Chapter 7 – Biodiversity

AWN Consulting Ltd, The Tecpro Building, IDA Business & Technology Park, Clonshaugh, Dublin 17, D17 XD90

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7. BIODIVERSITY

7.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) was carried out by Altemar Ltd. It assesses the biodiversity value of the Proposed Development area and the potential effects of the development on the ecology of the surrounding area and within the potential zone of influence (ZOI). Standard construction and operational phase control measures, in addition to monitoring measures are proposed to minimise potential effects and to improve the biodiversity potential of the Proposed Development site.

The programme of work in relation to biodiversity aspects of the EIAR have been designed to identify and describe the existing ecology of the area and detail designated sites, habitats or species of conservation interest. It also assesses the significance of the likely impacts of the Proposed Development on the biodiversity elements and designs mitigation measures to alleviate identified impacts. Full details of all the mitigation measures for the Proposed Development are contained in the Construction Environmental Management Plan (CEMP) prepared by AWN Consulting which is contained within the planning application documentation.

A separate Natura Impact Statement (NIS), in accordance with the requirements of Article 6(3) of the EU Habitats Directive, has been prepared to identify potential effects of the Proposed Development on Natura 2000 sites, Annex species or Annex habitats. It concludes that "The proposed project will not adversely affect the integrity of European sites."

This chapter is supported by figures contained in Volume 4 of this EIAR. While selected figures may be reproduced within the chapter for ease of reference, the full size and quality of those figures are provided in Volume 4. Annotated mark ups, diagrams and photographic records are excluded, as these are provided for illustrative or contextual purposes only and are not replicated at full presentation quality.

The relevant Volume 4 figures to this chapter include:

- SACs within 15km of Proposed Development site.
- SPAs within 15km of Proposed Development
- Ecological Constraints - Fossitt Maps, Bat findings, Mammal constraints and Breeding Bird Activity

7.2 Legislation, Policy & Guidance

7.2.1 EU Habitats Directive

The "Habitats Directive" (Council Directive 92/43/EEC) on the Conservation of Natural Habitats and of Wild Flora and Fauna) is the main legislative instrument for the protection and conservation of biodiversity within the European Union. The Habitats Directive provides for the designation, conservation and protection of sites comprising Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), collectively forming the Natura 2000 network of 'European sites'. Article 3 of the Habitats Directive obliges Member States to designate as SACs sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II of the Habitats Directive. Article 10 of the Habitats Directive requires that Member States endeavour to improve the ecological coherence of the Natura 2000 network to manage and conserve features of the landscape which are of major importance for wild fauna and flora, for example ecological corridors or stepping-stones which are important for the migration, dispersal and genetic exchange of species.

Article 6(2) obliges Member States to take the necessary measures to avoid the deterioration of an SAC, or disturbance of a species for which the site is designated. Article 6(3) sets out the requirement for an "Appropriate Assessment", to ensure that a proposed plan or project will not have an adverse effect on the integrity of a SAC. Article 7 applies the requirements of Article 6(2) and 6(3) of the Habitats Directive to SPAs designated under the Birds Directive.

In addition, and separate to the Appropriate Assessment requirements, Article 12 of the Habitats Directive obliges Member States to establish a regime of strict protection for certain species listed in Annex IV of the Directive, wherever they occur within their natural range. The protection for species under Article 12 of the Habitats Directive is not confined to the boundary of SACs. Species listed in Annex IV include the otter and certain species of bat.

7.2.2 EU Birds Directive

The "Birds Directive" (European Council (2009) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds) confers legal protection to all naturally occurring wild birds within the EU territory. Member States are obliged to adopt the necessary measures to maintain the population of bird species, and that includes, in accordance with Article 3, an obligation to create, maintain and manage habitats for birds, and specifically for the species of Bird listed in Annex I of the Directive, Article 4 requires Member States to create SPAs which, by virtue of Article 7 of the Habitats Directive, form part of the Natura 2000 network of European sites and are subject to the Appropriate Assessment requirements under Article 6(3) of the Habitats Directive.

Additionally, Article 5 of the Birds Directive requires that Member States establish a general system of protection for all naturally occurring wild birds within the EU territory, similar to the system of strict protection required for Annex IV species under the Habitats Directive.

7.2.3 Wildlife Acts 1976 – 2024[1]

The primary domestic legislation providing for the protection of wildlife in general, and wild birds in particular, and the control of some activities adversely impacting upon wildlife is the Wildlife Act of 1976, as amended. The aims of the Wildlife Act, according to the National Parks and Wildlife Service (NPWS) 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." All wild bird species are protected under the Act. The European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) made significant amendments to the Wildlife Acts to ensure consistency with the Habitats and Birds Directives.

7.2.4 Birds and Natural Habitats Regulations

The European Communities (Birds and Natural Habitats) Regulations 2011 are also a key piece of legislation (S.I. No. 477/2011) containing legal direction on the protection of flora and fauna pursuant to European Law. The Planning and Development Acts also incorporates the AA requirements into the planning regime.

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

[1] Wildlife Act 1976, as amended. Administrative consolidation of the Wildlife Act 1976, Law Reform Commission (2024)

7.3 Methodology

This chapter of the EIA Report concentrates on ecological features within the Proposed Development area of significance, primarily designated habitats and species. This includes habitats/species listed in Annex I, II and IV of the EU Habitats Directive, rare plants listed in the Flora Protection Order[2] and other semi-natural habitats of conservation value.

The objective of the assessment is primarily to identify and address potential impacts on biodiversity as a result of the Proposed Development. This is achieved by:

- Identifying baseline conditions of the site and its environs.
- Identifying the sensitivity of receptors with potential to be affected by changes in the baseline conditions.
- Predicting the magnitude of likely changes to the baseline receiving environment.
- Assessing the significance of effect taking into account sensitivity of receptors and magnitude of effect.
- Identifying and assessing appropriate mitigation measures, including alternatives.
- Assessing the significance of residual effects, taking account of any mitigation measures.

Habitat/flora, mammal, bat and breeding bird surveys were carried out. These specific surveys were completed in order to establish baseline conditions in relation to biodiversity and assess how the Proposed Development could affect the ecological receptors within the scope of works. The information gleaned from these surveys was necessary to comply with the Habitats Directive, Birds Directive, Wildlife Acts and Flora Protection Order and to inform decisions regarding the route of the gas pipeline.

Desktop research to determine existing records in relation to habitats and species present in the study areas was firstly undertaken. This included research on the National Parks and Wildlife Services (NPWS) metadata website, the National Biodiversity Data Centre (NBDC) database and a literature review of published information on flora and fauna occurring in the Proposed Development study areas.

Other environmental information for the area was reviewed, e.g. in relation to soils, geology, hydrogeology and hydrology (Chapter 5 and Chapter 6 of this EIA Report). Interactions in terms of the Chapters on these topics presented in this EIA Report were important in the determination of source-vector-pathways and links with potential hydrologically connected areas outside the Proposed Development site. For example, the determination of water courses and pathways to offsite water bodies/protected sites or pathways to ground and potentially sensitive aquifers if present.

The potential effects on European sites are assessed in this chapter of the EIA Report in relation to the requirements of the EIA Directive and Irish legislation and does not purport to comprise information for the purposes of the screening assessment to be carried out by the competent authority or authorities pursuant to Article 6(3) of the Habitats Directive. The obligation to undertake appropriate assessment derives from Article 6(3) of the Habitats Directive and is the subject of an Appropriate Assessment Screening Report.

Table 7-1 Field Survey Dates

Area	Surveyors	Survey Dates
Bat Fauna	Frank Spellman, Emma Peters, Luke Dodebier, Jack Doyle, Jeff Boyle, Gayle O'Farrell and Kalvin Townsend-Smyth of Altemar	9th/17th December 2024, 20th/21st/28th/29th January 2025, 4th/5th/10th/14th/18th February 2025, 21st to 25th July 2025, 21st August 2025, and 13th-15th & 20th-22nd of January 2026.

[2] Statutory Instruments. S.I. No. 235 Of 2022 Flora (Protection) Order 2022. Government Of Ireland

Breeding Bird	Frank Spellaman & Emma Peters of Altemar	9th-12th of June 2025
Habitats & Flora	Frank Spellaman & Emma Peters of Altemar	16th of April, 9th-12th of June, and the 21st of August 2025.
Mammal	Frank Spellaman & Emma Peters of Altemar	14th of October 2024, 9th, 17th of December 2024, the 20th,21st, 29thand 30th of January, the 4th,5th,10th (Emma only), 14th (Frank only) and 18th of February, the 11th and 18th of March 2025, the 13th-15th, the 20th-22nd of January 2026 and the 12th & 13th March 2026

7.3.1 Study Area

While the main focus of biodiversity was on the Proposed Development footprint, see Figure 7.1, the surrounding environment up to 150m from the Proposed Development footprint (as recommended in the Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes, TII , 2006) was taken into account in addition to potential biological and hydrological connectivity in relation to European sites in a Zone of Influence (ZoI) which is detailed further in Section 7.3.2 below.

The ecological surveys were designed based upon the characteristics of the Proposed Development and its likely significant impacts on the baseline environment during construction and/or operation. The study areas are described as follows.

7.3.1.1 Habitats

The area within or immediately adjacent to the Proposed Development footprint where sensitive habitats could be directly or indirectly affected during construction/operation.

The study area of this assessment included the footprint of the Proposed Development and extended linear searches along field boundaries (e.g. hedgerows, treelines, ditches, watercourses etc.) outside the Proposed Development site (area inclusive of Proposed Development area along pipeline route considered by EIAR) for potential ecological constraints.

7.3.1.2 Rare and/or Protected Flora

The area within or immediately adjacent to the Proposed Development footprint where rare and/or protected flora could be directly or indirectly affected during construction/operation.

7.3.1.3 Fauna species

Other than those listed below (includes badger, otter, other protected mammal species, amphibians, and reptiles).

Various habitats of high non-volant mammal potential were present within and adjacent to the Proposed Development site and surrounding area. These habitats include scrub, drainage ditches, grassland hedgerows, woodland and treelines throughout the survey area. Therefore, mammal surveys were commissioned to determine the potential impact of the Proposed Development on mammals.

Survey coverage included all areas within, immediately adjacent to, and up to 150m from the Proposed Development site boundary where fauna species could be directly or indirectly affected during construction/operation.

7.3.1.4 Bats

Desk based studies identified multiple habitats of potential value for bat species foraging, roosting and/or commuting bats (e.g. bridges, hedgerows, treelines, woodland, watercourses) within the ZoI. Surveys were conducted covering all areas within, immediately adjacent to the Proposed Development site to identify and grade features of bat roost potential which may be directly or indirectly affected during construction/operation. Surveys were carried out to determine the status of features of bat roosting potential.

7.3.1.5 Breeding Birds

A desk and ground level breeding habitat assessment identified multiple habitats that could provide breeding habitat. Areas of high breeding bird potential included hedgerows, treelines, mature trees, scrub, riparian/drainage ditch vegetation and grassland present throughout and adjacent to the Proposed Development.

Due to the scale of the ZoI of the Proposed Development, breeding bird surveys were carried out covering the area within and immediately adjacent to the Proposed Development where nesting bird species, and their associated breeding habitat, could be directly or indirectly affected during construction/operation.

All wild birds, and their nests and eggs, are protected under the Wildlife Acts. Some bird species are also listed on Annex I of the Birds Directive, and / or as SCIs within designated European sites.

7.3.1.6 Aquatic biodiversity

A high number of waterbodies are crossed by the Proposed Development, many of which are hydrologically connected to River Boyne and River Blackwater SAC for which Atlantic salmon, otter and river lamprey are listed as Qualifying Interests. A number of crossed waterbodies may also be of habitat value for a number of fisheries. Waterbodies within and/or immediately adjacent to the Proposed Development footprint which could be directly or indirectly affected during construction/operation were surveyed by Triturus Environment Ltd. to provide a baseline assessment of the aquatic ecology including fisheries and biological water quality, as well as protected species and habitats in the vicinity of the Proposed Development.

The ZoI, or distance over which a likely significant effect may occur will differ across the subject ecological receptors, depending on the predicted impacts and the potential impact pathway(s). The results of both the desk study and the suite of ecological field surveys undertaken have established the habitats and species present along the Proposed Development. The ZoI is then informed and defined by the sensitivities of each of the ecological receptors present, in conjunction with the nature and potential impacts associated with the Proposed Development. In some instances, the ZoI extends beyond the study area (e.g. surface water quality effects of a sufficient magnitude can extend, and affect, receptors at significant distances downstream). For example, the pollution of a watercourse by a significant quantity of a substance that could have an effect on a sensitive habitat or species where the substance was carried downstream to a receiving environment such as a protected coastal estuary.

The ZoI of the Proposed Development in relation to terrestrial habitats is generally limited to the footprint of the Proposed Development and the immediate environs (to take account of shading or other indirect impacts, such as air quality). Hydrogeological / hydrological linkages (e.g. rivers or groundwater flows) between impact sources and wetland / aquatic habitats can often result in impacts occurring at significant distances.

The ZoI of air quality effects is generally local. Construction dust tends to be deposited within 350m of a construction site, the majority of the deposition occurs within the first 50m (refer to Chapter 8 (Air Quality) for more detail). Species assessments are outlined in Table 7-1.

With regards to hydrological impacts, the distances over which water-borne pollutants are likely to remain in sufficient concentrations to have a likely significant effect on receiving waters and associated wetland / terrestrial habitat is highly site-specific and related to the predicted magnitude of any potential pollution event. Evidently, it will depend on volumes of discharged waters, concentrations and types of pollutants (in this case sediment and/or hydrocarbons), volumes of receiving waters, and the ecological sensitivity of the receiving waters.

The ZoI of the Proposed Development in relation to likely significant effects on most breeding bird, mammal, bat, and flora species is generally limited to habitat loss within the footprint of the Proposed Development, and disturbance to adjacent areas. The ZoI of the Proposed Development on aquatic species extends beyond the site outline to the upper Boyne catchment, Grand Canal and Figile River via hydrological pathways (watercourses, drainage ditches etc.) crossed by the Proposed Development. ZoI extents are summarised in Table 7-2.

Table 7-2 ZoI Extents

Ecological receptor	Pathway	ZoI
Bat Fauna	Trees, treelines, hedgerows, buildings, waterbodies.	Proposed Development boundary and areas immediately adjacent.
Breeding Bird	Trees, treelines, hedgerows, scrub, riverbanks, wetlands.	Proposed Development boundary and areas immediately adjacent.
Habitats & Flora	Grassland, hedgerows, treelines, woodland, waterbodies.	Proposed Development boundary and areas immediately adjacent.
Mammal	Hedgerows, treelines, scrub, woodland, waterbodies.	Proposed Development boundary, >50m beyond extent of entire Proposed Development boundary, >150m beyond extent of entire Proposed Development boundary at waterbody crossings.
Aquatic/Fisheries	Watercourses, canals, drainage ditches.	Waterbodies intercepted/immediately adjacent by Proposed Development boundary, catchments hydrologically downstream of the Proposed Development.
Designated Sites	Dust, waterbodies.	Catchments hydrologically downstream of the Proposed Development, sites adjacent to the Proposed Development.

7.3.2 Ecology Surveys

7.3.2.1 Habitat Surveys

The habitat and species assessments were carried out in two stages. The first stage comprised desktop research utilising National Parks and Wildlife Services (NPWS) metadata website, google satellite imagery, Geohive hub online map viewer and the National Biodiversity Data Centre (NBDC) database to determine existing records in relation to habitats and species present in the study area as defined by the area of the Proposed Development boundary and Zones of Influence. This area referred to by the standard ecological

impact assessment guidance[3] is adequate to include and address potential effects on mobile species such as otters or badgers, if present.

The second stage involves an evaluation of the site to establish the existing environment in the footprint of the Proposed Development area. Habitat types were identified during fieldwork on 16th of April, 9th-12th of June, and the 21st of August 2025.

