In fact, the Figile River is maintained by excavators to remove silt accumulations.

The River Barrow has also siltation problems leading to a requirement for ongoing maintenance. In a letter dated 27/9/99 from Gaynor, Corr & Associates, on behalf of the Irish farmers Association to the River Barrow drainage board, a conclusion in relation to the Bog of Allen Group was that '*Silting (by peat fines) of the Figile River is a serious problem*'. Siltation is the term used to describe the coating of a river-bed with deposits of mud, clay, sand or peat and it may affect the macroinvertebrate diversity resulting in a dramatically reduced biological quality index (Q-Value). Siltation is reported to have had impacts in some streams in the south eastern river basin district and problems of this nature appear

<sup>7</sup>[http://www.wfdireland.ie/docs/1\\_River%20Basin%20Management%20Plans%202009%20-%202015/SERBD%20RBMP%202010/Water%20Management%20Unit%20Action%20Plans/Figile%20WMMU%20Mar%202010.pdf](http://www.wfdireland.ie/docs/1_River%20Basin%20Management%20Plans%202009%20-%202015/SERBD%20RBMP%202010/Water%20Management%20Unit%20Action%20Plans/Figile%20WMMU%20Mar%202010.pdf)



to be on the increase. Siltation can be caused by various activities including gravel removal, peat extraction, road & house building, land drainage, mining, animals such as cattle gaining access to rivers, over-grazing, and forestry operations (EPA, 2012).

The Figile River was monitored by the EPA at six locations with the most recent data available from 2017. Biological water quality ranged from Q3 to Q4. The rating at each site surveyed in 2017 has been included in **Table 4-19**. The closest monitoring station is located just north of the site at Kilcumber Bridge (RI14F010180) which was rated Q3-4 in 2017. There is one station in excess of 4km upstream (NE) of the proposed development site at the bridge South of Ticknevin Bridge (RS14F010070), where biological water quality was rated Q3 in 2017. There are three active monitoring stations located downstream (SW) of the proposed development site: Bridge in Clonbulloge (RS14F010300); Derrygarran Bridge (RS14F010400) and Ardra Bridge (RS14F010500). Biological water quality at these locations was rated Q4 in 2017.

The following is the most recent EPA assessment of the Figile River based on the 2017 results: Unsatisfactory ecological conditions persisted in the upper reaches (0050, 0100, 0200) of the Figile River in August 2017. The downstream stations at Clonbulloge Br. (0300), Andra Br. (0500) and Derrygarran Br. (0400) remained in satisfactory condition.

**Table 4-19:** River Water Quality at EPA Stations at the Figile River when mostly recently surveyed in 2017.

Station Name/Location	Station ID	Q-rating	Corresponding WFD status
BR S of Ticknevin Bridge	RS14F010050	Q3	Poor
Cushaling Bridge	RS14F010100	Q3-4	Moderate
Kilcumber Bridge	RS14F010200	Q3-4	Moderate
Figile – Bridge in Clonbulloge	RS14F010300	Q4	Good
Derrygarran Bridge	RS14F010400	Q4	Good
Ardra Bridge	RS14F010500	Q4	Good
1 km u/s Barrow R confluence	RS14F010600	Not monitored	Not monitored

Biological water quality sampling was carried out at Kilcumber Bridge in 2019 and was rated 'Q3' which is the equivalent to Water Framework Directive (WFD) 'Poor' status (MWP, 2019).

#### 4.2.4 Evaluation of Designated Sites, Habitats and Fauna

The habitats and associated flora, fauna and other ecological features or resources identified in **Sections 4.2.1, 4.2.2 and 4.2.3** are now evaluated on the basis of their local, national and international conservation importance using the evaluation criteria described in **Appendix 2-A**. Secondly, based on these evaluations, an assessment will then be made as to which of these habitats or species are considered KERs that may be impacted upon during the proposed construction, operation or decommissioning phases of the project. An evaluation of the designated sites to identify those that are KERs is also presented here.

##### 4.2.4.1 Sites of National Importance

Sites of national importance (NHA and pNHA) are discussed hereunder. European/Natura 2000 Designated sites are discussed in reports prepared in line with the Appropriate Assessment process. **Table 4-20** gives an evaluation of Sites of national importance and rationale for inclusion/exclusion as a Key Ecological Receptor (KER).

**Table 4-20: Evaluation of designated sites and rationale for inclusion/exclusion as a KER**

Receptor	Evaluation	Rationale for inclusion/exclusion as a Key Ecological Receptor (KER)	KER
Grand Canal pNHA (02104)	Nationally Important	Located 4.72km north of the proposed development. There is no hydrological link between the proposed development site and this pNHA.	No
Long Derries, Edenderry pNHA (000925)	Nationally Important	Located 5.2km northeast and situated upstream of the proposed development.	No
Black Castle Bog NHA (000570)	Nationally Important	Located 6.70km northwest of the proposed development. There is no hydrological link between the proposed development site and this NHA.	No
Carbury Bog NHA	Nationally Important	Located 11.6km northeast of the proposed development. There is no hydrological link between the proposed development site and this NHA.	No
Daingean Bog NHA (00220033)	Nationally Important	Located 14.7km west of the proposed development. Situated upstream of Daingean 2 <sup>nd</sup> order stream which discharges in to the Figile River ca. 3km downstream of the proposed development.	No

##### 4.2.4.2 Habitats and Species

**Table 4-21** presents an evaluation of the importance of the habitats and species identified within the receiving environment of the proposed development.

Impacts on mammals which have been recorded in hectad N62 previously such as such as Hedgehog, Pine martin, Red squirrel and Eurasian pygmy shrew are not considered likely to result in significant effects given the lack of evidence to suggest that the study area provides important habitat for populations of local, county or national significance for these species. Consequently, these species are considered receptors of local importance (lower value) and are not considered to be KERs.

Table 4-21: Evaluation of habitats and species

Receptor	Evaluation	Description	Key Ecological Receptor
<b>Habitats</b>			
Improved Grassland Habitat (GA1)	local importance (lower value)	Highly modified and maintained habitats with low floral biodiversity.	No
Hedgerow (WL1)	local importance (higher value)	Dominant field boundary with species diversity and offers cover to badgers and linear features for bats.	Yes
Scrub (WS1)	local importance (higher value)	Appears alongside hedgerows, has biodiversity value provide breeding and foraging habitat for mammals and birds.	Yes
Drainage Ditches (FW4)	local importance (higher value)	Artificial channels that have not been maintained. These features occur mostly along field boundaries. Provide potential habitat for amphibians.	Yes
Wet Grassland (GS4)	Local Importance (higher value)	Habitat associated largely with the Figile River floodplain, considerable floral diversity. Provide potential habitat for amphibians.	Yes
Lowland/Depositin g River (FW2)	County Importance	Watercourse supports a resident population of White-clawed Crayfish, a species listed in Annex II of the Habitats Directive.	Yes
Buildings and Artificial Surfaces (BL3)	Local Importance (lower value)	Tracks, Edenderry plant and regional/local roads at the site have low/non-existent floral supporting capacity.	No
<b>Species</b>			
Bats	Local Importance (higher value)	There were no roosts recorded within the site boundary. The site is used by foraging bats and mature broadleaved trees and ivy cover may have some roost potential. Bats are Annex IV species under the EU Habitats' Directive and are also listed as protected species under the Irish Wildlife Act (Amendment) 2000. Although no evidence of roosting was found within the proposal site, the legal status and ecological sensitivity of these species merits their evaluation as nationally important species.	Yes
Otter	Local Importance (higher value)	This species is listed as a conservation interest in the River Nore and River Barrow SAC and utilises the Figile River for hunting.	Yes
Badger	Local Importance (higher value)	An active sett was located to the southwest of the proposed development. It is evident that Badgers are very active and hold territory in this area.	Yes
Hare	Local Importance (lower value)	Potential habitat for other species lies within the proposal site boundary (scrub, woodland, etc) and this species was recorded on site. However, populations of greater than local significance were not recorded and there is more suitable habitat in the wider area.	No
Fox	Local Importance (lower value)	Potential habitat for other species lies within the proposal site boundary (scrub, woodland, etc) and this species was recorded on site. However, populations of greater than local significance were not recorded and there is more suitable habitat in the wider area.	No

Receptor	Evaluation	Description	Key Ecological Receptor
Additional fauna (e.g. Hedgehog, , Red Squirrel, Pygmy shrew)	Local Importance (lower value)	Potential habitat for other species lies within the proposal site boundary (scrub, woodland, etc) but populations of greater than local significance were not recorded.	No
Birds	Local Importance (lower value)	Potential habitat for other species lies within the proposal site boundary (scrub/hedgerow).	Yes
Terrestrial Macroinvertebrates	Local Importance (higher value)	The terrestrial insect population in wet grassland provide food source for bats.	Yes
Atlantic salmon	Local Importance (higher value)	Atlantic salmon is listed on Annex II of the EU Habitats Directive and is occurs in the River Barrow but were not recorded in the Figile River during surveys 2019. Largely unsuitable habitat present.	No
Brook lamprey	Local Importance (higher value)	The Figile River has supporting habitat for juvenile lampreys along its margins, as well as some suitable spawning gravels.	Yes
Other fish	Local Importance (higher value)	The fish population in the study area is important in the overall functioning of the aquatic ecosystem of the Figile River	Yes
Freshwater pearl mussel	International importance	This species is critically endangered but there are no known FPM in watercourses downstream of the proposed development. The species is highly unlikely to occur in the Figile or Barrow Rivers as these rivers have been drained and the habitats are suboptimal.	No
White-clawed crayfish	County Importance	This species is listed as a conservation interest of the River Barrow and River Nore cSAC and occurs in the Figile River within the potential zone of influence of the proposed development.	Yes
Other aquatic macroinvertebrates	Local Importance (higher value)	The macroinvertebrate community of the Figile River is important in the functioning of the aquatic ecosystem of the Figile River, but populations of greater than local significance were not recorded.	Yes
Common frog and Smooth newt	Local Importance (higher value)	Species not recorded however, suitable habitats occur within the site which include wet grassland, drainage ditches.	Yes
Common lizard	Local Importance (lower value)	Not recorded but may occur, a population of greater than local significance was not recorded.	No

#### 4.2.5 Do-Nothing Scenario

The proposed development site is situated on Improved agricultural grassland. This has been managed and is currently used for grazing cattle. It is likely this land-use would continue or perhaps be further drained and developed as improved agricultural grassland following the national trend.

### 4.3 LIKELY SIGNIFICANT EFFECTS

Assessments of the direct and indirect likely significant impacts on ecological receptors (i.e. flora and fauna) that may occur as a result of the proposed development are assessed in the following sections.

This section will identify in detail the ecological impacts of the construction and operational phases of the proposed development on the local natural environment.

Where impacts are assessed to be potentially significant, mitigation measures were incorporated into the project design to remove or reduce impacts. The potential effects of the proposed development were considered and assessed to ensure that all effects on KERs are adequately addressed and no significant residual effects are likely to remain following the implementation of mitigation measures/best practice.

#### 4.3.1 Construction phase

##### 4.3.1.1 Impacts to Designated Areas

The proposed development does not traverse the boundaries of any European or Nationally designated sites designated for nature conservation. There will be no direct effects on any designated site as a result of the construction of the proposed development. A Natura Impact Statement (NIS) was completed to determine the ecological effect of the project on the integrity of Natura 2000 sites, either alone or in combination with other plans or projects, in view of the site's conservation objectives. The NIS concluded that the project will not adversely affect the integrity of the River Barrow and River Nore SAC (002162).

##### 4.3.1.2 Impacts to Habitats and Flora

###### 4.3.1.2.1 Direct Habitat loss

Habitat loss will result from the construction of the substation and overhead line. There will be loss of the following habitats; Improved agricultural grassland, Wet grassland, Hedgerow/Scrub and Drainage ditches.

Habitat loss impacts to facilitate the development are considered to range from **short term** to **long-term** (15-60yrs) **moderate negative**. These impacts are not mitigated for ecological receptors identified as being of local importance (lower value), such as improved agricultural grassland.

###### 4.3.1.2.2 Habitat disturbance

The proposed development will inevitably result in some fragmentation as it bisects certain areas of habitat: Wet grassland, Drainage ditches and Hedgerows/scrub. This disturbance is assessed as **long-term moderate negative**.

###### 4.3.1.2.3 Habitat Fragmentation

The degree of impact in relation to habitat fragmentation is assessed as **long-term moderate negative**, an unmitigated impact. The proposed works inevitably result in some fragmentation, the effect is classified as **long-term moderate negative** due to removal of areas of Wet grassland, Drainage ditches and Hedgerows/scrub in the study area which are important for a number of KER.



#### 4.3.1.2.4 Invasive Alien Species

No invasive species were recorded on the site during the initial site visits.

A pre-construction survey for invasive species will be conducted. Should invasive species be recorded at works locations within the development footprint, an Invasive Species Management Plan will be prepared prior to construction works commencing. In the absence of mitigation, the effect associated with the spread of invasive species would be assessed as a **long term moderate negative** impact. This could occur by importation of IAS during construction.

#### 4.3.1.3 *Impacts to Fauna*

The proposed development has the potential to result in habitat loss, disturbance and displacement to the fauna that reside within the ZOI. Where fauna of particular ecological significance or potential habitat for such species was recorded, these were included as KERs and are described in the following sections. Effects on mammals such as Hedgehog, Pine martin, Red squirrel and Eurasian pygmy shrew Hare and Fox species are not considered likely to be of significance given the lack of evidence to suggest that the study area provides important habitat for populations of local, county or national significance for these species. Consequently, these species are considered to be receptors of local importance (lower value) and are not considered to be KERs.