Areas which were highlighted during desktop assessment were investigated in closer detail according to the Heritage Council Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2011). Habitats in the Proposed Development area were classified according to the Heritage Council publication "A Guide to Habitats in Ireland" (Fossitt, 2000). This publication sets out a standard scheme for identifying, describing and classifying wildlife habitats in Ireland. This form of classification uses codes to classify different habitats based on the plant species present. Species recorded in this report are given in both their Latin and English names. Latin names for plant species follow the nomenclature of "An Irish Flora" (Parnell & Curtis, 2012). Habitat mapping was carried out using QGIS 3.4 and displayed on Bing satellite imagery or street mapping. Any rare or protected species or habitats were noted. As part of the fieldwork an invasive species assessment was carried out. The site survey was supplemented by a review of the National Biodiversity Data Centre data base. The Heritage Council's A Guide to Habitats in Ireland (Fossitt, 2000) is the standard habitat classification system used in Ireland and can be found at: https://www.npws.ie/sites/default/files/publications/pdf/A%20Guide%20to%20Habitats%20in%20Ireland%20-%20Fossitt.pdf.

7.3.2.2 Habitat Evaluation

The ecological value of the site was assessed following the guidelines set out in the Institute of Ecology and Environmental Management's Guidelines for Ecological Impact Assessment (2019) and according to the Natura Scheme for evaluating ecological sites (after Nairn & Fossitt, 2004) in the TII Guidelines (formerly NRA) for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009) which outlines the methodology for evaluating ecological impacts. Judgements on the evaluation were made using geographic frames of reference, e.g. European, National, Regional or Local outlined as follows:

Ecological valuation: Examples

International Importance:

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

[3] Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009);Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2019).

- Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
- Biogenetic Reserve under the Council of Europe.
- European Diploma Site under the Council of Europe.
- Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).

National Importance:

- Site designated or proposed as a Natural Heritage Area (NHA).
- Statutory Nature Reserve.
- Refuge for Fauna and Flora protected under the Wildlife Acts.
- National Park.
- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA);
- Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
- Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or
- Species listed on the relevant Red Data list.
- Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive County Importance:
- Area of Special Amenity.
- Area subject to a Tree Preservation Order.
- Area of High Amenity, or equivalent, designated under the County Development Plan.
- Resident or regularly occurring populations (assessed to be important at the County level) of the following:
  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
- County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, if this has been prepared.
- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (higher value):

- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;
- Resident or regularly occurring populations (assessed to be important at the Local level) of the following:
  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;

- Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (lower value):

- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife;
- Sites or features containing non-native species that are of some importance in maintaining habitat links.

Due cognisance of features of the landscape which are of major importance for wild flora and fauna, such as those with a "stepping stone" and ecological corridors function, as referenced in Article 10 of the Habitats Directive were considered in this assessment.

7.3.2.3 Mammals (Excluding Bats)

Signs of mammals such as badgers and otters were searched for while surveying the study area noting any sights, signs or any activity in the vicinity especially along adjacent boundaries. Mammal surveys were carried out on the 14th of October 2024, 9th, 17th of December 2024, the 20th, 21st, 29th and 30th of January, the 4th, 5th, 10th (Emma only), 14th (Frank only) and 18th of February, the 11th and 18th of March 2025, and 13th-15th and 20th-22nd of January 2026. In relation to otters an assessment of the suitability of water courses crossed for usage by otters was undertaken by walking the banks of water courses for up to 150m either side of the pipeline route searching for signs of usage e.g. holts, couches, resting places or slides.

7.3.2.4 Bats

The site survey was supplemented by a review of Bat Conservation Ireland's (BCIreland) National Bat Records Database. During the mammal surveys, trees onsite within and immediately adjacent to the Proposed Development's footprint were assessed with reference to bat roost potential. Bat detector, emergent and re-entry surveys survey were carried out on the 21st - 25th of July 2025. Trees of bat roosting potential were re-evaluated during mammal surveys in 2026.

The bat survey report is presented as Appendix 7.2 to this chapter and contains a detailed methodology.

7.3.2.5 Breeding Birds

Breeding Birds were surveyed using standard walked transects and signs were recorded where encountered during the field walkover survey. A desk study was carried out to identify any potential suitable inland feeding and / or roosting sites for winter birds located within or directly adjacent to the Proposed Development areas. Breeding bird surveys were carried from the 9th to the 12th of June 2025.

Field surveys carried out deemed the overall lands to be unsuitable feeding and/or roosting sites for wintering birds, due to habitat conditions being dominated by improved agricultural grassland or arable land and/or subject to relatively high levels of grazing disturbance. As such it was not deemed necessary to carry out detailed wintering bird surveys in these areas. The results of the desk-based study have informed the assessment of potential impacts on wintering bird species arising from the Proposed Development.

7.3.2.6 Aquatic biodiversity

A full Aquatic Baseline Assessment was undertaken by Triturus Environmental Ltd. of waterbodies along the length of the Proposed Development. The findings of this assessment were fully considered in relation to potential impacts as a result of the Proposed Development. The associated report is included in Appendix 7.5.

7.3.3 Categorisation of the Baseline Environment

Desktop research to determine existing records in relation to habitats and species present in the study areas included research on the National Parks and Wildlife Services (NPWS) metadata website, and the National Biodiversity Data Centre (NBDC) database. The following resources assisted in the production of this chapter of the report.

- The following mapping and Geographical Information Systems (GIS) data sources, as required:
- National Parks & Wildlife (NPWS) protected site boundary data;
- Ordnance Survey of Ireland (OSI) mapping and aerial photography;
- OSI/Environmental Protection Agency (EPA) rivers and streams, and catchments;
- Digital Elevation Model over Europe (EU-DEM);
- Google Earth and Bing aerial photography 1995-2023;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
  - Natura 2000 - Standard Data Form;
  - Conservation Objectives;
  - Site Synopses;
  - National Biodiversity Data Centre records:
  - Online database of rare, threatened and protected species;
- Publicly accessible biodiversity datasets.
  - Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2019) ; and
- Relevant Development Plans;
  - Meath County Development Plan 2021-2027
  - Offaly County Development Plan 2021-2027

7.3.4 Assessment Methodology

Following desktop assessment and fieldwork, an evaluation of the development area and determination of the potential effects on flora, fauna and habitats of the area, including effects on their ecological integrity and conservation status, is based on the following guidelines and publications:

- Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC (EC, 2007);
- Guidance document on the strict protection of animal species of Community interest under the Habitats Directive (EC, 2021);
- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DEHLG, December 2009, Rev 2010);
- EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- Best Practice Guidance for Habitat Survey and Mapping (Heritage Council, 2011);
- Ecological Surveying Techniques for Protected Flora & Fauna (NRA, 2008);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009);
- Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2019);
- Birds of Conservation Concern in Ireland 2020 –2026 (Gilbert, Stanbury & Lewis 2021);
- The IUCN Red List of Threatened Species (2025);
- The Status of EU Protected Habitats and Species in Ireland (NPWS, 2025).

The methodology and terminology for rating effects is derived from the EPA *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (2022) and are included in Chapter 1 of this EIAR.

7.3.5 Forecasting Methods and Difficulties Encountered

No difficulties were encountered in relation to the surveys and compilation of this chapter. It should be noted that the survey area was restricted to fields for which access permission had been granted, However all land-holdings through which the proposed route lies were accessible. Access was occasionally and temporarily limited during survey activities due to the presence of free-roaming livestock, including cattle herds, but all areas subjected to these restrictions were covered at later dates. Weather conditions had minimal impact on the execution of the survey.

7.4 Receiving Environment

7.4.1 Designated Conservation Sites

The European Commission's *"Assessment of plans and projects in relation to Natura 2000* sites guidance on Article 6(3) and (4) of the Methodological Habitats Directive 92/43/EEC" published 28th September 2021 states at section 3.1.3, that:

"*Identifying the Natura 2000 sites that may be affected should be done by taking into consideration all aspects of the plan or project that could have potential effects on any Natura 2000 sites located within the zone of influence of the plan or project. This should take into account all of the designating features (species, habitat types) that are significantly present on the sites and their conservation objectives. In particular, it should identify:*

- *any Natura 2000 sites geographically overlapping with any of the actions or aspects of the plan or project in any of its phases, or adjacent to them;*
- *any Natura 2000 sites within the likely zone of influence of the plan or project Natura 2000 sites located in the surroundings of the plan or project (or at some distance) that could still be indirectly affected by aspects of the project, including as regards the use of natural resources (e.g. water) and various types of waste, discharge or emissions of substances or energy;*
- *Natura 2000 sites in the surroundings of the plan or project (or at some distance) which host fauna that can move to the project area and then suffer mortality or other impacts (e.g. loss of feeding areas, reduction of home range);*
- *Natura 2000 sites whose connectivity or ecological continuity can be affected by the plan or project*".

The range of Natura 2000 sites to be assessed, i.e. the zone in which impacts from the plan or project may arise, will depend on the nature of the plan or project and the distance at which effects may occur. For Natura 2000 sites located downstream along rivers or wetlands fed by aquifers, it may be that a plan or project can affect water flows, fish migration and so forth, even at a great distance. Emissions of pollutants may also have effects over a long distance. Some projects or plans that do not directly affect Natura 2000 sites may still have a significant impact on them if they cause a barrier effect or prevent ecological linkages. This may happen, for example, when plans affect features of the landscape that connect Natura 2000 sites or that may obstruct the movements of species or disrupt the continuity of a fluvial or woodland ecosystem. To determine the possible effects of the plan or project on Natura 2000 sites, it is necessary to identify not only the relevant sites but also the habitats and species that are significantly present within them, as well as the site objectives.

The Zone of Influence may be determined by considering the Proposed Development's potential connectivity with European sites, in terms of:

- Nature, scale, timing and duration of all aspects of the proposed works and possible impacts, including the nature and size of excavations, storage of materials, flat/sloping sites;
- Distance and nature of potential pathways (dilution and dispersion; intervening 'buffer' lands, roads etc.); and
- Location of ecological features and their sensitivity to the possible impacts.

The potential for source pathway receptor connectivity is firstly identified through GIS interrogation, and detailed information is then provided on sites with connectivity. The main potential source of potential pollution/impacts associated with the Proposed Development are silt, petrochemical, dust and/or other pollutants associated with the proposed works. Examples of potential pathways included air and hydrological pathways (i.e. waterbody crossings). European sites and their Qualifying Interests/Conservation Objectives considered as potential receptors due to their presence within/adjacent to the potential Zone of Influence of the Proposed Development are presented Table 7-3 and demonstrated in Figures 7.1-7.2. Ramsar sites and sites of National importance ((Natural Heritage Areas (NHA), proposed

Natural Heritage Areas (pNHA) considered as potential receptors due to their presence within/adjacent to the potential Zone of Influence of the Proposed Development are presented Table 7-4 and demonstrated in Figures 7.3-7.4

The designated conservation sites within 15km of the site and those with potential pathways were examined for potential effect, even though these areas were deemed to be outside the ZOI. Sites beyond 15km had no direct pathways. This assessment included sites of international importance; Natura 2000 sites (Special Areas of Conservation (SAC), Special Protection Areas (SPA)), Ramsar sites and sites of National importance ((Natural Heritage Areas (NHA), proposed Natural Heritage Areas (pNHA). Up to date GIS data (2024 NPWS data shapefiles) was acquired and plotted against 1, 5, 10 and 15km buffers from the Proposed Development site. Additional information on rare and threatened species was acquired through the National Biodiversity Data Centre maps.

Table 7-3 Proximity to Natura 2000 sites within 15km.

Site Code	NATURA 2000 Site	Distance (from closest point of site boundary including compounds)	Conservation objectives and Qualifying interests
Special Areas of Conservation			
002342	Mount Hevey Bog SAC	20 m	Conservation Objectives The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150]
002299	River Boyne and River Blackwater SAC	3.3 km	Conservation Objectives To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected. Qualifying Interests Alkaline fens [7230] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae)* [91E0] *Lampetra fluviatilis* (River Lamprey) [1099] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]
000925	The Long Derries, Edenderry SAC	3.8 km	Conservation Objectives To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected. Qualifying Interests

			Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210]
002162	River Barrow and River Nore SAC	14.8 km	Conservation Objectives To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected. Qualifying Interests Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae)* [91E0] *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Vandenboschia speciosa* (Killarney Fern) [6985]
002205	Wooddown Bog SAC	15.1 km	Conservation Objectives To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected. Qualifying Interests Degraded raised bogs still capable of natural regeneration [7120]
000582	Raheenmore Bog SAC	16.1 km	Conservation Objectives To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected. Qualifying Interests

			Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150]
Special Protection Areas			
004232	River Boyne and Blackwater SPA	3.3 km	Conservation Objective To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA. Qualifying Interests Kingfisher (*Alcedo atthis*) [A229]

Table 7-4 Proximity to nationally designated and Ramsar sites within 15km.

Designation	Conservation Sites	Distance (from closest point of site boundary including compounds)
NHA	Black Castle Bog	607 m
NHA	Molerick Bog	1.9 km
NHA	Carbury Bog	7.3 km
NHA	Milltownpass Bog	10 km
NHA	Daingean Bog	10.5 km
NHA	Wooddown Bog	15.1 km
pNHA	Grand Canal	0 m
pNHA	Mount Hevey Bog	20 m
pNHA	Royal Canal	1.3 km
pNHA	The Long Derries, Edenderry	3.8 km
pNHA	Ballynabarny Fen	4.4 km
pNHA	Ballina Bog	7.3 km
pNHA	Raheenmore Bog	12.8 km
pNHA	Raheen Lough	13.2 km
Ramsar	Raheenmore Bog	12.8 km

Figure 7-1 SACs within 15km of Proposed Development site.