##### 4.3.1.3.1 Otter

No Otter holts were recorded during the 2020 ecological walkover surveys, however the habitats within the proposed development area are considered suitable for foraging otter. The water crossing works at the Figle River (for the overhead line) may temporarily displace commuting or foraging Otters, however the impact is considered to be limited given the localised and temporary nature of the works and the wide availability of suitable habitat upstream and downstream of the works. Potential unmitigated impacts to commuting otter are considered to be **temporary slight negative**. The effects would be considered **temporary Imperceptible negative**.

##### 4.3.1.3.2 Badger

There is potential for disturbance impacts to Badgers in the area during the construction phase of the development, particularly where construction takes place near an active sett. In December 2020 two locations were identified where Badger activity occurred, one of which is an active sett. Both locations of known badger activity are outside the footprint of the proposed development (see Figure 4-4 below). In the event that breeding badgers are present within the development area during construction, there is potential for **short-term significant** impacts to occur in the absence of mitigation. Badgers are expected to forage throughout the area and will likely avoid areas of development. Any avoidance of the development area by badgers is expected to be a **temporary-short term slight negative impact** without mitigation.

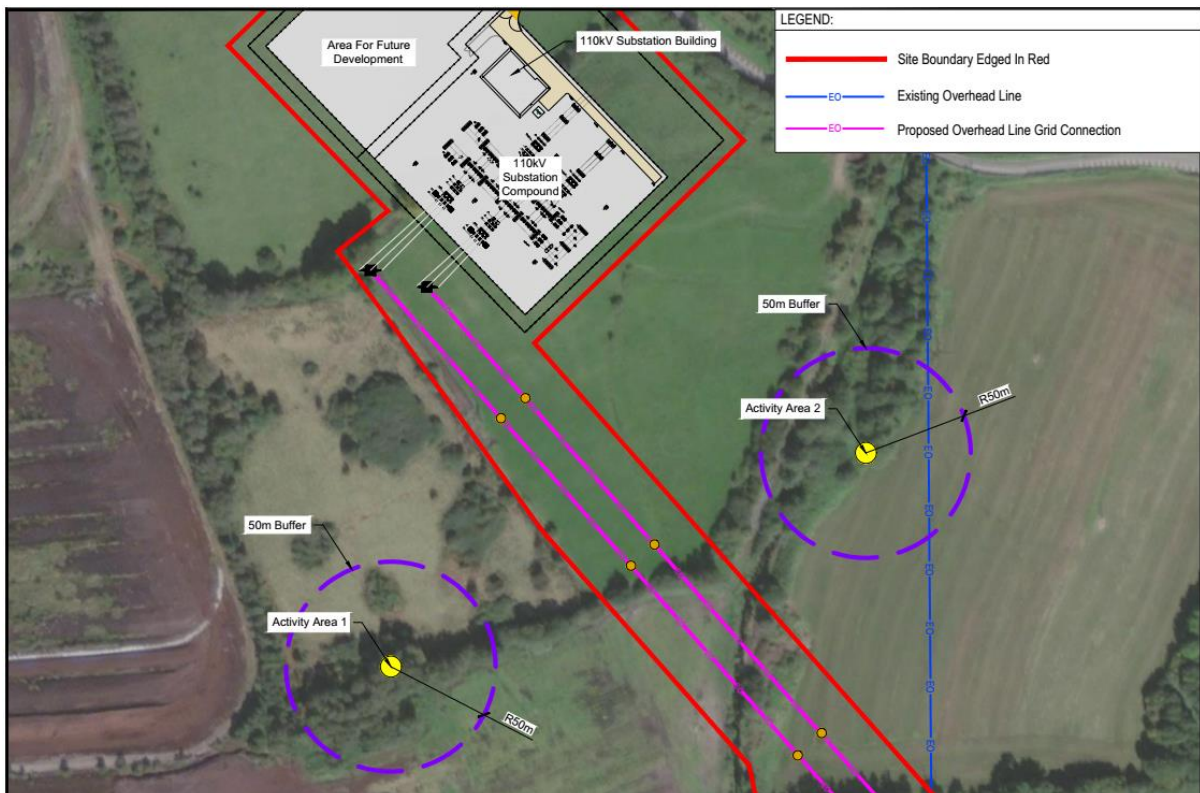


Figure 4-4. Activity Area 1 and 2 with 50m buffer

**4.3.1.3.3 Bats**

The most likely impacts to bats during the construction phase are considered to arise from habitat loss.

No maternity or hibernation roosts were located with the development area; however, the mature ivy clad trees do provide some potential for roosting bats.

With felling of hedgerows and mature trees, there will be a loss of potential roosts and loss of foraging habitat for bats. The removal of broadleaved trees and small area of wet grassland to facilitate the development is considered a **long-term moderate impact** to roosting and foraging bats. This takes into account the reduction of broadleaved trees and the related loss of potential roosts, as well as the extent of similar habitats in the area that would not be affected.

**4.3.1.3.4 Fish**

Water quality changes in the Figile River can affect the fish supported by this watercourse.

There is potential for earthworks associated with the construction phase to cause impacts to water quality owing to entrainment of suspended solids and nutrient release in surface water features (e.g. via surface water run-off). There is also the potential for the release of pollutants used during the construction phase (e.g. hydrocarbon fuels, hydraulic fluids, etc.) into surface waters. Such events could lead to negative impacts on fish further downstream or habitat that support fish and their food. Excessive fine sediment, in suspension or deposited, can have damaging impacts on all life stages of fish, particularly salmonids.

As stated in Salmon and Trout Conservation (2017), effects of excessive deposition of fine sediment on salmonid spawning success and egg survival have been well documented over the years. The effects of excessive sediment on fish, as documented in Salmon and Trout Conservation (2017) are: mortality; reduction in suitable spawning habitat and declines in egg/early life stage success; gill irritation/trauma; altered blood physiology; altered movement/swimming performance; changed foraging behaviour and reduced territoriality. It has been proved that infiltration of fine sediment limits success of eggs hatching through the reduction of gravel permeability and oxygen availability. Salmonid eggs (as well as many cyprinid fish and Lamprey eggs) require a well-oxygenated environment during the embryonic development stage, so eggs are laid in permeable gravel beds with interstitial pore spaces, which allow the passage of oxygenated water. Excess fine sediment in the water, when deposited, can clog these interstitial pores, obstructing the circulation of oxygenated water, which reduces egg survival (Salmon & Trout Conservation, 2017). The release of silt from works areas to the Figile River could exacerbate the existing poor substrate condition of the Figile River, a watercourse already degraded by the effects of peat silt. Pathways from proposed construction areas to the Figile River are primarily via drainage ditches and overland flows. Though these pathways are low gradient and of relatively low conveyance, potential source-pathway-receptor linkages do exist which could worsen riverbed siltation.

Environmental control measures as described in the project description of this EIAR designed to protect water quality will be in place during the construction phase of the project. Potential impacts on hydrology and water quality have been assessed in detail in **Chapter 6** of the EIAR. The low gradient character of the site is considered a positive feature with regard conveyance rates and potential transfer of pollutants to sensitive aquatic areas. Potential impacts on water quality and ensuing impacts on fish are considered to be a **temporary slight negative**.

#### **4.3.1.3.5 Aquatic macroinvertebrates**

Aquatic macroinvertebrates selected as KERs refer to White-clawed crayfish, Duck mussel and the aquatic macroinvertebrate assemblage in the Figile River. Aquatic communities are adapted, and hence able to cope with, natural 'baseline' sediment inputs. Healthy freshwater ecosystems require sediment inputs to maintain habitat and nutrient fluxes, but excessive loading can have catastrophic effects on river ecosystem function. The main direct physical effects are reduction in habitat availability and modification of habitat biogeochemical conditions through reduction of oxygen and increased concentrations of toxic compounds (Kemp *et al.* 2011; Jones *et al.* 2012). Sediment suspended in the water column can also cause sublethal effects from turbidity and direct physical damage, particularly to fish species (Wilber & Clarke, 2001). The Figile River is a watercourse that has already been subjected to drainage with ongoing inputs of peat, which contribute to elevated rates of peat deposition in the river. The macroinvertebrate community of the Figile River is considered reduced and biological water quality is therefore impaired. Nonetheless, the proposed development could potentially worsen biological water quality and cause further reduction in water quality and therefore reduce macroinvertebrate diversity.

A high suspended solid load in waters draining construction area could lead to an increased peat/sediment load in the Figile River. The negative impacts of high and persistent sediment loads on invertebrate assemblages and abundances are well documented with Ephemeroptera, Plecoptera, Trichoptera (EPT) taxa exhibiting the greatest negative response to increased sediment. Sediment can trigger invertebrate decline in various ways including; scour damage, burial of heavy or immobile

species, the clogging of gills or feeding structures, and reduction in interstitial habitat and primary production (Salmon and Trout Conservation, 2017).

Salmon and Trout Conservation (2017) note that fine sediment exerts an important control on the transfer and fate of a wide range of agricultural and industrial contaminants. Sediment therefore represents an important vector for contaminants such as phosphorus, heavy metals and organic pollutants.

Potential impacts on water quality and ensuing impacts on macroinvertebrates are considered to be **temporary slight to moderate negative**, given the presence of pollution sensitive species such as mayfly (larval) and the presence of White-clawed crayfish.

Crayfish plague kills White-clawed crayfish and is the principal cause of decline in Britain and parts of Europe. There was an outbreak of the River Barrow in Co. Carlow in 2017. Crayfish plague is a water mould that infects Crayfish, which die within a few weeks of being infected. The disease is identified as a major threat to White-clawed Crayfish and Crayfish plague has occurred in Ireland even in the absence of alien vectors. Disease can, in some circumstances, be introduced through contaminated equipment and water in the absence of vector species. Spores of Crayfish plague can survive only up to about 16 days in the absence of a susceptible host (Oidtmann, 2000). With the deployment of machinery to the proposed development site, there is potential for importation of water from areas affected by the Crayfish plague. There is therefore potential for the transfer of Crayfish plague to the Figle River, which could decimate stocks of the species and likely affect the main channel of the River Barrow. This unmitigated potential impact is assessed as **long term to permanent profound negative**.

#### **4.3.1.3.6 Terrestrial macroinvertebrates**

The loss of mature trees and grassland will result in the loss of terrestrial macroinvertebrates and their habitats. The impact of the proposed development is at a local scale.

Impacts on terrestrial macroinvertebrates are considered to be **long term slight-moderate negative** where infrastructure remains post construction, taking into account the adjacent habitats of similar value to this group that will not be impacted. Impacts on terrestrial macroinvertebrates are considered to be **temporary moderate negative** where infrastructure is reinstated post construction.

#### **4.3.1.3.7 Amphibians**

Common frog and Smooth newt may occur but were not recorded. The loss of drainage ditches and small areas of wet grassland will result in a reduction of breeding and foraging habitat for amphibians, respectively.

Impacts on amphibians is considered to be **long term moderate negative** in the absence of mitigation.

### **4.3.2 Operational Phase**

#### **4.3.2.1 Impacts to Designated Areas**

The proposed development does not traverse the boundaries of any European or Nationally designated sites important for nature conservation. A Natura Impact Statement (NIS) has been prepared which describes the potential effects on the River Barrow and River Nore SAC. Following a screening for Appropriate Assessment report, this Natura 2000 site was selected for further examination based on the proposed development potentially having significant effects on water

quality. The findings presented in the NIS are that the proposed development, by itself or in combination with other plans and projects, in light of best scientific knowledge in the field, will not adversely affect the integrity of the River Barrow and River Nore SAC.

#### **4.3.2.2 Impacts to Habitats and Flora**

No further impacts to habitats within the development area are expected during operation of the development.

#### **4.3.2.3 Impacts to Fauna**

##### **4.3.2.3.1 Badger**

It is considered that once the construction phase of the proposed development has been completed, badgers that may have been temporarily displaced owing to construction activity will utilise the habitats within and adjacent to the development area within a short period of time. There will therefore be no impacts to Badgers during operation.

##### **4.3.2.3.2 Otter**

It is considered that once the construction phase of the proposed development has been completed, Otters that may have been temporarily displaced owing to construction activity will utilise the habitats within and adjacent to the development area within a short period of time. There will therefore be no impacts to Otters during operation.

##### **4.3.2.3.3 Bats**

It is considered that once the construction phase of the proposed development has been completed, bats that may have been temporarily displaced owing to construction activity will utilise the habitats within and adjacent to the development area within a short period of time. There will therefore be no impacts to bats during operation.

##### **4.3.2.3.4 Aquatic Fauna and Amphibians**

Impacts to these animal groups at operation stage relate to water quality in the surface waters at the site. Adverse effects on water quality and subsequent effects on aquatic fauna owing to maintenance, vehicular access and other activities at the site are assessed as **temporary slight negative** in the absence of mitigation.

#### **4.3.3 Decommissioning Phase**

No decommissioning is addressed in the EIAR as the substation will become a permanent 110kV substation node on the national electricity grid.

#### **4.3.4 Cumulative effects**

A cumulative impact arises from incremental changes caused by other past, present or reasonably foreseeable actions together with the proposed development. Climate change and agriculture are other considerations. The surrounding environment is dominated by agricultural land, conifer



plantation and degraded bog. The projects considered in relation to the potential for cumulative effects include those listed below:

- Wind Farm projects
- Proposed Irish Water Eastern and Midlands Regional Water Supply Project
- Peat Extraction
- Agriculture
- Industry

The proposed substation and grid connection route utilise areas of highly modified habitats. There will be no loss of ecological sensitive habitats associated with these works and no significant ecological effects are anticipated. The grid connection route will not give rise to cumulative effects when considered in combination with other projects. The cumulative effects considered most significant are described hereunder.