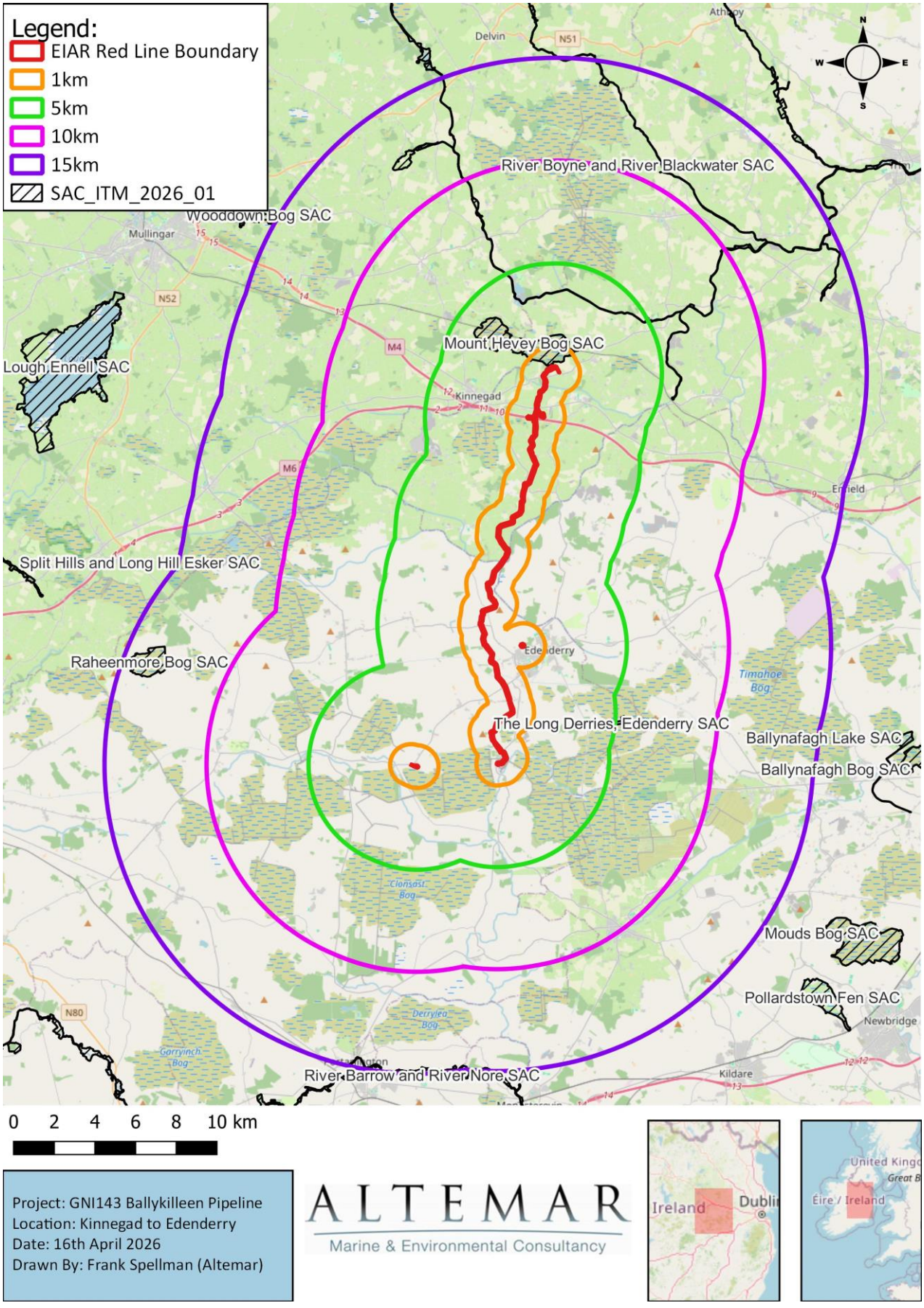


Figure 7-2 SPAs within 15km of Proposed Development

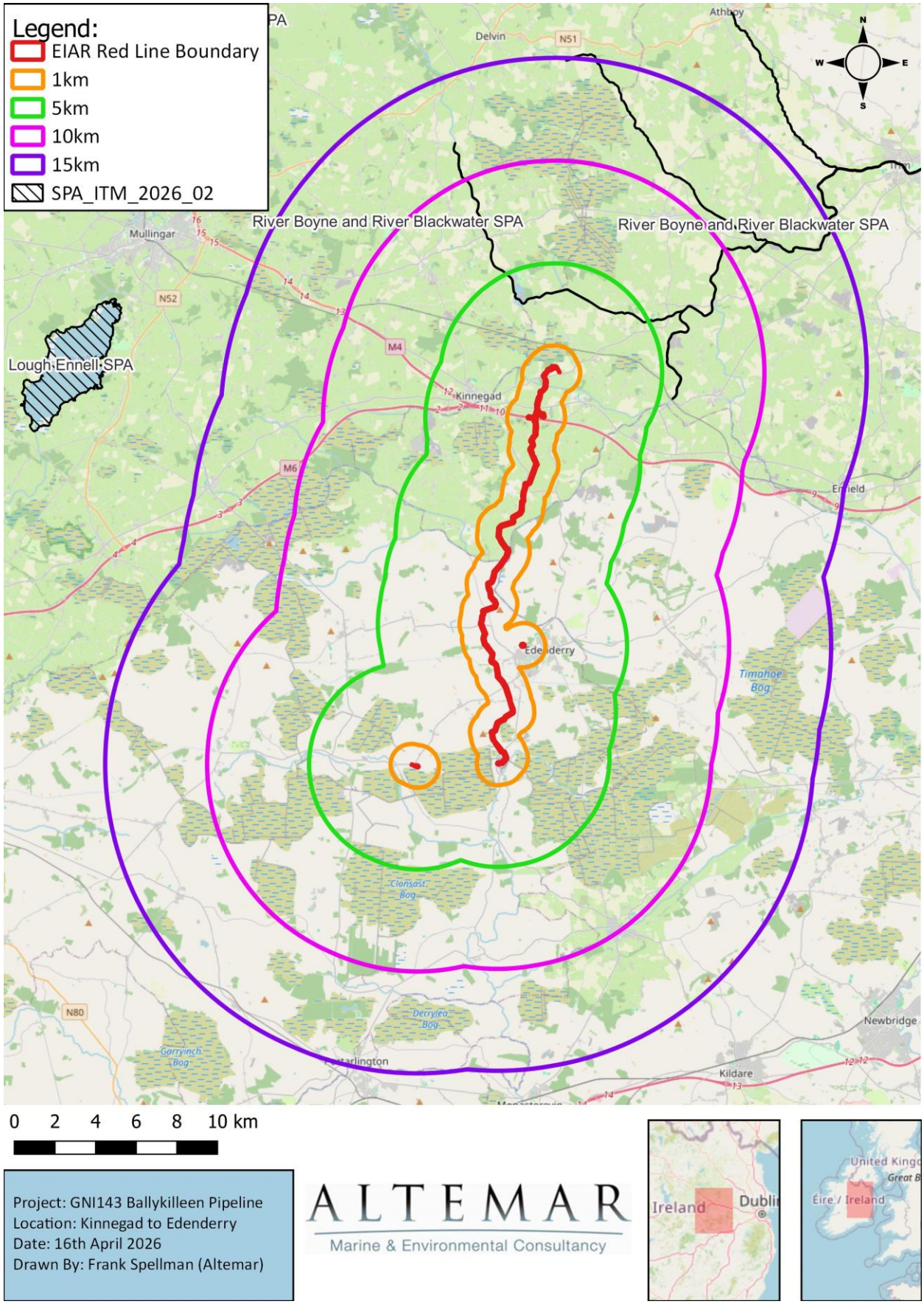


Figure 7-3 NHAs/pNHAs within 15km of Proposed Development

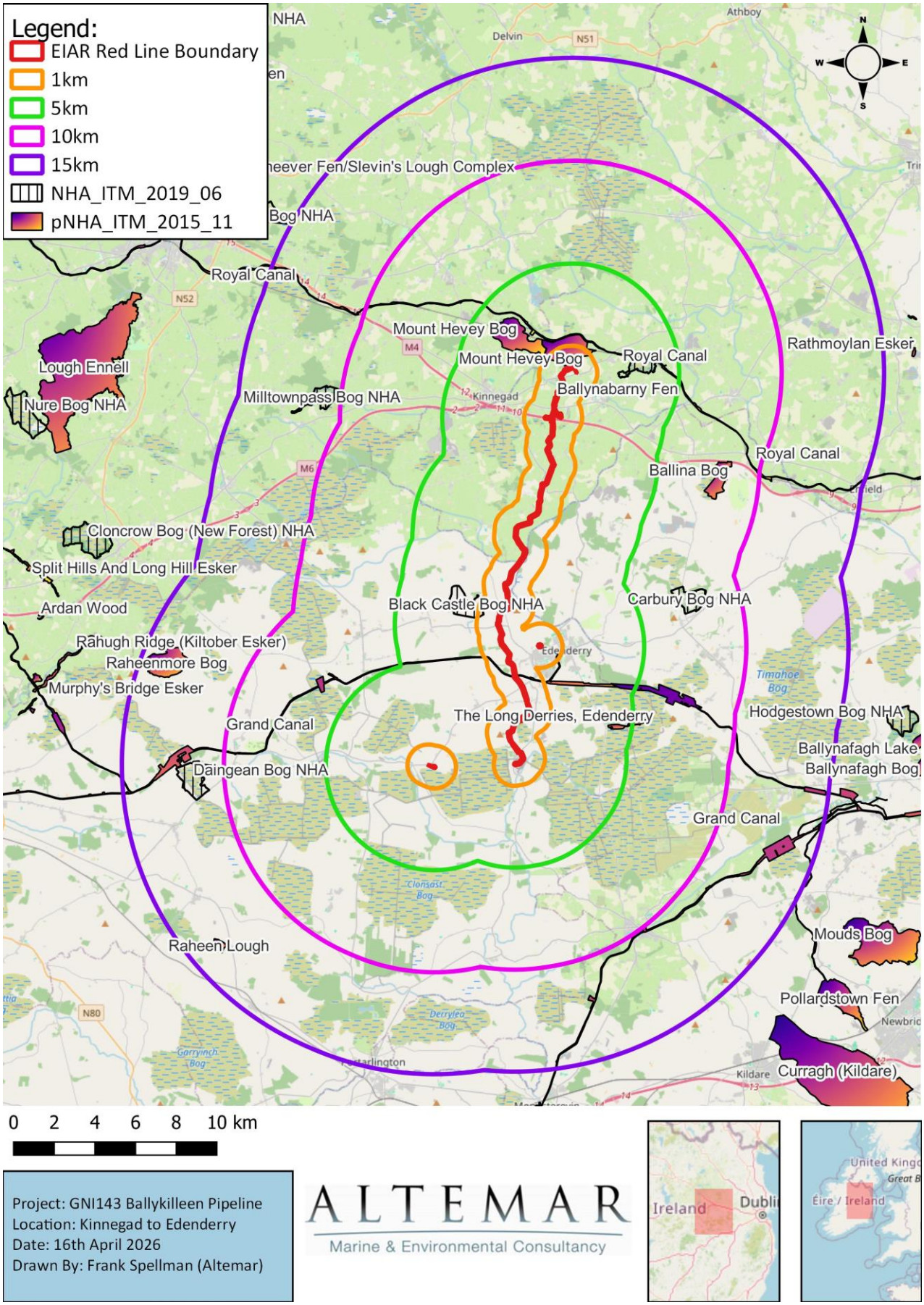
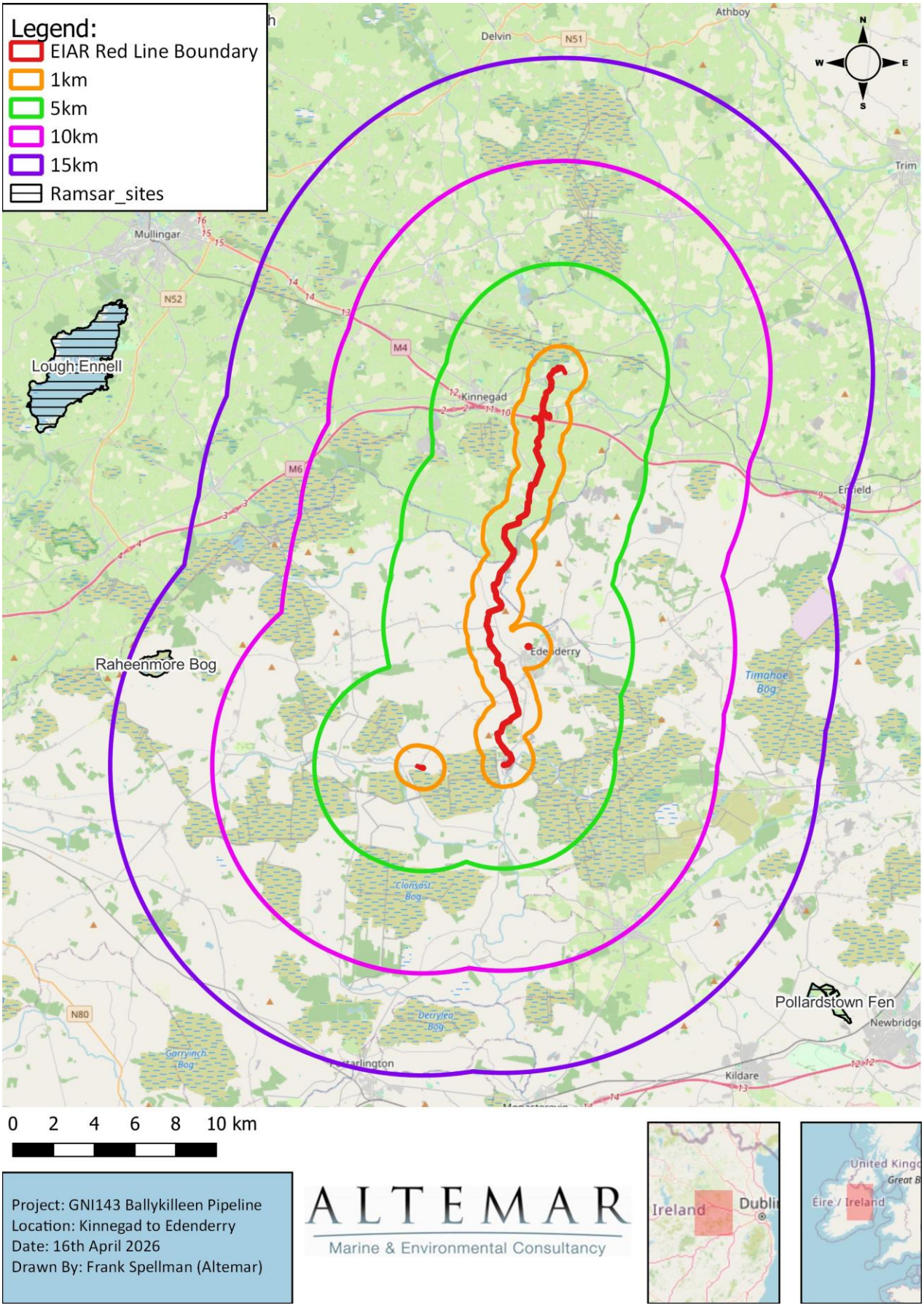


Figure 7-4 Ramsar sites within 15km of Proposed Development



7.4.2 Biodiversity Records

The National Biodiversity Data Centre's online viewer was consulted to determine the extent of biodiversity and / or species of interest in the area. An assessment of the site-specific area was carried out and it recorded no species of interest within the site area. Following this, a 10km^2 grid was assessed (Reference grid N52, N53, N62, N63, N64) Appendix 7.1 provides a list of all species of interest recorded in the 10 km^2 grid area.

7.4.3 Non-Designated Areas

The Proposed Development areas predominantly comprise fields of open improved grazed agricultural grassland along with occasional arable fields and wet grassland. A list of habitats recorded, and their corresponding Fossitt codes is presented in Table 7-5 below and in the Habitat Map in Volume 4 of this EIAR.

7.4.3.1 Terrestrial Ecology

A site assessment was carried out on the 16th of April, 9th-12th of June, and the 21st of August 2025.

Table 7-5 Habitats noted during survey according to Fossitt (2000) and outlined according to EIAR Sections.

Section	Chainage	Habitats	Details
1	0-3,931 m	**WL1 –** Hedgerow **WL2 -** Treeline **BL3 –** Built land and artificial surfaces **GA1 -**Agricultural grassland **FW4/WL2 –** Drainage ditch/Treeline **BC1 –** Arable crop fields **WS1 –** Scrub **ED2 –** Spoil and bare ground **GS2-** Dry meadow and grassy verges **WD2 –** Mixed broadleaf/conifer woodland.	• There are orchids between chainage 800m & 900m. • River crossings; RVX01 • Watercourse crossings; WCX01, WCX02.
2	3,931 – 7,441 m	**BL3 –** Built land and artificial surfaces **WL1 –** Hedgerow **WL2 -** Treeline **GA1 -**Agricultural grassland **FW2 –** Depositing/lowland rivers **ED2 –** Spoil and bare ground **BC1 –** Arable crop fields **FW4 –** Drainage ditch	• Watercourse crossings; WCX03, WCX04 & WCX05.
3	7,441 – 11,669 m	**WL1 –** Hedgerow **WL2 –** Treeline **GA1 -**Agricultural grassland **BL3 –** Built land and artificial surfaces **WD2 –** Mixed broadleaf/conifer woodland. **ED1 –** Exposed sand, gravel or till **FW4 –** Drainage ditch **FW2 –** Depositing/lowland rivers **GS2-** Dry meadow and grassy verges	• **Watercourse crossing;** WCX06, WCX07, WCX08, WCX09, WCX10, WCX11 & WCX12.

Section	Chainage	Habitats	Details
4	11,669 - 15,348 m	**WL1 –** Hedgerow **WL2 –** Treeline **GA1 -**Agricultural grassland **BL3 –** Built land and artificial surfaces **FW2 –** Depositing/lowland rivers **FW4 –** Drainage ditch **GS2-** Dry meadow and grassy verges **GS4 –** Wet grassland **ED1 –** Exposed sand, gravel or till	• River crossings; RVX02, • Watercourse crossing; WCX13, WCX14, WCX15 & WCX16.
5	15,348 – 19,494 m	**WL1 –** Hedgerow **WL2 –** Treeline **GA1 -** Agricultural grassland **BL3 –** Built land and artificial surfaces **WD1 –** Mixed broadleaf woodland **WS1 –** Scrub **FW2 –** Depositing/lowland rivers **FW3 -** Canal **FW4 –** Drainage ditch **FW4/WL1 –** Drainage ditch/Hedgerow **ED1 –** Exposed sand, gravel or till **ED3 –** Recolonising bare ground	• Watercourse crossing; WCX17, WCX18, WCX19, WCX20, WCX21, WCX22 & WCX23 Grand Canal.
6	19,494 – 23,650 m	**WL1 –** Hedgerow **WL2 –** Treeline **WS1 –** Scrub **GA1 -** Agricultural grassland **GA2 –** Amenity grassland **BL3 –** Built land and artificial surface **FW4 –** Drainage ditch **ED1 –** Exposed sand, gravel or till **GS2 -** Dry meadow and grassy verges **ED3 –** Recolonising bare ground	• Watercourse crossing; WCX24, WCX25, WCX26, WCX27, WCX28, WCX29 and WCX30. • Development boundary is 64 meters away from invasive Japanese knotweed. • Blue fleabane (endangered but not protected) at southwest of the site.

7.4.3.2 GA1 - Agricultural grassland

The proposed pipeline route is though farmland thus the most common habitat encountered was agricultural grassland. Majority of the lands are used for livestock and are highly managed. The species noted included silverweed (*Potentilla anserina*), Cuckoo-flower (*Cardamine pratensis*), lesser common knapweed (*Centaurea nigra*), common ragwort (*Jacobaea vulgaris*), white clover (*Trifolium repens*), red clover (*Trifolium pratense*), ribwort plantain (*Plantago lanceolata*), greater plantain (*Plantago major*), groundsel (*Senecio vulgaris*), thistles (*Cirsium spp.*)including creeping thistle (*Cirsium arvense*), dock's (*Rumex spp.*), *agg*) including broad-leaved docks (*Rumex obtusifolius*), meadowsweet (*Filipendula ulmaria*), prickly sow-thistle (*Sonchus asper*), cleavers (*Galium aparine*), wild carrot (*Daucus carota subsp. carota*), common chickweed (*Stellaria media*), lesser stitchwort (*Stellaria graminea*), cats-ear (*Hypochaeris radicata*), hoary willowherb (*Epilobium parviflorum*), daisy (*Bellis perennis*), equal-leaved knotgrass (*Polygonum arenastrum*), red deadnettle (*Lamium purpureum*), black medic *(Medicago lupulina*), common vetch (*Vicia sativa*), common mouse-ear (*Cerastium fontanum*), self-heal (*Prunella vulgaris*), field speedwell (*Veronica persica*), germander speedwell (*Veronica chamaedrys*), yarrow (*Achillea millefolium*), meadow buttercup (*Ranunculus acris*), creeping buttercup (*Ranunculus repens*) and

creeping cinquefoil *(Potentilla reptans*). Grass species found in this habitat included Yorkshire fog (*Holcus lanatus*), wild oat (Avena fatua), perennial rye-grass (*Lolium perenne*) and cocksfoot grass (*Dactylis glomerata*).

Plate 1 Agricultural grassland

Plate 2 Agricultural grassland.

7.4.3.3 GA2 – Amenity grassland

The amenity grassland habitat was only found in one location within the survey area at the Edenderry powerplant. The species included silverweed (*Potentilla anserina*), thistles (*Cirsium spp.*), docks (*Rumex spp.*), daisy (*Bellis perennis*), self-heal (*Prunella vulgaris*), meadow buttercup (*Ranunculus acris*), creeping buttercup (*Ranunculus repens*), cleavers (*Galium aparine*), yarrow (*Achillea millefolium*), creeping cinquefoil *(Potentilla reptans*) and Canadian fleabane (*Erigeron canadensis (Conyza canadensis)*).

7.4.3.4 GS2 - Dry meadow and grassy verges

This habitat was found in multiple ways throughout the survey area. GS2 was noted on the sides of roadways, in unattended areas of fields and as large meadows. A common orchid (*Dactylorhiza fuchsii*) coterie (approximately 15 specimens) was noted on within this habitat on a roadside under a mature tree line at chainage 846m. It should be noted that no orchids that are protected under the Flora Protection Order (2022) were noted on site.
Additional species noted within this habitat included common comfrey (*Symphytum officinale*), Cuckoo-flower (*Cardamine pratensis*), lesser common figwort *(Scrophularia nodosa),*bittersweet (*Solanum dulcamara*), Sweet clover/ribbed melilot *(Melilotus officinalis),* purple loose-strife (*Lythrum salicaria*), red-osier dogwood (*Cornus sericea*), dock s (*Rumex spp.*), dandelions (*Taraxacum officinale* agg.), red bistort (*Persicaria amplexicaulis*), meadowsweet (*Filipendula ulmaria),* common ragwort (*Jacobaea vulgaris*), common knapweed (*Centaurea nigra*), hedge bindweed (*Calystegia sepium),* hedge woundwort (*Stachys arvensis*), great willowherb (*Epilobium hirsutum*), black medic *(Medicago lupulina*), daisy (*Bellis perennis*), self-heal (*Prunella vulgaris*), meadow buttercup (*Ranunculus acris*), creeping buttercup (*Ranunculus repens*), cleavers (*Galium aparine*), yarrow (*Achillea millefolium*), creeping cinquefoil *(Potentilla reptans*), Shepard's purse (*Capsella bursa-pastoris*), cats-ear (*Hypochaeris radicata*), fool's parsley (*Aethusa cynapium*), hemp agrimony (*Eupatorium cannabinum*) and prickly sow-thistle (*Sonchus asper*). Grasses species noted within this habitat included cocksfoot grass (*Dactylis glomerata*), common bent (*Agrostis capillaris*), meadow foxtail (*Alopecurus pratensis*), red fescue (*Festuca rubra agg.*) and Yorkshire (*Holcus lanatus*).

Plate 3 Dry meadow habitat.

Plate 4 Orchid in dry meadow habitat (Section 1 chainage 846m)

7.4.3.5 BC1 - Arable crops including BC1/WS1

There are five areas within the redline classified under arable crops. These fields we managed for harvesting crops during the time of the survey. The species noted within this habitat included corn (*Zea mays L.*), barley (*Hordeum vulgare*), red bartsia (*Odontites vernettnus*), pineappleweed (*Matricaria discoidea*), ramping fumitory (*Fumaria muralis*), smooth sow-thistle (*Sonchus oleraceus*), prickly sow-thistle (*Sonchus asper*) and cleavers (*Galium aparine*),

Plate 5 Arable crop fields.

7.4.3.6 GS4 - Wet grassland

Six fields were classified under the wet grassland habitats. These grasslands had more cover of *juncus* and *Carex spp* along with some wetland plants such as Watermint (*mentha aquaitca*), meadowsweet (*Filipendula ulmaria*) and ribwort plantain (*Plantago lanceolata*). Other grassland species including dandelions (*Taraxacum officinale* agg.), hoary ragwort (*Senecio erucifolius*), white clover (*Trifolium repens*), red clover (*Trifolium pratense*), groundsel (*Senecio vulgaris*), thistles (*Cirsium spp.*), broad-leaved docks (*Rumex obtusifolius*) and prickly sow-thistle (*Sonchus asper*).

Plate 6 Wet grassland

7.4.3.7 WL1 – Hedgerows including WL1/WD2

Hedgerows bordered many of the fields of the proposed route traverse and given the extent of the Proposed Development, there was a great variety of species. The majority of the hedgerows were comprised of native species and were managed. Shrub species noted within this habitat included brambles (*Rubus fruticosus agg*), hawthorn (*Crataegus monogyna*), elder (*Sambucus nigra*), snowberry (*Symphoricarpos albus*), pheasant berry (*Leycesteria formosa*), blackthorn (*Prunus spinosa*), gorse (*Ulex europaus*), buddleia (*Buddleja davidii*), honeysuckle (*Lonicera periclymenum*), rose-hip (*Rosa canina* agg.), holly (*Ilex aquifolium*), tutsan (*Hypericum androsaemum*), sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*), alder (*Alnus glutinosa*), beech (*Fagus sylvatica*), willow (*Salix sp.*), wych elm (*Ulmus glabra*), honeysuckle (*Lonicera periclymenum*), griselinia (*Griselinia littoralis*) and cherry laurel (*Laurocerasus officinalis*). The ground flora layer of this habitat included species such as primrose (*Primula vulgaris*), self-heal (*Prunella vulgaris*), prickly sow-thistle (*Sonchus asper*), yarrow (*Achillea millefolium*), pineappleweed (*Matricaria discoidea*), herb Robert (*Geranium roberianum*), rose-bay willowherb (*Chamaenerion angustifolium*), redshank (*Persicaria maculosa*), nettle (*Urtica dioica*), cow parsley (*Anthriscus sylvestris*), silverweed (*Potentilla anserina*), great willowherb (*Epilobium hirsutum*), black medic (*Medicago lupulina*),hedge bindweed (*Calystegia sepium*), meadow buttercup (*Ranunculus acris*), creeping buttercup (*Ranunculus repens*), bittercress (*Cardamine flexuosa*), common vetch (*Vicia sativa*), ivy (*Hedera helix*), Atlantic ivy (*Hedera hibernica*) and cleavers (*Galium aparine*).

Plate 7 Hedgerow habitat

7.4.3.8 WL2 – Treelines

Early mature to mature treelines lined many of the fields encountered along the route. The most common tree species noted in the treelines were Ash (*Fraxinus excelsior*), beech (*Fagus sylvatica*) and hawthorn (*Crataegus monogyna*) however, many other tree species were noted including Scot's pine (*Pinus sylvestris*), horse chestnut (*Aesculus hippocastanum*), birch (*Betula pendula*), willow (*Salix sp.*), bracken (*Pteridium aquilinum*), brambles (*Rubus fruticosus agg*), holly (*Ilex aquifolium*), common lime (*Tilia x europaea (T. cordata x platyphyllos*), rowan (*Sorbus aucuparia*), wild cherry (*Prunus avium),* elder (*Sambucus nigra*), alder (*Alnus glutinosa*), cyprus (*Cupressus spp.*) species including lawson cyprus (*Chamaecyparis lawsoniana*), oak (*Quercus sp.*) species including pedunculate oak (*Quercs robur*) and hazel (*Corylus avellana*). Most trees were covered of either ivy (*Hedera helix*) or Atlantic ivy (*Hedera hibernica*). Treelines of exclusively beech (*Fagus sylvatica*) or Ash (*Fraxinus excelsior*) were quite common.

Plate 8 Treeline

Plate 9 Treeline

7.4.3.9 DW4 - Drainage ditch including FW4/WL1 and FW4/WL2

Drainage ditches were frequently noted along the borders of the fields within the proposed route. They varied in depth but had a mean depth of 1.5m. The drainage ditches were predominantly seasonally wet with some being permanently wet and some permanently dry. The species noted within this habitat included Sedges (*Carex sp.*) including pendulous sedge (*Carex pendula*), great willowherb (*Epilobium hirsutum*),cleavers (*Galium aparine*), hoary willowherb (*Epilobium parviflorum*), Water parsnip (*Berula erecta*), water-cress (*Nasturtium officinale (Rorippa nasturtium-aquaticum)*), germander speedwell (*Veronica chamaedrys*), primrose (*Primula vulgaris*), bluebell (*Hyacinthoides non-scripta*), hogweed (*Heracleum sphondylium*), and fool's parsley (*Aethusa cynapium*).

Plate 10 Drainage Ditch (Wet year round)

Plate 11 Drainage Ditch (filled with vegetation)

Plate 12 Drainage Ditch

7.4.3.10 FW2 – Depositing/lowland rivers including FW2/WL1 and FW2/WL2

The proposed route crosses thirty-two rivers and watercourses, most of which are drainage ditches and are tributaries of the Boyne and the Yellow River. These areas passing points were surveyed for invasive species particularly Giant-rhubarb (*Gunnera tinctoria*), Giant salvinia (*Salvinia molesta*) and Himalayan balsam (*Impatiens glandulifera*). These invasive species were not found. Many of the drainage ditches and river crossings were lined by double treelines or hedgerows.

Plate 13 River

7.4.3.11 FW3 – Canal

The route crosses over the Grand Canal at the Rathmore/ Boruta bridge. The Crossing in along the Grand Canal greenway which is paved and managed. The species noted along the banks included meadowsweet (*Filipendula ulmaria*), pendulous sedge (*Carex pendula*), brambles (*Rubus fruticosus agg*), yellow flag (*Iris pseudacorus*), self-seeded willow (*Salix sp.*) and alder (*Alnus glutinosa*) saplings, tufted vetch (*Vicia cracca*) and Bullrush (*Typha latifolia*).

Plate 14 Grand Canal

7.4.3.12 WS1 – Scrub including WS1/ED3

Scrub was present throughout the site and was dominated by brambles (*Rubus fruticosus agg*), willow (*Salix sp.*), gorse (*Ulex europaus*) and elder (*Sambucus nigra*). Other species noted within this habitat included Japanese rose (*Rosa rugosa*), rose-hip (*Rosa canina* agg.), tutsan (*Hypericum androsaemum*), holly (*Ilex aquifolium*), blackthorn (*Prunus spinosa*), hawthorn (*Crataegus monogyna*), red-osier dogwood (*Cornus sericea*), purple moor-grass (*Molinia caerulea*), sedges (*Carex spp.)*, meadowsweet (*Filipendula ulmaria*), marsh woundwort (*Stachys palustris*), hemp agrimony (*Eupatorium cannabinum*), common vetch (*Vicia sativa*), bush vetch (*Vicia sepium*), buddleia (*Buddleja davidii*), and square-stalked st.johnswort (*Hypericum tetrapterum*).

7.4.3.13 ED1 – Exposed sand, gravel or till including ED1/ED3

Exposed gravel access paths were noted in ten areas along the proposed route. Noted within the Edenderry powerplant was blue fleabane (*Erigeron acer)* which is quite endangered in Ireland and protected in the north of Ireland (no legal protection in Republic of Ireland).

7.4.3.14 ED2 – Spoil and bare ground

This habitat indicates bare or turned up soil that has not yet been colonised by plants.

7.4.3.15 ED3 – Recolonising bare ground

This habitat was noted in small areas throughout the survey area but largely in the Edenderry powerplant area. The species noted within this habitat included common knapweed (*Centaurea nigra*), common ragwort (*Jacobaea vulgaris*), willow (*Salix sp.*) saplings, silverweed (*Potentilla anserina*), thistles (*Cirsium spp.*), cats-ear (*Hypochaeris radicata*), white clover (*Trifolium repens*), red clover (*Trifolium pratense*), Watermint (*mentha aquaitca*), coltsfoot (*Tussilago farfara*), yarrow (*Achillea millefolium*), wild carrot (*Daucus carota subsp. carota*).

7.4.3.16 WD1 – (Mixed) Broadleaf woodland including WD1/WS1

This habitat was only noted in one area (~325 m^2 area) and another mixed in with scrub habitat. The species noted included brambles (*Rubus fruticosus agg*), ash (*Fraxinus excelsior*), beech (*Fagus sylvatica*), birch (*Betula pendula*), and willow (*Salix sp.*).

7.4.3.17 WD2 – Mixed broadleaf/conifer woodland

This habitat was noted along the sides of the M4 and at the north bank of crossing WCX07. Species noted here included Scot's pine (*Pinus sylvestris*), ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*), willow (*Salix spp*.), hazel (*Corylus avellana*), alder (*Alnus glutinosa*), oak (*Quercus spp.)*, birch (*Betula pendula*), gorse (*Ulex europaeus*) and field maple (*Acer campestre*).

7.4.3.18 BL3 – Built land including BL3/ED3

The built land habitat within the proposed route it made of up roadway including the M4 dual carriageway, paving footpaths, houses and yards.

7.4.4 Evaluation of Habitats

The proposed development site consists primarily of agricultural grassland, hedgerows, treelines, scrub and arable crops, with minor components to varying degrees of dry meadows and grassy verges, amenity grassland, wet grassland, drainage ditches, depositing/lowland rivers, canal, exposed sand/grave/till, spoil/bare ground, recolonising bare ground, (mixed) broadleaf woodland, mixed broadleaf/conifer woodland, and built land. No habitats of conservation importance were noted on site. However, the mixed broadleaf and broadleaf/conifer woodland, and waterbodies would be considered to be of local ecological importance.

7.4.5 Invasive Species

There were no records of any invasive species in the Proposed Development areas. However, it should be noted that Japanese knotweed (*Fallopia japonica*) (invasive species listed in the First Schedule of Regulation 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations 2024) was noted approximately 64m east outside of the Proposed Development route between chainage 23,200 m

and 23,300 m. Some medium-impact invasives noted on onsite included buddleia (*Buddleja davidii*) and cherry laurel (*Laurocerasus officinalis*). Buddleia and cherry laurel are not listed under the First Schedule invasive species list. An Invasive Species Management Plan is included alongside the application of the Proposed Development.