#### 4.3.4.1 Climate change

Climate is an important environmental influence on ecosystems. Changing climate affects ecosystems in a variety of ways. For instance, warming may force species to migrate to higher latitudes or higher elevations where temperatures are more conducive to their survival. Similarly, as sea level rises, saltwater intrusion into a freshwater system may force some key species to relocate or die, thus removing predators or prey that are critical in the existing food chain. Climate change not only affects ecosystems and species directly, it also interacts with other human stressors such as development. Although some stressors cause only minor impacts when acting alone, their cumulative impact may lead to dramatic ecological changes (Settele *et al.*, 2014). Because species differ in their ability to adjust, asynchronies<sup>8</sup> can develop, increasing species and ecosystem vulnerability. These asynchronies can include mismatches in the timing of migration, breeding, pest avoidance, and food availability. Growth and survival are reduced when migrants arrive at a location before or after food sources are present (Horton *et al.* 2014). Ecosystems can serve as natural buffers from extreme events such as wildfires, flooding, and drought. Climate change and human modification may restrict ecosystems' ability to temper the impacts of extreme conditions, and thus may increase vulnerability to damage. An example of a biotope is the riparian zone that act as buffer zones protecting riverine ecosystems from runoff of silt/nutrient laden waters via overland/pluvial flow, by absorbing/attenuating surface floodwaters. Land along the Figile River, as well as land 'improvement' along other watercourses within the catchment may become vulnerable to erosion if climate change leads to increases in heavy rain-storms. This could lead to uncontrolled erosion of riverbanks, and riparian areas and loss of soil from fields, resulting in unnatural sediment loads and associated siltation of rivers. Climate change and shifts in ecological conditions could also support the spread of pathogens, parasites, diseases and non-native biota, with potentially serious effects on agriculture and aquatic ecosystems. Together with the proposed development, the aforementioned affects of climate change could exacerbate potential impacts associated with the proposed development.

Taking into account the degraded nature of the wider study area (already altered state of the Figile River which has been drained and maintained, past and present peat extraction, and increased conifer plantation), the potential for cumulative impacts are considered unlikely to be significant, and **long term imperceptible negative** at most.

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<sup>8</sup> absence or lack of concurrence in time

#### 4.3.4.2 Wind Farm Development

A number of wind energy developments have taken place or are planned in the Offaly region. These are listed below:

- Mountlucas Wind Farm - Operating
- Yellow River Wind Farm – Permitted
- Cloncreen Wind Farm – Permitted
- Cushaling Wind Farm – Permitted

It is considered that the scale of the works and implementation of effective mitigation avoids all adverse effects on the environment associated with other wind energy developments. There is no potential for cumulative effects arising in combination with any other or projects and therefore no potential for cumulative effects on the habitat's flora and fauna of the existing environment. A number of the developments listed above lie within the same surface water catchment as the proposed development, it is considered that the residual (mitigated) in-combination effect of the proposed development on surface water quality will be **imperceptible/negligible**. Therefore, there will be no significant cumulative effects of the development with other proposed projects on surface water quality.

#### 4.3.4.3 Proposed Irish Water Eastern and Midlands Regional Water Supply Project

The Irish Water Eastern and Midlands Regional Water Supply Project (WSP) is at pre-planning stage. The Preliminary Options Appraisal Report has identified abstraction from the Parteen Basin in Tipperary as the 'Emerging Preferred Option' for a new source of water supply for the Eastern and Midlands Region. The emerging preferred option corridor is situated north of the proposed development site and crosses the Figile River three times upstream of the proposed development site.

Irish Water (2018) intended to submit the planning application to An Bord Pleanála in 2019 and stated that water from the WSP will be available throughout the Eastern and Midlands Region from 2025 onwards. It is most likely the Kilcumber Bridge 110kV substation and grid connection will be constructed prior to the works on the pipeline.

It is considered that the residual (mitigated) in-combination effect of the proposed development on surface water quality will be **imperceptible/negligible**. Therefore, there will be no significant cumulative effects of the development with other proposed projects on surface water quality.

#### 4.3.4.4 Peat extraction

Peat extraction has been occurring in the region for many decades. The expected ecological impacts from this activity would be loss and alteration of peatland habitat. The drainage and cutting associated with peat extraction has, in the past, resulted in loss of intact lowland blanket bog, which is likely to have dominated the area before human activities altered the habitat. The resultant activity has led to habitat alteration of lowland blanket bog to degraded and cutover blanket bog. However, because of the subsequent drying out of the peat through drainage, and the alteration of the peatland habitat through cutting, this has resulted in the formation of entirely different habitats such as wet grassland and degraded lowland blanket bog in the region. The majority of the proposed development is located on an area of improved agricultural grassland. The main potential impacts of the proposed development are habitat loss, habitat alteration and disturbance to wildlife. As the site is outside of

peatland habitats, it is considered extremely unlikely that a negative cumulative impact to peatland habitats will be significant, and **long term imperceptible negative** at most.

#### 4.3.4.5 *Agriculture*

Agriculture is extensive within the study area and evidence of cattle grazing was noted during the site visit as there was poaching of the soil in parts of the fields. There is potential for the proposed development to contribute to a cumulative impact on water quality in drains within the site and the Figile River, through the potential for sediments and other pollutants entering the watercourses as a result of slurry spreading, drainage and other farming operations. For example, MCPA is a selective hormone type herbicide commonly used by farmers for the control of many broad-leaved weeds e.g. Thistles, Buttercup, Ragwort and in particular soft Rush in agricultural grassland. It is considered **unlikely** with adequate and appropriate mitigation that a negative cumulative impact to water quality would be significant.

#### 4.3.4.6 *Industry*

##### 4.3.4.6.1 Edenderry Power Plant

Edenderry Power Limited operate a power plant at Ballykilleen, Clonbullogue, Co. Offaly directly adjacent to the proposed development. Water is abstracted from the Figile River at a rate of 240m<sup>3</sup>/hr to meet most requirements of the plant. Two on-site wells are used for domestic supply and for production of demineralised water for the boiler. Effluent arises from regeneration of the water treatment system. Both effluent and surface water from the plant discharge to the Figile River.

The discharge to river is upstream of the abstraction point for the plant. Effluent from the plant is mainly composed of the following streams: water treatment plant effluent neutralisation; water treatment plant backwashes; boiler blowdown and cooling water and cooling tower blowdown. All effluent streams are drained to a settlement pond where they combine with the surface water run-off for the site before discharging to the river. The surface water from the oil storage area passes through an interceptor before reaching the settlement pond.

The power plant currently operates under an Environmental Protection Agency IPPC Licence (Register Reference Number P0482-04) so can be expected to operate within licence conditions. Therefore, there will be no significant cumulative effect of the development with ongoing EPL emissions.