7.4.6 Uncommon Species

A coterie of Common orchids (*Dactylorhiza fuchsii*) was recorded between chainage 800-900 m and blue fleabane (*Erigeron acer)* within the Edenderry power station. Blue fleabane is listed as "Endangered" on the Red Data List of Irish Plants. Neither of these are protected under the Flora Protection Order 2022, however it is advisable to conserve these species as they are uncommon and in decline in Ireland. Methods of their transplanting/seed collection will be outlined in the pre-construction mitigation.

7.4.7 Fauna

7.4.7.1 Bats

A full bat assessment report is included in Appendix 7.2, with relevant features/observations demonstrated in Volume 4 of the EIAR.

In summary, 70 trees of bat roosting potential (BRP) were noted (61 of low and 9 of moderate/medium BRP) in the survey area.

The report concludes;

'*The bat surveys comply with bat survey guidance documentation including Marnell et al (2022) and Collins (2016). A total of 70 trees of low (61) and moderate (9) roosting potential were recorded. Active roosts were identified in 10 of these trees during the emergent/re-entry surveys. However, the roost status of 23 trees are unknown due to identification of these in the period since emergent/re-entry surveys took place. A potential maternity roost was observed within a fissure of an ash tree south of chainage 15,100 m. Leisler, common pipistrelle and soprano pipistrelle were recorded roosting in trees within the influence of the proposed development. Overall, six bat species were recorded across emergence/re-entry and static detector surveys: common pipistrelle, soprano pipistrelle, leisler, daubenton, brown long-eared, natterer.*

Of the trees identified as containing active bat roosts, none are scheduled for removal for the Proposed Development. 13 trees of bat roosting potential are scheduled for removal (two trees of moderate and 11 of low bat roosting potential). Of these trees of bat roosting potential scheduled for removal, three (all of low bat roosting potential) have not yet been assessed via emergent/re-entry surveys due to only being identified in early 2026 as a result of storm damage/natural decay resulting in new potential roosting features.

The potential maternity roost (arborist tree tag no. G084) at chainage 15,200 m is likely a significant roost for this species locally. However, given the similar suitable habitat types available in the wider area encompassing the Proposed Development site, it is likely that similar levels of suitable bat roost availability is present in the surrounding area, and that the Proposed Development site is not of specific importance to populations of other bat species locally.

The site is likely frequented by other species including those identified in NBDC records (indicating one additional species within the surrounding areas of the assessment area historically).

Mitigation measures are required to prevent potential negative impacts on bats as a result of trees of bat roosting potential being scheduled for removal and prevent disturbance to existing bat roosts present in trees not scheduled for removal.'

7.4.7.2 Badgers & Otters

A full mammal assessment report is included in Appendix 7.3, with relevant features/observations demonstrated in Volume 4 of the EIAR.

Survey coverage in 2025 covered a wide area encompassing the Proposed Development boundary and surrounding areas. 2026 coverage was more focused covering the Proposed Development boundary, 50 m either side of the Proposed Development boundary throughout, and 150 m either side of the Proposed Development boundary at waterbody crossings.

With regards to badgers, 31 active setts were noted within the 2025 survey area coverage inclusive of 16 breeding/likely breeding setts. In 2026, an additional ten active setts were recorded within the survey area inclusive of two additional breeding/likely breeding setts. Of the 41 overall active setts, 20 of these are either within, or in close enough proximity, to the proposed working width and compound areas, and will require protective exclusion zones (50 m for breeding setts during breeding season (December to June inclusive) and 30 m for other active setts) to protect them from potential impacts arising from the construction phase of the Proposed Development. A preconstruction activity assessment is required to determine sett activity in the O'Grady's Option 2 compound area. Other evidence of badger activity (rooting, prints, trails, latrines etc.) were observed throughout the assessed areas, but concentrated in areas adjacent to badger setts.

With regards to otters the report outlines:

'Otters are known to utilize watercourses that the Proposed Development route traverses. Throughout the survey, evidence of otter activity was actively sought; however, a single otter footprint was noted at watercourse WCX04. Camera traps were deployed along the watercourses, but no otter activity was captured. It is considered likely that otters use these watercourses; however, due to their secretive and elusive nature, the absence of recorded evidence does not negate their presence or use of the watercourses.'

The report concludes;

'*Following mitigation, the overall impact on the ecology of the proposed development will result in a short-term minor adverse, not significant, residual impact on the ecology of the site and locality overall.*
A pre-construction survey will be carried out for terrestrial mammals of conservation importance. It is imperative that all works are carried out within the construction corridor and that fencing is erected before the commencement of works. A NPWS derogation licence is not required for the proposed development.'

7.4.7.3 Breeding birds

A full breeding bird assessment report is included in Appendix 7.4.

In summary, the report outlines:

'A total of 35 species were recorded within and adjacent to the overall assessment area. 22 species were recorded breeding or displaying behaviour indicative of breeding.

16 green-listed bird species of conservation concern were recorded breeding within and/or adjacent to the assessment area.

Five amber-listed bird species of conservation concern were recorded breeding within and/or adjacent to the assessment area: goldcrest, house martin, mallard, starling and swallow.

One red-listed bird species of conservation concern was recorded breeding within and adjacent to the survey area; yellowhammer.

The primary habitats of nesting value are hedgerows, and heavily ivy-clad trees and treelines.'

The Proposed Development is predicted to have a short/medium-term low adverse effect on breeding birds within the proposed area due to the removal of sections of hedgerow habitat and potential impact on trees within the assessment area. However, retention of all vegetation outside of the finalised construction corridor and reinstatement of sections of removed hedgerow will result in similar levels and type of currently available breeding habitat long-term. Trenchless crossings of watercourses and the Grand Canal will preserve breeding habitat for waterfowl and reed-nesting birds in these areas. As re-planted hedgerow sections mature, following full implementation of mitigation measures, the overall impact of the Proposed Development will be a longterm neutral/negligible effect on breeding birds within the assessment area.

Mitigation measures are proposed.'

7.4.7.4 Aquatic Biodiversity

A full aquatic baseline report is included in Appendix 7.5.

In summary, the report outlines;

'*The watercourses surveyed in the vicinity of the proposed Edenderry Gas Pipeline development were typically heavily modified lowland channels and drainage ditches of low aquatic value. Widespread historical straightening and deepening as part of land drainage works had resulted in watercourses with poor hydromorphology and often poor summer flows. A total of 6 no. sites on the Ballynakill Stream, Mountwilson Stream, Ballyleakin River and three unmapped channels were dry at the time of survey. Bordering and adjoining land uses had also exacerbated significant siltation and eutrophication impacts. Such pressures evidently influenced biological water quality with all sampling sites failing to achieve good status in July-August 2025.*

However, a low number of high conservation value aquatic species were recorded during the surveys including Annex II Atlantic salmon (2 no. sites), lamprey (3 no. sites) and otter (2 no. sites) in addition to Red-listed European eel (2 no. sites) and the Red-listed whirligig beetle Gyrinus urinator (1 no. site). The presence of one or more of these species resulted in these sites being evaluated as ***local importance (higher value)*** *in terms of their aquatic ecology, with the majority of sites being of* ***local importance (lower value)*** *(****Table 4.3****). Given its location within the Grand Canal pNHA (002104), watercourse crossing CAX1 on the Grand Canal was of* ***national importance****. This site also supported Red-listed duck mussel (Anodonta anatina). Whilst surveyed as a downstream control site (not a pipeline crossing), site RVX02b on the River Boyne was of* ***county importance*** *in terms of its aquatic ecology given its high value as an ecological corridor.*

No examples of Annex I aquatic habitats, no rare or protected macrophytes/aquatic bryophytes and no white-clawed crayfish were recorded during the surveys. No breeding or resting places of otter, protected under the Wildlife Act 1976-2023, were recorded within 150m of the survey sites.'

'*All biological water quality sampling sites sampled failed to meet the target good status (≥Q4) requirements of the European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 and the Water Framework Directive (2000/60/EC) (****Figure 4.1****). Site WCX19 on the Kinnafad River, a tributary of the River Boyne, achieved* ***Q3-4 (moderate status)*** *with all other sites achieving* ***Q2-3 or Q3 (poor status)*** *or* ***Q2 (bad status)*** *(****Appendix B****).*

The unsatisfactory biological water quality of the survey area (i.e. <Q4) reflected the widespread significant siltation, eutrophication and hydromorphological impacts which had evidently contributed to a reduction in water quality. Furthermore, many watercourse crossings were unsuitable for Q-sampling given poor flows and the absence of riffle areas for sampling (as pe Toner et al., 2005). Thus, 20 no. Q-ratings are considered tentative. Hydromorphology (channelisation) and peat extraction are known to be the

major water quality pressures within the wider survey area (EPA data) and this was supported by observations made during the aquatic surveys.'

Table 7-6 Identification of Key Ecological Receptors

Ecological Receptor	Type	Assigned Value	Justification	Key Ecological Receptor?
Mount Hevey Bog SAC, River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA, River Barrow and River Nore SAC	Designated Conservation Sites (Natura 2000 sites)	International Importance	Potential pathway for impact via dust, surface water runoff and pollution during the construction phase.	**Yes**
All other SAC & SPA sites within 15km of proposed development	Designated Conservation Sites (Natura 2000 sites)	International Importance	Not within the ZoI of the proposed development.	No
Grand Canal pNHA, Mount Hevey Bog pNHA	Designated Sites of Ecological importance (non-statutory)	National Importance	Potential pathway for impact via dust and vibration during the construction phase.	**Yes**
All other pNHAs & NHAs	Designated Sites of Ecological imporance (non-statutory)	National Importance	Not within the ZoI of the proposed development.	No
GS2-Dry Meadows and Grassy verges	Habitat	Local Importance (Lower)	Semi-improved habitat dominated by common species; no protected or rare flora; coterie of common orchids located on north verge of R161; low conservation value in all other locations	No
WL1 – Hedgerow (Mature Native)	Habitat	Local Importance (Higher)	Native-dominated, species-rich hedgerow with trees; ecological corridor; ground flora diversity.	**Yes**
GA2 - Amenity grassland	Habitat	Local Importance (Lower)	Regularly mown, species-poor sward with generalist species; low ecological or structural value.	No
BC1 – Arable Land	Habitat	Local Importance (Lower)	Actively cultivated; common arable weed species on margins; low ecological value.	No
WL2 – Treeline	Habitat	Local Importance (Higher)	Native species, structural diversity, wildlife corridor function, potential for bats/birds.	**Yes**
FW4 – Drainage Ditch	Habitat	Local Importance (Lower)	Regularly occurring, generally stagnant/poor quality water; some aquatic vegetation; limited flow, limited faunal value.	No

WD1 – Mixed Broadleaved Woodland	Habitat	Local Importance (Higher)	Very minor, peripheral component of Proposed Development boundary not foreseen to be impacted by Proposed Development based on proposed construction corridor.	No
ED3 – Recolonising Bare Ground	Habitat	Local Importance (Lower)	common colonising species; low species diversity; rare blue fleabane within Bord na Móna grounds (no legal status in RoI, protected in NI).	No
BL2 – Earth Bank	Habitat	Local Importance (Lower)	Limited distribution and negligible ecological value locally.	No
BL3 – Buildings & Artificial Surfaces	Habitat	Local Importance (Lower)	Limited to road crossings and existing Edenderry Renewable Energy Complex; no ecological value.	No
ED1 – Exposed Sand/Gravel/Till	Habitat	Local Importance (Lower)	Minimal distribution, some common colonising species, negligible ecological value.	No
ED2 – Spoil & Bare Ground	Habitat	Local Importance (Lower)	Minimal distribution, some common colonising species, negligible ecological value.	No
FW2 – Depositing/Lowland Rivers	Habitat	Local Importance (Higher)	Multiple crossings; sensitive aquatic species; hydrological connection to SACs with aquatic Qualifying Interests.	**Yes**
FW3 – Canals	Habitat	Local Importance (Higher)	One crossing (Grand Canal); aquatic flora/fauna.	**Yes**
GA1 – Improved Agricultural Grassland	Habitat	Local Importance (Lower)	Most dominant habitat; generally species poor dominated by grasses and common grassland species.	No
GS4 Wet Grassland	Habitat	Local Importance (Higher)	Minor component of the Proposed Development site; no protected/rare flora species; used for grazing.	No
WD2 – Mixed Broadleaf/Conifer Woodland	Habitat	Local Importance (Higher)	Minor component of Proposed Development site, the majority of which will be by-passed via HDD.	**Yes**
WS1 - Scrub	Habitat	Local Importance (Lower)	Minor component of the Proposed Development site; no protected/rare flora species.	No
Badger (*Meles meles*) – Active breeding and non-breeding setts	Species	Local Importance (Higher)	41 active setts recorded by surveys; 15 active setts for which required exclusion zone is within or immediately adjacent to proposed working area & compound areas.	**Yes**

European Otter (*Lutra lutra*)	Species	International	Evidence of otter (footprint) observed at WCX04 (Knockerasally or Colehill River); no other evidence recorded; Qualifying Interest of hydrologically connected SACs.	**Yes**
Bat roosts	Species Group	Local Importance (Higher)	Active bat roosts recorded within 12 trees throughout Proposed Development site.	**Yes**
Bat Foraging	Species Group	Local Importance (Higher)	Foraging by five bat species noted throughout the Proposed Development site.	**Yes**
Amphibians	Species Habitat	Local Importance (Lower)	No frogs/newts observed throughout Proposed Development site, but drainage ditches and canal provide suitable habitat; no breeding confirmed	No
Breeding Bird Species	Species Group	Local Importance (Higher)	Green, amber and red listed Birds of Conservation Concern in Ireland (BoCCI)	**Yes**
Aquatic Fauna	Species Group	County Importance	Aquatic invertebrates, European eel, lamprey and other freshwater fish species, including those listed as Qualifying Interests of hydrologically connected SACs.	**Yes**

7.5 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction phase and operational phase of the Proposed Development to this chapter. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full development package. For a more comprehensive understanding of the Proposed Development, please refer to Chapter 2 (Description of the Proposed Development) of the EIA Report. Chapter 2 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant document in order to define the Proposed Development.

7.5.1 Construction Phase

The Proposed Development requires crossing the Kinnegad River (RVX01) and the Yellow river (RVX02). As these rivers are ecologically sensitive and tributaries of the River Boyne and associated River Boyne SPA, trenchless methods for laying the gas pipeline will be utilised. For the remaining 30 waterbody crossings, it is anticipated that two watercourses (WCX02 & WCX29) and the Grand Canal (WCX23) will also require a trenchless crossing, and that an open-cut trenched technique will be utilised for all other waterbody crossings. There will be no instream works required for trenchless crossings. In stream works will be required for the open-cut trench technique over approximately 3-4 days in each instance. Mitigation measures will be implemented to limit impacts waterbodies and banks of waterbodies reinstated with native plants and fencing (where required).

Construction methodologies to be implemented and materials to be used will ensure that the pipeline is installed in accordance with the guidelines and standards of GNI. Temporary disturbance during the construction phase that may impact flora and fauna includes:

- A working width of 30 meters will be pegged out.
- Hedgerows to be removed.
- Trees being felled.
- Topsoil removal.
- Drainage ditches to be crossed by open cut method.
- Trenchless crossing technique to be utilised where required.

The Kilwarden Offtake Installation and Ballykilleen Above Ground Installation (AGI) form the above ground components of the Proposed Development. The Ballykilleen AGI will be constructed within the existing Edenderry Renewable Energy Complex, much of which currently consists of built land and has its own existing internal road network and stormwater drainage network as part (including EPA discharge license). As part of the Kilwarden Offtake Installation upgrades to the existing laneway off the R161 will be carried out to facilitate access during construction and operation.

Temporary construction and storage compounds will be established during the construction phase. Fencing will be installed along the full length of the construction corridor boundary prior to commencement.

The Contractor and their appointed Site Manager will prepare a targeted Method Statement concisely outlining the construction methodology and incorporating all mitigation and control measures specified in the planning application and accompanying reports, and as required by planning conditions where relevant.

7.5.2 Operational Phase

Once the Proposed Development is operational, it will consist of a buried pipeline and associated ancillary infrastructure, the Kilwarden Offtake Installation and the Ballykilleen AGI.

The pipeline itself will be passive in nature and not interact actively with the surrounding environment. The Kilwarden Offtake Installation will operate as a passive, low intensity "dead site" with no permanent utility connection, and subject only to occasional, irregular maintenance activities. Operational activities at the Ballykilleen AGI will be limited to routine inspection and maintenance visits by GNI personnel. Hardstanding area will be introduced at the Kilwarden Offtake Installation and Ballykilleen AGI, increasing surface water run-off rates in these areas.

Reinstated hedgerows and vegetation removed during the construction stage will continue to mature during the operation phase.

7.6 Potential Impacts of the Proposed Development

7.6.1 Construction Phase

There are no rare or protected habitats recorded within or immediately adjacent to the Proposed Development site. The field development areas may be considered of Low Local Ecological Value with Hedgerows of Moderate ecological value.

7.6.1.1 European Sites

There are direct pathways via dust and watercourses leading to European sites. The pathways, conservation objectives and qualifying interests are displayed in Table 7-7:

Table 7-7 European sites for which direct/indirect pathways from the Proposed Development cannot be excluded.

NATURA Code	Name	Details/Reason
002342	Mount Hevey Bog SAC	Conservation Objectives The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Qualifying Interests Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the *Rhynchosporion* [7150] Potential Impact The Mount Hevey Bog SAC is located c. 20m from the northernmost area of the overall redline boundary. Given this, it is considered that there is a direct Ecological 'Source-Pathway-Receptor Linkage' between the Proposed Development and this SAC. However, given that the SAC is hydrologically upgradient of the Proposed Development site, there is no hydrological pathway-linkage (see Chapter 6 for further details) Out of an abundance of caution, significant effects on this SAC cannot be ruled out, in the absence of mitigation, given the proximity of the SAC to the site boundary and the potential for construction phase impacts on the Qualifying Interests of this European site. Mitigation measures are required to ensure that dust will not significantly impact upon the qualifying interests of this SAC. There is also the potential for significant effects on this SAC during enabling works and groundworks. In a strict application of the precautionary principle, it has been concluded that there is the potential for significant effects on the Mount Hevey Big SAC, in the absence of mitigation measures.
002299	River Boyne and River Blackwater SAC	Conservation Objectives To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected. Qualifying Interests Alkaline fens [7230] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae)* [91E0] *Lampetra fluviatilis* (River Lamprey) [1099] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] Potential Impact The Proposed Development site is located 3.3 km from this SAC at its closest point. (Figure 1). There is a direct hydrological pathway to this SAC via the following waterbodies which traverse the northern and central sections of the Proposed Development site and are primary/secondary tributaries to the River Boyne: Boyne_040 (Kinnegad 07 Stream & AGHNAGILLAGH Stream). Boyne_030 (KNOCKERSALLY or COLEHILL Stream / PARK 07 Stream / BALLYNAKIL 07 Stream / CASTLEJORDAN 07 Stream / RAHIN Stream / ROOSK 07 Stream). YELLOW (CASTLEJORDAN)_030 (Yellow [Castlejordan] Stream). Boyne_020 (MOUNTWILSON Stream & Kinnafad Stream).

NATURA Code	Name	Details/Reason
		These waterbodies flow approximately 6.2km (linear distance, it is noted that the fluvial distance is significantly longer) in an east to northeast direction prior to reaching their confluence point at the River Boyne and River Blackwater SAC. In the absence of mitigation, there is the potential for significant effects on the aquatic qualifying interests of this SAC due to sediments entering the watercourses. The direct hydrogeological pathway has potential to negatively effect on the conservation objectives of this SAC.
004232	River Boyne and River Blackwater SPA	Conservation Objective To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA. Qualifying Interests Kingfisher (*Alcedo atthis*) [A229] Potential Impact The Proposed Development site is located 3.3 km from this SPA at its closest point. (Figure 2). There are direct hydrological pathways to this SPA via the following waterbodies which traverse the northern and central sections of the Proposed Development site and are primary/secondary tributaries to the River Boyne: Boyne_040 (Kinnegad 07 Stream & AGHNAGILLAGH Stream). Boyne_030 (KNOCKERSALLY or COLEHILL Stream / PARK 07 Stream / BALLYNAKIL 07 Stream / CASTLEJORDAN 07 Stream / RAHIN Stream / ROOSK 07 Stream). YELLOW (CASTLEJORDAN)_030 (Yellow [Castlejordan] Stream). Boyne_020 (MOUNTWILSON Stream & Kinnafad Stream). These waterbodies flow approximately 6.2km (linear distance, it is noted that the fluvial distance is significantly longer) in an east to northeast direction prior to reaching their confluence point at the River Boyne and River Blackwater SPA. Out of an abundance of caution, given the potential for addition of sediments into the watercourses during construction, significant effects on the qualifying interests of this SAC cannot be ruled out. Given the distance to this SPA (3.3km), no significant noise or vibration impacts on the qualifying interests of this SPA are foreseen during construction or operation. The site consists primarily of undeveloped agricultural land and is not significant for birds of this SPA given the wider availability to similar land in the surrounding environment. In the absence of mitigation, significant effects on the qualifying interests of this SPA are likely via direct hydrological pathways. Significant effects cannot be ruled out.
002162	River Barrow and River Nore SAC	Conservation Objectives To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected. Qualifying Interests Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Reefs [1170] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410]

NATURA Code	Name	Details/Reason
		Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] European dry heaths [4030] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Petrifying springs with tufa formation (*Cratoneurion*) [7220] Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae)* [91E0] Vertigo moulinsiana (*Desmoulin's Whorl Snail*) [1016] *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] *Petromyzon marinus* (Sea Lamprey) [1095] *Lampetra planeri* (Brook Lamprey) [1096] *Lampetra fluviatilis* (River Lamprey) [1099] *Alosa fallax fallax* (Twaite Shad) [1103] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355] *Vandenboschia speciosa* (Killarney Fern) [6985] <u>Potential Impact</u> The Proposed Development site is located 14.8 km from this SAC at its closest point. (Figure 2). The site has a direct hydrological linkage to this SAC via the following river waterbodies: BALLYLEAKEN Stream (FIGILE_030). BALLYKILLEEN Stream (FIGILE_030). These two streams traverse the southern section of the site and are secondary/tertiary tributaries to the River Figile. These waterbodies flow in a southerly direction before discharging to the River Figile, which subsequently outfalls to the River Barrow and River Nore SAC at a confluence point located approximately 16.1km south of the site (linear distance, it is noted that the fluvial distance is significantly longer). In the absence of mitigation, there is the potential for significant effects on the aquatic qualifying interests of this SAC via construction phase impacts. The direct hydrological pathway has potential to negatively affect the conservation objectives of this SAC. Likely significant effects cannot be ruled out.

7.6.1.2 Habitats

There were no protected habitats noted within or immediately adjacent to the Proposed Development boundary. Two uncommon plants were noted within the Proposed Development boundary. A coterie of common orchids (*Dactylorhiza fuchsii*) was recorded adjacent to chainage 846, and blue fleabane (*Erigeron acer)* recorded within the Bord na Móna site at Edenderry Power Station. Blue fleabane is listed as "Endangered" on the Red Data List of Irish Plants. Neither of these plant species are protected under the Flora (protection) Order, 2022. In the absence of mitigation, it is highly likely that blue fleabane will be lost within the immediate vicinity of the works area as a result of vegetation removal, trenching and vehicular movements during the proposed works. Due to the location of the common orchids within the Proposed Development site, there is the potential for this species to be lost within the works area during topsoil removal, trenching and vehicular movements.

When taking into account the habitats to be removed/impacted during the construction phase in relation to the widespread occurrence and abundance of those same habitats in the surrounding area, the construction phase of the Proposed Development would not be seen to threaten the integrity of those habitats locally, or the conservation status of any rare/threatened or protected habitats.

In the absence of mitigation, the impact of the Proposed Development on habitats is considered low/negligible, adverse, not significant, and short-term.

7.6.1.3 Hedgerows

The construction methodology requires the removal of a stretch of approximately 30m of hedgerow at each hedgerow boundary crossing within the working width. This will result in the short-term loss of Low to High value hedgerow. The loss of hedgerows will result in negative impacts on connectivity for fauna through the landscape, as well as a loss in flora and fauna supported directly and indirectly by hedgerows. However, the cumulative loss of hedgerows would be considered insignificant in relation to the availability of similar type and quality habitat in the greater area, in particular due to the impact being dispersed across boundary crossings throughout the construction working width (note that not all field boundaries consist of hedgerows). Hedgerow sections removed are to be reinstated through planting post-construction.

The loss of Low value hedgerow will have a low, adverse, not significant and short-term effect on biodiversity. The loss of Moderate value hedgerow will have a low, adverse, not significant and short-term effect on biodiversity. The loss of High value hedgerow will have a low, adverse, not significant and short-term effect on biodiversity locally.

7.6.1.4 Fauna

7.6.1.4.1 Badgers

In total, 41 active badger setts were recorded throughout and adjacent to the Proposed Development site, inclusive of external compound areas. Although no setts are located within the proposed working width along the proposed pipeline route (30m extended to 45m at road/watercourse crossings), there is a risk that any works and/or vehicular movements during working width marking, hedgerow removal, tree felling, topsoil removal, open-cut trenching/trenchless crossing methods and materials storage in the vicinity of active setts may risk the structural integrity of these setts through vibration, and therefore the viability of the setts as well as the safety of individual badgers within them. An exclusion zone of 50m for active breeding setts (during breeding season) and 30 m for all other active/subsidiary setts is required for badger setts in line with the National Roads Authority (NRA) Guidelines (2005). Of the 41 active setts recorded, 20 of these are either within, or in close enough proximity, to the proposed working width and compound areas that their required exclusion zones either overlap or are within immediate proximity to the proposed working width/compound areas. Given the abundance of badger setts recorded throughout the survey areas, it can be ascertained that the local badger population is in a healthy state, and that similar abundances likely occur in the wider area surrounding the Proposed Development, which are comprised of comparable habitats.

Trenching along the proposed route corridor, fencing along the full perimeter of the proposed working area and the removal of approximately 30m of hedgerow at hedgerow intersections has the potential to disrupt foraging behaviour and movements of badgers locally. There is a risk of injury and/or death to badgers via becoming trapped within excavations.

Without mitigation, it is highly likely that a minority of active badger setts (breeding and non-breeding), as well as badger movements and behaviour locally, will be disturbed/disrupted. There is a risk to the safety of individuals via excavations along the proposed corridor. The potential impact on badgers locally in the absence of mitigation measures is medium-adverse, significant and short-term. Impacts on this species locally are likely.

7.6.1.4.2 Otters

During mammal assessments by Altemar, no evidence of otters or otter holts were recorded along any of the river, watercourse or waterbody crossings within 150 m of the boundary for the Proposed Development. However, during the Aquatic Assessment carried out by Triturus, evidence of otters (spraint and prints) were recorded at three sampling locations (RVX01b, WCX04, & RVX02b). Of these three locations, only one (WCX04) on the Knockerasally/Colehill River, Ballyboggan, was within 150 m of the Proposed Development boundary. The remaining observations were located a minimum of 2km from the Proposed Development area. The WCX04 observation consisted of prints on a muddy shelf. However, no evidence of otter holts were recorded by Triturus or Altemar in the vicinity of this location. It is worth noting that an active breeding badger sett is located in proximity to where these otter prints were identified.

In the absence of mitigation, there is the potential for open-cut crossings to have negative impacts on otter movements, foraging habitat and prey species. At the WCX04 crossing, where open-cut is proposed, multiple potential prey species (brown trout, European eel, three-spined stickleback and minnow) were recorded during electrofishing surveys. Construction of open cut crossings at other similar and minor waterbodies may have additional downstream impacts on otter habitat and prey species. There is also a risk of silt/petrochemical/pollutant-laden surface water run-off from active construction and material storage areas entering waterbodies with negative downstream impacts on the prey species of otter, including within both River Boyne and River Blackwater SAC and River Barrow and River Nore SAC for which otter is listed as a Qualifying Interest. Given the temporary duration of open-cut crossings (3-4 days), the transitory nature of works along the proposed route as works progress, and limited value of the majority of waterbodies for foraging/movements by otters, any potential impacts on any given waterbody would be short-term in duration with a limited timeframe in which they may occur, and unlikely to have a significant impact on this species. However, given the short hydrological distance from a number of waterbody crossings to larger waterbodies/watercourses, presence of potential prey species in a number of waterbodies to be crossed, the presence of otter (although minimal evidence recorded) locally and hydrological connections to European Sites for which otter is listed as a Qualifying Interest, potential impacts on otters cannot be excluded.

The potential impact on otters, in the absence of mitigation measures, is low, adverse, negative, significant and short-term. Impacts on this species cannot be ruled out.

7.6.1.4.3 Bats

There are no buildings or other man-made structures within the assessment area that will require demolition. The potential impacts on bats from the Proposed Development would be disturbance of tree roosts, removal of trees of bat roosting potential, and disruption to foraging and commuting via hedgerow/treeline removal and construction activities.

The construction phase will involve the removal of 30 metres of hedgerow at each crossing. Although efforts will be made to reduce this width at locations containing trees/treelines, the net impact will be cumulative along the entire project route. These gaps in the hedgerows will possibly disrupt the commuting and foraging behaviour of bats who use linear landscape features such as hedgerows for navigating. However, in the context of widespread availability of comparable linear features in the surrounding areas, and limited length of treeline/hedgerow that will be removed in any one particular location, taking into account cumulative losses and the intention to replace any removed hedgerows, the impact of hedgerow removal on foraging and navigation for bats locally would be considered to be negligible adverse, negative, not significant, medium-term in duration.

In total, 70 trees of bat roosting potential were identified within the assessment area (61 low and 9 moderate). Emergence/re-entry surveys confirmed active roosts within 10 of these trees. No trees of high roosting potential were identified within the assessment area, although a large, potential maternity Leisler

roost (not scheduled for removal) was recorded at Chainage 15,200 m. Due to subsequent surveys in the winter following emergent/re-entry surveys and interim storms, 23 trees of bat roosting potential have not yet been surveyed for roosting bats, of which three are scheduled for removal (all low roosting potential). Overall, 13 trees of bat roosting potential are scheduled for removal. The felling of trees of bat roost potential may result in the loss both active and suitable roost sites. The potential impact in the absence of mitigation measures on active and potential bat roosts is low adverse, negative, significant, long-term in duration.

Illumination from temporary lighting deployed during the construction phase could create light overspill onto areas utilised by bats, thus reducing habitat availability for commuting and feeding. However, given the staged nature of the works along the construction corridor, the presence of treelines and hedgerows along the boundaries of the majority of fields, undulating topography and the widespread availability of similarly suitable habitat in the surrounding area, the potential impact of lighting in the absence of mitigation measures on bats is negative, not significant, temporary in duration.

7.6.1.4.4 Breeding birds

A total of 35 species were recorded, with 22 species recorded nesting within habitats along the Proposed Development site. The majority of birds encountered (16 species) are typical open farmland birds, designated as green-listed birds of conservation concern in Ireland (BoCCI), which are not susceptible to habitat loss. However, five amber-listed BoCCI were recorded within or immediately adjacent to subject area, and one red-listed BoCCI (yellowhammer) was recorded breeding along the proposed pipeline route. Hedgerow and ivy-clad trees were the primary habitat utilised by nesting birds.

Effects on bird breeding may occur as a result of hedgerow/tree/scrub removal/clearance. Considering the species actively or displaying evidence of breeding, the cumulative scale of hedgerow removal in relation to similar available habitat in the wider area, and the planned reinstatement of removed hedgerows following construction, the potential effects on local bird populations during construction in the absence of mitigation are considered to be low adverse, negative, not-significant, medium-term. Significant effects are unlikely.

Although significant impacts on breeding bird species are unlikely, due to protection of wild birds and their nests under the Wildlife Act 1976 and Habitats Directive (1992), Birds Directive (2009) and European Communities (Birds and Natural Habitats) Regulations 2011, mitigation measures are proposed to prevent the disturbance and/or destruction of nesting birds.