##### 4.3.4.6.2 Clonbullogue Ash Repository facility

Clonbullogue Ash Repository facility is a functional element of the Bord na Mona Energy Ltd and its situated ca.2km southwest of the proposed substation. This facility disposes of inert waste products (fly ash and bottom ash), arising from peat combustion within the boiler of the Edenderry Power Ltd.

This facility currently operates under an Environmental Protection Agency IEL Licence W0049-02 and so can be expected to operate within licence conditions. Therefore, there will be no significant cumulative effect of the proposed project with ongoing operations from Clonbullogue Ash Repository facility.

##### 4.3.4.6.3 Drehid Waste Management Facility

Drehid Waste Management Facility is located approximately ca.14km east of the subject site. This facility currently operates under an Environmental Protection Agency IEL active Licence No. W0201-03 and so can be expected to operate within licence conditions. Therefore, there will be no significant

cumulative effect of the proposed project with ongoing operations from Drehid Waste Management Facility.

#### **4.3.4.6.4 Drehid Mechanical Biological Treatment (MBT) Facility**

Drehid Mechanical Biological Treatment (MBT) Facility located approximately ca.14km east of the subject site. This facility currently operates under an Environmental Protection Agency IEL Licence No. W0201-03 and so can be expected to operate within licence conditions. Therefore, there will be no significant cumulative effect of the proposed project with ongoing operations from Drehid Mechanical Biological Treatment (MBT) Facility.

#### **4.3.4.6.5 Derrinturn urban wastewater plant**

Derrinturn urban wastewater plant is located approximately 11km northeast of the subject site. This plant has a discharge point to the to the Cushing River which is located upstream from the Figle River. This facility currently operates under UWWT License No. D0244-01. It can be expected to operate within licence conditions. Therefore, there will be no significant cumulative effect of the proposed project with ongoing operations from Derrinturn urban wastewater plant.

#### **4.3.4.6.6 Daingean urban wastewater plant**

Daingean urban wastewater plant is located approximately 11km west of the subject site. This plant discharges in to the Daingean River which flows southeast before meeting the Figle River to the south of the subject site. This facility currently operates under UWWT License No. D0226-01. It can be expected to operate within licence conditions. Therefore, there will be no significant cumulative effect of the proposed project with ongoing operations from Daingean urban wastewater plant.

#### **4.3.4.6.7 Rosderra Farms**

Rosderra Farms is located 8km northwest of the subject site. This farm currently operates under License No. P0614-02, it can be expected to operate within licence conditions. Therefore, there will be no significant cumulative effect of the proposed project with ongoing operations from Rosderra Farms.

#### **4.3.4.6.8 Mattie Moore Pig Farm**

Mr. Mattie Moore pig farm is located approximately 13km northwest of the subject. This farm currently operates under License No. P0430-01, it can be expected to operate within licence conditions. Therefore, there will be no significant cumulative effect of the proposed project with ongoing operations from Mr. Mattie Moore farm.

## 4.4 MITIGATION

### 4.4.1 Construction phase

#### 4.4.1.1 *Environmental Manager/Ecological Clerk of Works*

A suitable qualified and experienced project ecologist will be employed during the construction phase of the project. Duties will include the review of all method statements, delivery of toolbox talks and monitoring of construction phase to ensure all environmental controls and EIAR mitigation is implemented in full. The project ecologist will be awarded a level of authority and will be allowed to stop construction activity if there is potential for adverse environmental effects other than those predicted and mitigated in the EIAR. For example, if there is a risk of contaminated surface water entering a drain, and measures are not in place to block the pathways to the Figile River, then the project ecologist can stop the work until prescribed measures to prevent such a risk have been implemented.

#### 4.4.1.2 *Construction and Environmental Management Plan (CEMP)*

A draft CEMP (**Appendix 4**) has been prepared for the proposed development. A finalised CEMP will be implemented by the appointed contractor. The implementation of proposed mitigation measures, environmental commitments of the project, as well as the monitoring and supervision of these measures will be managed through the CEMP. Mitigation measures to prevent significant negative impacts to the ecological receptors identified in this chapter and **Chapter 6** (Water) will also be incorporated into the project through the CEMP.

The finalised CEMP will take cognisance of Construction Industry Research and Information Association (CIRIA) technical guidance on water pollution control (Murnane *et al*, 2006) and will include the following:

- Noise, Vibration, Dust and Air Control;
- Management of Construction and Demolition Waste;
- Water Quality/Sediment and Erosion Control;
- Fuel and Oils Management;
- Management of Concrete;
- Emergency Response Plan;
- Tree Felling and Site Clearance Plan; and
- Construction method statements will be prepared prior to commencement of construction and incorporated into the CEMP.

#### 4.4.1.3 *Habitats*

Acknowledging that works required for development are exempt from conditions stipulated in the Wildlife Acts, removal of trees will be conducted where possible outside the general bird breeding season which runs from the 1<sup>st</sup> of March to the 31<sup>st</sup> of August inclusive.

Spraying of vegetation using pesticides (herbicides, fungicides and insecticides) will not be permitted at any stage of development.

#### 4.4.1.4 *Disturbance to fauna (general measures)*

- Habitat disturbance to fauna will be limited by controlling the movement of maintenance vehicles. Construction vehicles will not encroach onto habitats beyond the proposed development footprint;



- Duration of construction activities will be restricted to between 7.30am and 7.30pm, Monday to Friday and between 8am and 6pm on Saturdays. Construction work will not take place at night unless in exceptional circumstances to reduce potential disturbance to fauna;
- In the unlikely event that protected faunal species are found actively using the site for breeding/roosting during the construction phase, works will cease immediately, and the area will be cordoned off until advice is sought from a suitable qualified specialist; and
- Should the resting or breeding places of any protected species be discovered within the site during construction works, the NPWS will be informed. Any mitigations required for badgers will be carried out under license from NPWS, and using NRA Guidelines (2005) (now TII) where applicable; Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes.

#### 4.4.1.5 Badger

A survey of setts within 50m of the scheme (150m if piling is required) is required no more than 10-12 months in advance of construction (NRA, 2005). This will ensure that there will be sufficient time to comply with all licensing requirements and that the necessary actions are undertaken to protect the badger populations prior to the commencement of construction. The survey should be supplemented by a further inspection of the development area immediately prior to site clearance to ensure that no new setts are established in the intervening period and that setts previously identified continue to be used by badgers. Additional surveys/enabling works will only be undertaken under the appropriate NPWS licence.

#### 4.4.1.6 Otter

Pre-construction surveys will be undertaken to ensure that newly established holts do not occur within the works area before the commencement of construction. Should a holt be identified, additional surveys/enabling works will only be undertaken under the appropriate NPWS licence.