7.6.1.5 Aquatic Biodiversity

A total of 34 sampling locations across 32 rivers and waterbodies proposed to be crossed by the Proposed Development underwent aquatic surveys by Triturus. Annex II species (Atlantic salmon and lamprey) and critically endangered European eel were recorded at a small number of sites. Although evidence of otter was recorded during aquatic surveys, including prints proximate to the Proposed Development site, no holts were recorded within 150 m of the Proposed Development site and survey area covered by Altemar Ltd. The proposed works will involve open-cut method for installing pipeline sections under drainage ditches, unmarked channels, and a number of watercourses. With the level of exposed earth along the working corridor and potential need for dewatering of excavations, there is the potential for impacts on aquatic biodiversity from silt or petrochemicals via contaminated surface water runoff and open-cut installation adjacent to/through waterbodies. However, crossings of the largest waterbodies (including the Grand Canal) will be carried out via trenchless methods. It is currently proposed that crossings RVX01 (Kilwarden River), RVX02 (Yellow River), WCX23 (Grand Canal), WCX02 (Aghnagillagh Stream) and WCX29 (Ballykilleen Stream) will be crossed using a trenchless crossing method - the remaining 27 waterbody crossings will be carried out via an open-cut method.

In the absence of mitigation, given the context and scale of the proposed in-stream works, and potential for surface water run-off containing silt/petrochemicals/pollutants to enter waterbodies along the

construction corridor, potential impacts on aquatic biodiversity locally are considered to be medium adverse, negative, significant and short-term. Mitigation is required to protect aquatic habitats along the proposed route from silt and pollution.

Table 7-8 Assessment of Likely Significant Impacts on Key Ecological Receptors during construction in the absence of mitigation

Key Ecological Receptor	Likely Significant Effect	Type of effect	Quality	Significance	Extent	Probability	Duration
River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA, River Barrow and River Nore SAC, Mount Hevey Bog SAC	Silt-laden and contaminated runoff from site clearance, and construction entering drainage ditches and watercourses, leading to downstream water quality degradation and potential impacts on aquatic biodiversity, Natura 2000 sites, and pNHAs. Dust.	Direct	Negative	Significant	Local	Likely	Short-term
Grand Canal pNHA, Mount Hevey Bog pNHA	Vibration from HDD, Dust from site clearance, vehicular movements and stockpiles	Direct	Negative	Significant	Local	Likely	Short-term
WL1 – Hedgerow (Mature Native)	Removal of these habitats to facilitate the Proposed Development. Damage or removal of vegetation that is to be retained.	Direct (habitat loss and damage)	Negative	Moderate	Local	Likely	Permanent
WL2 – Treeline	Removal of these habitats to facilitate the Proposed Development. Damage or removal of vegetation that is to be retained.	Direct (habitat loss and damage)	Negative	Moderate	Local	Likely	Permanent
FW2 – Depositing/Lowland Rivers	Silt-laden and contaminated runoff from site clearance, and construction entering drainage ditches and watercourses.	Direct	Negative	Moderate	Local	Likely	Short-term
FW3 – Canals	Disturbance to fauna due to vibration via HDD operation.	Direct	Negative	Significant	Local	Likely	Temporary
WD2 – Mixed Broadleaf/Conifer Woodland	Removal of these habitats to facilitate the Proposed Development. Damage or removal of vegetation that is to be retained.	Direct (habitat loss and damage)	Negative	Significant	Local	Likely	Permanent

Badger (Meles meles) (Protected Terrestrial Mammal)	Disturbance or potential destruction to nearby setts caused by construction activities including noise and vibration. Disruption to foraging and commuting routes could reduce access to feeding areas and increase movement distances.	Direct (disturbanceand barrier to movement)	Negative	Significant	Local	Likely	Short-term
European Otter (*Lutra lutra*)	Silt-laden and contaminated runoff from site clearance, and construction entering watercourses with impacts on habitat, movements and availability of prey species.	Direct (barrier to movement) and indirect (impacts on prey species)	Negative	Significant	Local	Likely	Short-term
Bat roosts	Destruction of active bat roosts and/or trees of bat roosting potential.	Direct	Negative	Significant	Local	Likely	Permanent
Bat Foraging	Loss of foraging habitat due to removal of vegetation.	Direct (habitat loss and disturbance)	Negative	Moderate	Local	Likely	Permanent
Birds (breeding)	Vegetation clearance will lead to direct loss of nests or nesting habitat. Noise and activity from machinery and personnel could disturb breeding behaviour.	Direct and indirect (habitat loss and disturbance)	Negative	Moderate	Local	Likely	Long-term
Aquatic Fauna	Silt-laden and contaminated runoff from site clearance, and construction entering waterbodies.	Direct	Negative	Moderate	Local	Likely	Short-term

7.6.1.6 Do-nothing scenario

In the absence of any elements of the Proposed Development taking place, it would be expected existing land-use practices would continue, and that existing habitats and species within the ZoI of the Proposed Development would persist at current levels subject to normal fluctuations in abundance and distribution.

7.6.2 Operational Phase

7.6.2.1 European Sites

Given the passive nature of the buried and above-ground components of the Proposed Development, no potential effects on European Sites screened 'IN' are foreseen. Therefore, mitigation measures are not required in relation to the operational phase of the Proposed Development.

7.6.2.2 Habitats

All habitats within the corridor of the Proposed Development will be reinstated where removed and allowed to persist following construction and during operation of the Proposed Development indefinitely. Topsoil where removed will be re-filled and seeded/re-planted/returned to the previous habitat type e.g. agricultural grassland, arable crop field, grassland etc.

Due to the passive and buried nature of much of the Proposed Development, no significant change to habitats will occur following reinstatement in the long term.

Above ground components of the Proposed Development will result in a net loss, albeit minor and insignificant in the context of the habitats lost (almost entirely agricultural grassland), abundance of similar habitat in the wider area, and proportion of habitat lost in relation to the overall Proposed Development area.

Habitats facilitating rare species recorded within the proposed site, namely blue fleabane and common orchid, would continue to persist unaffected or be reinstated to their previous state.

In the absence of mitigation, the operational impact of the Proposed Development on habitats is considered negligible-neutral, not significant, and short-term.

7.6.2.3 Hedgerows

During operation, in the absence of mitigation, much of the removed hedgerow sections would likely re-establish over time. However, recovery of removed hedgerow sections would be slow, in many cases would not occur, ecological benefits previously provided (connectivity, bird nesting habitat, bat foraging corridor, pollinator habitat etc.) would take a long period of time to be restored, and most likely biodiversity benefits would return to original levels in the long term.

In the absence of mitigation, the operational impact of the Proposed Development on hedgerows is considered low-negative, not significant, and long-term.

7.6.2.4 Fauna

7.6.2.4.1 Badgers

Due to the buried nature of the proposed pipeline, passive nature of the above ground components of the Proposed Development, and interaction with the surrounding environment during operation limited to periodic maintenance activities, there are no foreseen operational impacts on badgers during the operational stage of this development. Hedgerows/vegetation removals may initially have low/negligible effects on badger foraging and movements which will effectively be nullified as vegetation regenerates.

In the absence of mitigation, the operational impact of the Proposed Development on badgers is considered negligible-neutral, not significant, and long-term.

7.6.2.4.2 Otters

Due to the buried nature of the proposed pipeline at waterbody crossings, passive nature of the above ground components of the Proposed Development, and interaction with the surrounding environment during operation limited to periodic maintenance activities, no interaction with the Proposed Development, otters, and their environment during operation is foreseen.

In the absence of mitigation, the operational impact of the Proposed Development on otters is considered negligible-neutral, imperceptible, and long-term.

7.6.2.4.3 Bats

Due to the buried nature of the proposed pipeline, passive nature of the above ground components of the Proposed Development, and interaction with the surrounding environment during operation limited to periodic maintenance activities, no interaction is foreseen between the development, bats, and bat habitat during operation.

In the absence of mitigation, the operational impact of the Proposed Development on bats is considered negligible-neutral, imperceptible, and long-term.

7.6.2.4.4 Breeding birds

Due to the buried nature of the proposed pipeline, passive nature of the above ground components of the Proposed Development, and interaction with the surrounding environment during operation limited to periodic maintenance activities, no interaction is foreseen between the development, breeding birds, and bird nesting habitat during operation.

In the absence of mitigation, the operational impact of the Proposed Development on breeding birds is considered negligible-neutral, imperceptible, and long-term.

7.6.2.5 Aquatic Biodiversity

Given that existing surface water run-off and percolation patterns will persist, the buried nature of the proposed pipeline, passive nature of the above ground components of the Proposed Development, and lack of direct or indirect operational interactions with the aquatic environment, no operational effects from the Proposed Development on aquatic biodiversity is predicted.

In the absence of mitigation measures, the operational impact on aquatic biodiversity is considered negligible-neutral, imperceptible and long-term.

Table 7-9 Assessment of Likely Significant Impacts on Key Ecological Receptors during operation in the absence of mitigation

Key Ecological Receptor	Likely Significant Effect	Type of effect	Quality	Significance	Extent	Probability	Duration
River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA, River Barrow and River Nore SAC, Mount Hevey Bog SAC	Surface water run-off from limited additional hard-standing area at Kilwarden Offtake Installation and Ballykilleen AGI.	Indirect	Neutral	Imperceptible	Local	Unlikely	Long-term
Grand Canal pNHA, Mount Hevey Bog pNHA	None. The passive nature of the above and below ground components will not results in interactions.	None	Neutral	None	Site	Unlikely	Long-term
WL1 – Hedgerow (Mature Native)	Although re-establishment may occur long-term in areas, fragmentation of habitat could reduce ecological connectivity and biodiversity value.	Direct	Neutral	Imperceptible	Local	Unlikely	Long-term
WL2 – Treeline	Re-establishment may not occur naturally, and if so, may require decades to return to original state. Fragmentation of habitat could reduce ecological connectivity and biodiversity value.	Direct	Neutral	Imperceptible	Local	Unlikely	Long-term
FW2 – Depositing/Lowland Rivers	Surface water run-off from limited additional hard-standing area at Kilwarden Offtake Installation and Ballykilleen AGI.	Indirect	Neutral	Imperceptible	Local	Unlikely	Long-term
FW3 – Canals	None. The underground pipeline will not interact with the canal.	None	Neutral	None	Site	Unlikely	Long-term
WD2 – Mixed Broadleaf/Conifer Woodland	Re-establishment may not occur naturally, and if so, may require decades to return to original state. Fragmentation of habitat could reduce ecological connectivity and biodiversity value.	Direct	Neutral	Imperceptible	Local	Unlikely	Long-term
Badger (Meles meles) (Protected	Limited hardstanding areas will reduce available foraging to imperceptible levels. Some disruption to	Direct	Neutral	Imperceptible	Local	Unlikely	Long-term

Terrestrial Mammal)	biodiversity corridors via hedgerow/treeline section removal in short-medium term.						
European Otter (*Lutra lutra*)	Surface water run-off from limited additional hard-standing area at Kilwarden Offtake Installation and Ballykilleen AGI.	Indirect	Neutral	Imperceptible	Local	Unlikely	Long-term
Bat roosts	Reduction in available potential roosting habitat through tree removal.	Direct	Neutral	Imperceptible	Local	Unlikely	Long-term
Bat Foraging	Loss of foraging habitat due to removal of vegetation will likely recover in many areas, although likely not to the original levels and over a significant duration of time.	Direct	Negative	Negligible	Local	Likely	Long-term
Birds (breeding)	Loss of nesting habitat due to removal of vegetation will likely recover in many areas, although likely not to the original levels and over a significant duration of time.	Direct	Negative	Negligible	Local	Likely	Long-term
Aquatic Fauna	Surface water run-off from limited additional hard-standing area at Kilwarden Offtake Installation and Ballykilleen AGI.	Indirect	Neutral	Imperceptible	Local	Unlikely	Long-term

7.6.2.6 Do-nothing scenario

In the absence of the Proposed Development taking place, it would be expected existing land-use practices would continue, and that existing habitats and species within the ZoI of the Proposed Development would persist at current levels subject to normal fluctuations in abundance and distribution.

7.7 Mitigation Measures

7.7.1 Construction Phase

A suitably qualified Ecological Clerk of Works (ECoW) will be appointed at the outset of the construction works to ensure that all environmental and ecological commitments are adhered to throughout the project. The ECoW will provide guidance on the required mitigations to the Project Team, and in particular the Site Manager. The Site Manager shall ensure that all personnel working on-site are trained and aware of the mitigation measures detailed below. While the Ecological Clerk of Works (ECoW) oversees ecological and environmental compliance, they are not solely responsible. All project staff, including the appointed contractor(s) environmental personnel, share the responsibility for ensuring that environmental best practices are adhered to. The appointed contractor(s) staff must work together to maintain high environmental standards and mitigate impacts, thereby ensuring the success of the project's environmental commitments.

The ECoW will monitor works practices with targeted efforts and attendance at site at project start up to ensure mitigation measures and best practice measures are in place. The frequency of the ECoW's attendance on site will be dictated by the nature of the works. The ECoW will be fully appraised of all of the mitigation measures included in the project.

The appointed ECoW will be appropriately qualified, with commensurate experience in the role of ECoW for work on similar construction projects. The appointed Ecologist or environmental scientist will have the authority to stop works or temporarily halt or delay ongoing works where further consideration or on-site improvements of mitigation may be necessary.

It has been determined that subject to the appropriate mitigation as outlined in the accompanying NIS being adhered to, which have been informed by associated specialist reports, it is considered that any potential for adverse effects on the integrity of the qualifying interests, special conservation interests and conservation objectives of the European Sites screened IN will be avoided.

The measures associated with the construction phase required to avoid or reduce any potential harmful effects on biodiversity are set out below. These measures are not included as mitigation to protect European Sites. The measures outlined below will be carried out in conjunction with those outlined in the accompanying Construction Environmental Management Plan (CEMP) and NIS. The Site Manager shall ensure that all personnel working on-site are trained and aware of the mitigation measures detailed below.

7.7.1.1 European Sites

See accompanying NIS for all mitigation measures in relation to specific Conservation Objectives and Qualifying Interests of European sites screened 'IN'.

7.7.1.2 Habitats/Hedgerows

- If protected or notable species are encountered during operations at the Site the Ecological Clerk of Works (ECoW) or NPWS will be contacted for advice;
- All trees that are to be retained, both within and adjacent to the Proposed Development boundary (where the root protection area of the tree extends into the Proposed Development boundary), will be fenced off at the outset of works and for the duration of construction to avoid structural damage to the trunk, branches or root systems of the trees. Temporary fencing will be erected at a sufficient

distance from the tree so as to enclose the Root Protection Area (RPA) of the tree. The RPA will be defined based upon the recommendation of a qualified arborist;

- Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it;
- The area within the RPA will not be used for vehicle parking or the storage of materials (including soils, oils and chemicals). The storage of hazardous materials (e.g. hydrocarbons) or concrete washout areas will not be undertaken within 10 m of any retained trees, hedgerows or treelines;
- The construction contractor will seek to avoid removing any hedges or trees during bird nesting season and where this is not possible, an ecologist will be engaged to ensure compliance with the Wildlife Act 1976, as amended. The Applicant (GNI) employ their own internal policies on Tree Cutting and Hedge Trimming that applies the Biodiversity Mitigation Hierarchy on all projects to avoid and minimise any tree/hedgerow loss, where practicable. The Applicant will engage with the Local Authority to identify and agree suitable biodiversity measures and/or lands to achieve biodiversity net gain before completion of the project.
- To prevent the introduction of Invasive Alien Species (IAS) to the site stringent biosecurity measures will be implemented by the Construction Contractor. All vehicles entering the site will undergo a mandatory pre-entry inspection for signs of soil, seeds, pests, or other potential IAS contaminants. If a vehicle is suspected of carrying potential IAS, it will be refused entry and immediately isolated.
- The mitigation measures outlined in Chapter 5 (Land, Soils and Geology) Section 5.6.1, and Chapter 6 (Hydrology and Hydrogeology) Section 6.6.2 will be implemented in full during the construction. These mitigation measures will be implemented as part of the site Construction Environmental Management Plan (CEMP). The CEMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager and Ecological Clerk of Works where relevant. These measures are designed to prevent the contamination of groundwater, surface water, and downstream ecosystems. These measures are not designed for the protection of European Sites.
- The retention of existing green corridors such as hedgerows and promotion of biodiversity through native species landscaping will be undertaken where feasible. All areas of hedgerow vegetation removed will be fully reinstated with an appropriate native planting mix of local provenance including the following species:
  - Elder (*Sambucus nigra*)
  - Hazel (*Corylus avellana*)
  - Hawthorn (*Crataegus monogyna*)
  - Blackthorn (*Prunus spinosa*)
  - Whitebeam (*Sorbus aria*)
  - Rowan (*Sorbus aucuparia*)
  - Birch (*Betula Spp.*) (wetter areas)
  - Guelder Rose (*Viburnum opulus*)

Prior to commencement of works on site a suitably qualified arborist will undertake a survey of the proposed pipeline route BS5837: Trees in relation Design, Demolition and Construction – Recommendations (BSI, 2012). Any trees or areas of mature vegetation that are removed to facilitate the full footprint of the Proposed Development will be quantified and replanted on a like-for-like basis. As only low vegetation and hedgerows can be planted directly above the proposed pipeline, any additional mature trees that are to be replaced will be planted in the surrounds of the offtake location. A landscape plan will be prepared by a suitably qualified landscape architect showing the location of the proposed compensatory planting around the proposed offtake location. All replacement planting will be of native stock and of local provenance for the promotion of biodiversity.