#### 4.4.1.7 Bats

The mitigation measures for bats will follow:

- *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes* (TII, 2005);
- *Guidelines for the treatment of bats during the construction of National Road Schemes* (TII, 2006); and
- *NPWS Irish Wildlife Manuals, No. 25: Bat Mitigation Guidelines for Ireland* (Kelleher & Marnell, 2006).

If felling of trees with bat roosting potential (i.e. mature trees with voids, cracks, loose bark and/or ivy cover) is required, a bat survey will be required by a suitably qualified bat ecologist prior to felling; as such works have the potential to cause disturbance and/or damage to roosting bats. Should any tree roosts be identified, a derogation licence from the NPWS will be required to fell or undertake works in close proximity these trees.

If felling of such mature trees is required, the following TII (2006) guidance will be followed:

- Immediately prior to felling, trees should be inspected for the presence of bats and/or other bat activity by a suitably qualified bat ecologist during daylight hours and night-time using a

bat detector. This survey should be carried out from dusk through the night until dawn to ensure bats do not re-enter the tree;

- Where examination of the tree has shown that bats have not emerged or returned to tree, felling may proceed the following day. Should a delay in felling be encountered, resurveying is required;
- In areas where bat activity has been recorded, tree-felling must not be conducted in June to early August; and
- Felling during winter months (December – February) should be avoided as this increases the risk to hibernating bats.

#### 4.4.1.8 Management of Invasive Alien species

The measures followed to avoid the spread of invasive alien species will follow guidelines issued by the National Roads Authority – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads (NRA 2010). The following measures address potential effects associated with the construction phase of the project:

- Prior to being brought onto the site, all plant and equipment will need to be clean and free of soil/mud/debris or any attached plant or animal material;
- Prior to entering the site, all plant/equipment will be visually inspected to ensure all adherent material and debris has been removed;
- Good construction site hygiene will be employed to prevent the introduction and spread of problematic invasive alien plant species (e.g. Himalayan balsam, Japanese knotweed etc.) by thoroughly washing vehicles prior to leaving any site;
- All plant and equipment employed on the construction site (e.g. excavator, footwear, etc.) will be thoroughly cleaned down using a power washer unit prior to arrival on site to prevent the spread of invasive plant species;
- All washing must be undertaken in areas with no potential to result in the spread of invasive species. This process will be detailed in the contractor's method statement;
- Any soil and topsoil required on the site will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present; and
- All planting and landscaping associated with the proposed development shall avoid the use on invasive shrubs.

All footwear/waders and all equipment that will be placed within the water should be treated to prevent foreign flora/fauna entering the water and after use to prevent the spread to other catchments.

Non-native species control will be practised according to the following IFI documents, noting that some works components are located near the Figle River, or drains that feed this watercourse:

- 'IFI Biosecurity Protocol for Field Survey Work' (IFI, 2010);
- 'Disinfection of scuba diving equipment' (IFI, 2011)<sup>9</sup>; and
- 'Invasive species biosecurity guidelines for boaters' (IFI, 2013)<sup>10</sup>.

<sup>9</sup> <https://www.fisheriesireland.ie/biosecurity-guidelines-for-scuba-diving.html>

<sup>10</sup> <https://www.fisheriesireland.ie/extranet/invasive-species-1/360-invasive-species-biosecurity-guidelines-for-boaters-leaflet-1.html>

An invasive species survey shall be undertaken prior to commencement of construction. Should newly established invasive species be identified within the site, an Invasive Species Management Plan will be incorporated into the final CEMP. Areas where invasive species are present will be identified and demarcated prior to commencement of construction:

- A distribution map of the invasive alien plant species along the route, and the above recommendations, will be incorporated into the final CEMP;
- To reduce the likelihood of invasive species spreading, the construction personnel involved in works will be trained in basic relevant invasive species prevention and management (toolbox talk).

To reduce the likelihood of invasive species being introduced to the site from quarries, the aggregate will be crushed stone which will be biologically inert and would not be expected to have a seed bank.

#### **4.4.1.9 Management of Water Quality**

Measures are required when working near watercourses to ensure that pollutants do not spill or seep into the aquatic environment. In this respect, all works will be carried out in compliance with the conditions and procedures set out in the CEMP (and later the final CEMP).

- A CEMP will be implemented prior to commencement of works which will be based on the preliminary CEMP that has been prepared for this project and is available in **Appendix 4 of Volume 3** of the EIAR. This CEMP will make provisions for Best Practice Guidelines on the control of water pollution during construction.
- Re-fuelling and storage of machinery will be in dedicated bunded areas only. Spill kits will be available within each plant/vehicle on site and also located close to identify pollution sources or sensitive receptors (fuel storage areas, etc.).
- Interceptor drip trays will be positioned under any stationary mobile plant to prevent oil contamination of the ground surface or water. Plant and site vehicles are to be well maintained and any vehicles leaking fluids must be repaired or removed from site immediately. Any servicing operations shall take place over drip trays.
- Silt and runoff will be prevented from entering ground water, surface water drains or water courses using appropriate means. These include the temporary installation of silt fences, cut off drains, silt traps and drainage to vegetated areas where appropriate.

#### **4.4.2 Operational Phase**

##### **4.4.2.1 Replanting**

There will be removal of approximately 160 meters of hedgerow to facilitate the development. Replanting will occur on the northwest and south eastern sides of the development on the outside of the palisade fence. The length of replanting will equal the amount of hedgerow lost. The planting will consist of native hedgerow species which will provide habitat and food sources for local wildlife, including bat and bird species.

##### **4.4.2.2 Bats**

As foraging habitat and potential roost sites (mature trees) will be removed to facilitate project, it is proposed three bat and three bird boxes will be erected at suitable locations in the study area (e.g. in standing trees).

Bat boxes will be installed and maintained (if required) by an Ecologist according to manufacturer's instructions. Any boxes installed should be robust and cater for a range of species. Guidance for installation of bat boxes should follow:

- Bat Conservation Ireland (BCI) Guidance Notes for Agri-environmental Schemes (2015); and
- Bat Mitigation Guidelines for Ireland (Kelleher and Marnell, 2006).

#### 4.4.2.3 Amphibians

As there will be a loss of Drainage ditch habitat to facilitate the proposed substation, three small ponds at least 10 m<sup>2</sup> and 1 m deep will be constructed, these standing bodies of water will provide habitats for Common Frog and Smooth newt. The location will be decided by the project ecologist in conjunction with the site manager/engineer.

#### 4.4.2.4 Other

Any trees cut down will be stacked in piles to create hedgehog resting habitat, dead wood also creates a damp habitat for invertebrates and their larvae which can be a nutritious food source for birds and mammals.

#### 4.4.3 Decommissioning Phase

No decommissioning is addressed in the EIAR as the substation will become a permanent 110kV substation node on the national electricity grid.

### 4.5 RESIDUAL IMPACTS

With best practice incorporated into the design, the potential for significant effects in relation to disturbance/displacement of fauna is not anticipated. It is considered that the significance of the residual impacts will be **imperceptible negative**, provided the appropriate mitigation measures and best practice methodologies recommended and provided in the CEMP and implemented. Overall, the project has the capacity to provide a biodiversity gain, and therefore have a positive impact on biodiversity in the area through the application of appropriate and coordinated measures.

**Table 4-22: Assessment of scale and significance of residual effects.**

Receptor	Significance of Pre-Mitigation Effects	Ecological Significance following Mitigation
Hedgerow (WL1) / Scrub (WS1)	It is considered that the proposed development does not have the potential to result in significant effects on Hedgerows and scrub (approx. 160 m)	This is a small fraction of the overall Hedgerows and scrub. Replanting of native hedgerow species within the surrounding area. It is considered that the proposed development does not have the potential to result in significant residual effects on this Key Ecological Receptor (KER).
Drainage Ditches (FW4)	It is considered that the proposed development does not have the potential to result in significant effects on drainage ditches that have not been maintained, given the degree of loss/alteration and frequency of similar adjacent habitats. (aprox. 120 m)	It is considered that the proposed development does not have the potential to result in significant residual effects on this Key Ecological Receptor (KER).
Lowland/Depositing River (FW2)	It is considered that the proposed development does not have the potential to result in significant hydromorphological effects on this KER at the national, county or local level. The proposed development does have the potential to result in significant effects on water quality at the local level.	Mitigation measures to protect surface water quality are detailed in Chapters 2 (Project Description) and 7 (Water). With the above measures in place, it is considered that the proposed development does not have the potential to result in significant residual effects on this KER.
Wet Grassland (GS4)	It is considered that the proposed development does not have the potential to result in significant effects on Wet grassland that have not given the degree of loss/alteration and frequency of similar adjacent habitats.	It is considered that the proposed development does not have the potential to result in significant residual effects on this Key Ecological Receptor (KER).
Bats	With potential loss of roost and foraging habitats, the proposed development does have the potential to result in significant effects at the local level. It is considered that the development does not have the potential to result in significant effects on this KER either at the national or county level.	With adherence to best practice mitigation, no significant effects are anticipated on bats. Fragmentation of habitat and disturbance risk are not considered to be significant effects the study area. In light of the above and taking cognisance of the prescribed mitigation, it is considered that the proposed development does not have the potential to result in significant residual effects on this KER.



Receptor	Significance of Pre-Mitigation Effects	Ecological Significance following Mitigation
Otter	It is considered that the proposed development does not have the potential to result in significant effects on this KER at the national, county or local level.	<p>No significant effects are anticipated on this species given the nature of the habitats within the development footprint and given that no breeding or resting places were recorded within the study area. In addition, there will be no alteration of rivers or streams. There is no evidence to suggest that the study area and particularly the development footprint, is utilised with frequency by Otter and consequently significant disturbance/displacement effects are not anticipated.</p> <p>Mitigation measures to protect surface water quality are detailed in Chapters 2 (Project Description) and 7 (Water). With the above measures in place, it is considered that the proposed development does not have the potential to result in significant residual effects on this KER.</p>
Badger	No setts were located within 50m of the proposed development site in 2020. With potential loss of foraging habitats, the proposed development does have the potential to result in significant effects at the local level. It is considered that the development does not have the potential to result in significant effects on this KER either at the national or county level.	There are no direct impacts on badger setts and best practice mitigation includes a preconstruction survey. With the mitigation measures in place, it is considered that the proposed development does not have the potential to result in significant residual effects on this KER.
Brook Lamprey	It is considered that the proposed development does not have the potential to result in significant effects on this KER at the national, county or local level.	<p>No significant effects are anticipated on this species given the limited spawning habitat in the Figile River. There will be no alteration of this watercourse.</p> <p>Mitigation measures to protect surface water quality are detailed in Chapters 2 (Project Description) and 7 (Water). With the above measures in place, it is considered that the proposed development does not have the potential to result in significant residual effects on this KER.</p>

Receptor	Significance of Pre-Mitigation Effects	Ecological Significance following Mitigation
Other fish	It is considered that the proposed development does not have the potential to result in significant effects on this KER at the national county or local level.	<p>The fish community in the Figile River is dominated by coarse fish, relatively tolerant of water quality impacts. There will be no alteration of this watercourse.</p> <p>Mitigation measures to protect surface water quality are detailed in <b>Chapter 6 (Water)</b>. With the above measures in place, it is considered that the proposed development does not have the potential to result in significant residual effects on this KER.</p>
White-clawed Crayfish	This species is listed as a conservation interest of the River Barrow and River Nore cSAC and occurs in the Figile River within the potential zone of influence of the proposed development. The transfer of Crayfish plague to the Figile River would decimate stocks of the species and likely affect the main channel of the River Barrow. This potential impact is assessed as long term to permanent profound negative.	<p>Water quality mitigation and biosecurity measures will be implemented to protect water quality and prevent the transfer of pathogens to the Figile River.</p> <p>In light of the above factors it is considered that the proposed development does not have the potential to result in significant residual effects on this KER</p>
Other aquatic macroinvertebrates	The macroinvertebrate community of the Figile River is important in the functioning of the aquatic ecosystem of the Figile River, but populations of greater than local significance were not recorded	<p>The macroinvertebrate community in the Figile River is dominated by pollution tolerant species. There will be no alteration of this watercourse.</p> <p>Mitigation measures to protect surface water quality are detailed in <b>Chapter 6 (Water)</b>. With the above measures in place, it is considered that the proposed development does not have the potential to result in significant residual effects on this KER.</p>
Terrestrial Macroinvertebrates	Habitat used by terrestrial macroinvertebrates will be lost/disturbed during construction. It is considered that the proposed development does not have the potential to result in significant effects.	<p>The area of loss/disturbance represents a small fraction of the overall habitat used by this group in the area.</p> <p>It is considered that the proposed development does not have the potential to result in significant residual effects on this KER.</p>

Receptor	Significance of Pre-Mitigation Effects	Ecological Significance following Mitigation
Common Frog and Smooth newt	Habitat used by terrestrial this group will be lost/disturbed during construction. It is considered that the proposed development does not have the potential to result in significant effects.	<p>The area of loss/disturbance represents a small fraction of the overall habitat used by this group in the area.</p> <p>With the above measures in place, it is considered that the proposed development does not have the potential to result in significant residual effects on this KER.</p>

#### 4.6 CONCLUSION

Residual impacts on biodiversity including impacts to habitats, flora, fauna and water quality are not considered significant provided mitigations and best practice methodologies are employed during the construction phase.

The only European protected sites that could potentially be affected is the River Barrow and River Nore SAC, which occurs downstream. Provided that the proposed development is constructed and operated in accordance with the design, best practice and mitigation that is described within this application, significant effects on ecology are not anticipated at the international, national or county scales or on any of the identified Key Ecological Receptors (KERs).

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 will arise from the development.

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