7.7.1.3 Common Orchid

No statutory requirements exist mandating the protection and/or relocation of common orchid. However, given the habitat sensitivities of this species, it can be advised to implement mitigation measures to facilitate the persistence of this species on site or elsewhere. The following mitigation will be applied only if it does not impact on the ability to establish a function working width to facilitate the Proposed Development:

- The area containing orchids will be isolated via fencing and area avoided completely. The locations of individual orchids on site will be identified and a marker flag put proximate to each plant to aid positioning of fencing process. Protective fencing must be erected before the commencement on any works. The fencing will have a birth of 2m from the cluster of orchids on either side of the bank and will run along the existing boundary of the road. The fencing will have signage and have a draping of tarp to protect the orchids and surrounding soil from dust. The tarp will allow light to penetrate the soil. Fencing will remain in place until all works within 350m from the coterie have concluded.

7.7.1.4 Blue fleabane

No statutory requirements exist mandating the protection and/or relocation of blue fleabane in the Republic of Ireland. However, in the interest of biodiversity, given it's rare and threatened nature, and protected status in Northern Ireland, it can be advised to implement mitigation measures which facilitate the persistence of this species on site.

- Collection of seeds in heads (July to Sept) will be carried out by a suitably qualified individual each flowering season until commencement of construction. Seeds will be planted in suitable habitat adjacent to the Proposed Development approved by an ecologist and free from current and/or future development. The receptor site location will be discussed with the project ecologist. A suitably qualified individual will monitor the flowers and harvest the seeds in accordance with seasonal conditions.

7.7.1.5 Fauna

7.7.1.5.1 Bats

- Prior to any removal of trees of bat roosting potential, a survey will be carried out by a suitably qualified ecologist to identify whether any active roosts are present.
- In the event that active roosts are identified within any trees of bat roosting potential scheduled for removal, prior to removal, a derogation license will be sought from NPWS and no action taken regarding these trees unless derogation is granted.
- Trees identified as containing active bat roosts within and bounding to the construction corridor will be suitably marked to prevent any accidental damage/removal.
- Tree no. 50 (arborist tag id G084) containing a large, potential maternity, Leisler roost, in addition, will have ground protection and fencing implemented during construction.
- Illumination of treelines and canopies avoided during construction.
- The project ecologist will be consulted regarding all lighting related to the construction phase.
- An arborist will be appointed to oversee implementation of root protection zones prior to works.
- All sections of hedgerow to be removed to facilitate construction will be replaced with a similar species composition.

7.7.1.5.2 Breeding birds:

- An Ecological Clerk of Works (ECoW) will be appointed to oversee the construction phase and to oversee the implementation of all mitigation including compliance with Wildlife Acts and Water Pollution Acts and ensure that biodiversity in neighbouring areas including birds will not be impacted.
- All hedgerows requiring removal will be re-planted with a hedgerow mix of similar species composition following construction.

- No removal of ivy from trees to be retained within or adjacent to the works area will take place.
- The effectiveness of the proposed mitigation will be monitored throughout the construction period.
- The construction corridor will be marked out prior to the commencement of construction.
- All construction work will be confined strictly to the construction corridor. Any construction works required outside the construction corridor will require prior approval from the ECoW.
- Lighting during construction will not spill outside the Proposed Development.
- Relevant guidelines and legislation (Section 40 of the Wildlife Acts, 1976 to 2012) in relation to the removal of trees and timing of nesting birds will need be followed e.g. do not remove trees or shrubs during the nesting season (1st March to 31st August). Should this not be possible a pre-clearance inspection will be carried out by an ecologist and clearance will not take place if nests are present.

7.7.1.5.3 Badgers

- An Ecological Clerk of Works (ECoW) will be appointed to oversee the construction phase and to oversee the implementation of all mitigation including compliance with Wildlife Acts.
- Preconstruction surveys for mammals will be carried out along the full route given the time between the original surveys and possible site clearance.
- In the vicinity of badger setts, no construction operations will take place outside of daylight hours.
- To prevent badgers from climbing into pipes, gas pipes arriving onsite will be clean and sealed. Pipes in storage will be sealed. Open-cut trenches will have sloped face at the end of each of working day to allow badgers to exit.
- Fencing outlining the site boundary is planned to be erected for the entirety of the project. As directed by the ECoW mammal access points will be placed and monitored along the pipeline route. In areas of fencing close to known badger setts, access points will be made along existing tracks. Additional, access points will be made close to ecological corridors such as hedgerows, treelines, watercourses and drainage ditches.
- The effectiveness of the proposed mitigation will be monitored by the project ecologist throughout the construction period.
- The construction corridor will be marked out prior to the commencement of construction.
- Any construction works required outside the construction corridor will require prior approval from the project ecologist.
- In the cases where the exclusion zone of a sett crosses into or comes within 5 meters of the construction corridor, protective fencing must be placed along the required exclusion zone perimeter and signage placed on the fencing.
- Construction activities will only take place within 50m of breeding setts outside of the breeding season (December to June inclusive), during which a 30m exclusion zone of these setts will be implemented.
- In the vicinity of badger setts, construction operations will take place only during daylight hours.

7.7.1.6 Otters

- An Ecological Clerk of Works (ECoW) will be appointed to oversee the construction phase and to oversee the implementation of all mitigation including compliance with Wildlife Acts.
- All mitigation measures outlined in the EIAR Chapters and Natura Impact Statement (NIS) that pertain to protection of waterbodies during the construction stage of the Proposed Development, in particular those relating to surface water run-off, fuel/materials storage and waterbody crossings, will be implemented by the Contractor to protect otter habitat and forage species.
- Preconstruction surveys for mammals will be carried out along the full route given the time between the original surveys and possible site clearance.
- Any visual observations of otter, or evidence of their presence will be reported to the ECoW and site manager immediately, and works will cease immediately within 150m of the observational evidence until the area has been inspected by the ECoW and any necessary measures implemented depending on the findings.

7.7.1.7 Aquatic biodiversity:

- Silt interception will be integrated into all surface water run-off during construction prior to discharge off the works area.
- Discharge from de-watering of excavations will not be discharged directly to any watercourses, streams, drainage ditches or other waterbodies/features.
- An Ecological Clerk of Works (ECoW) will be appointed to oversee the construction phases and to oversee the implementation of all mitigation including compliance with Wildlife Acts and Water Pollution Acts and ensure that biodiversity within the site and neighbouring areas, including mammals, birds, bats and watercourses, will not be impacted.
- Waterbodies along the Proposed Development will be maintained in their current states and sufficient measures implemented and monitored to prevent downstream impacts on aquatic biodiversity. Waterbodies subject to open-cut trenching will be reinstated through separation during removal, and reinstatement of each waterbodies appropriate substrate immediately following works.
- The full suite of mitigation measures as outlined in the accompanying Natura Impact Statement (NIS) will be implemented to minimise the risk of significant effects on the River Boyne catchment, and the Natura 2000 sites located there. These include measures outlined in the OCEMP in relation to surface water runoff, silt/petrochemical interception, and open-cut trenching.
- In-stream works will only take place between 1st July and 30th September inclusive.
- All in-stream works will be carried out adhering to all measures outlined within the accompanying NIS and CEMP.
- Monitoring of waterbody conditions will be carried out daily for the duration of in-stream works and works adjacent to waterbodies.
- Any pollution events on site will be reported to the Site Manager and ECoW. All works are to cease until pollution source is identified, contained, and rectified.
- Following completion of in-stream works, open-cut sections will be restored to their previous condition. River/stream beds will be restored using original materials removed in reverse sequence of removal to restore original surface substrate. Banks will be returned to their original gradient and bare soil lined with biodegradable material to prevent erosion.
- There will be no spread of invasive species as a result of the Proposed Development. Biosecurity of both plant and animal species will be employed pre and post works and will form part of the Appointed Contractor's CEMP. The biosecurity protocols will include:
  - Implement Check–Clean–Dry procedures for all plant, equipment and PPE before entering and leaving site.
  - Restrict machinery movement and use designated access routes to protect the riparian zone.
  - Identify and demarcate any invasive species areas to prevent disturbance.
  - Inspect, segregate and appropriately manage excavated soils to avoid spread of invasive plant material.
  - Follow IFI field work protocol for field survey work (2010) aquatic biosecurity protocols for all works near watercourses.
  - Deliver toolbox talks to all personnel on invasive species awareness and biosecurity requirements.
- Maintain ongoing environmental supervision to ensure compliance and address issues promptly.

7.7.2 Operational Phase

7.7.2.1 Hedgerows

In addition to retention of existing green areas where feasible, the Proposed Development includes replacement planting of removed trees and hedgerow sections of similar species composition. These planting works will be undertaken in the next available planting season after completion of the main civil engineering works and monitored for a period of three years post-planting.

7.7.2.2 Habitats

Prior to any maintenance/repair/upgrade activities requiring heavy machinery and/or excavations during operation, a habitat survey will be carried out by a suitably qualified ecologist for any protected habitats in the vicinity of maintenance/repair/upgrade activities.

7.7.2.3 Fauna

7.7.2.3.1 Badgers & Otters

Prior to any maintenance/repair/upgrade activities requiring heavy machinery and/or excavations during operation, a mammal inspection will be carried out by a suitably qualified ecologist for any protected mammals or their resting places in the vicinity of maintenance/repair/upgrade activities.

7.7.2.3.2 Breeding birds

Any vegetation clearance/tree felling required for maintenance/access during operation of the Proposed Development will not take place during bird nesting season (1st March – 31st August). Exceptions to this will only occur following a pre-clearance inspection and subsequent direction by a suitably qualified ecologist/ornithologist.

7.7.2.3.3 Bats

Where trees of bat roosting potential are to be removed, bat boxes will be installed as close as feasibly possible to removed trees on suitable trees/structures to compensate for loss of roosting habitat. The number of bat boxes will correspond to the number of potential roosting features lost. Monitoring of these boxes will be undertaken by a suitably qualified ecologist for a period of three (3 No.) years following installation. Annual results of this monitoring are to be forwarded to the relevant local authority. Reinstated hedgerows require checking on an annual basis for a period of three (3 No.) years following reinstatement and any dead or missing plants are to be replaced.

7.7.2.4 Aquatic Biodiversity

Due to the nature of the Proposed Development, no impact on aquatic biodiversity during operation is foreseen. Although no operation-specific mitigation is required, if any maintenance/repair/upgrade works are required at waterbody crossings, all mitigation measures outlined within the EIAR, NIS and CEMP in relation to waterbodies and surface water will be adhered to.

7.8 Monitoring or Reinstatement Measures

7.8.1 Construction Phase

Monitoring of a suitably qualified ecologist will be required to ensure that no sensitive ecological receptors will be impacted by the Proposed Development, that any sensitive receptors have been signposted and that suitably marked exclusion zones are in place where required. Any vegetation removal during construction will only take place within the bird nesting season following inspection and approval by a suitably qualified ecologist. An ECoW will be appointed to monitor all on-going mitigation measures.

7.8.2 Operational Phase

Three years after the initial hedgerow planting, a comprehensive survey will be conducted on the reinstated hedgerows by a suitably qualified arborist, ecologist, or similar. The purpose of this survey is to assess the health, growth, and survival rates of the planted hedgerows and trees. Based on the survey findings, a replacement planting plan will be developed to replace the failed plantings. The plan will consider the same or suitable native species to maintain ecosystem integrity. Alongside this hedgerow

planting survey a review of any installed bat boxes will be undertaken, and in the event of significant damage or loss suitable replacement will be installed.

7.9 Residual Effects of the Proposed Development

7.9.1 Construction Phase

7.9.1.1 Hedgerows

With the employment of the appropriate mitigation measures regarding hedgerows as outlined above, any residual effects of the Proposed Development on hedgerows at a local level are anticipated to be ***low-adverse, negative, not significant and medium-term.***

7.9.1.2 Habitats

With the employment of the appropriate mitigation measures regarding habitats (and their associated flora) as outlined above, any residual effects of the Proposed Development on habitats at a local level are anticipated to be ***low-adverse, negative, not significant and short-term.***

7.9.1.3 Fauna

7.9.1.3.1 Badgers

With the employment of the appropriate mitigation measures regarding badgers as outlined above, any residual effects of the Proposed Development on badgers and their resting places at a local level are anticipated to be ***negligible-adverse, neutral, not significant and short-term.***

7.9.1.3.2 Otters

With the employment of the appropriate mitigation measures regarding otters as outlined above, any residual effects of the Proposed Development on otters and their habitat at a local level are anticipated to be ***negligible-adverse, neutral, not significant and short-term.***

7.9.1.3.3 Breeding birds

With the employment of the appropriate mitigation measures regarding breeding birds as outlined above, any residual effects of the Proposed Development on breeding birds and nesting habitat at a local level are anticipated to be ***low-adverse, negative, not significant and short-term.***

7.9.1.3.4 Bats

With the employment of the appropriate mitigation measures regarding bats and bat roost habitat as outlined above, any residual effects of the Proposed Development on bats at a local level are anticipated to be ***low-adverse, neutral, not significant and short-term.***

7.9.1.4 Aquatic Biodiversity

With the employment of the appropriate mitigation measures regarding aquatic biodiversity, in-stream works, surface water run-off and works in proximity to waterbodies as outlined above, any residual effects of the Proposed Development on aquatic biodiversity are anticipated to be ***low-adverse, neutral, not significant and short-term.***

Table 7-10 Summary of Construction Phase Likely Significant Effects Post Mitigation

Key Ecological Receptor	Likely Significant Effect	Type of effect	Quality	Significance	Extent	Probability	Duration
River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA, River Barrow and River Nore SAC, Mount Hevey Bog SAC	Silt-laden and contaminated runoff from site clearance, and construction entering drainage ditches and watercourses, leading to downstream water quality degradation and potential impacts on aquatic biodiversity, Natura 2000 sites, and pNHAs. Dust.	Direct	Negative	Not significant	Local	Unlikely	Temporary
Grand Canal pNHA, Mount Hevey Bog pNHA	Vibration from HDD, Dust from site clearance, vehicular movements and stockpiles	Direct	Negative	Not significant	Local	Unlikely	Short-term
WL1 – Hedgerow (Mature Native)	Removal of these habitats to facilitate the Proposed Development. Damage or removal of vegetation that is to be retained.	Direct (habitat loss and damage)	Negative	Moderate	Local	Likely	Medium-term
WL2 – Treeline	Removal of these habitats to facilitate the Proposed Development. Damage or removal of vegetation that is to be retained.	Direct (habitat loss and damage)	Negative	Moderate	Local	Likely	Long-term
FW2 – Depositing/Lowland Rivers	Silt-laden and contaminated runoff from site clearance, and construction entering drainage ditches and watercourses.	Direct	Negative	Not significant	Local	Unlikely	Temporary
FW3 – Canals	Disturbance to fauna due to HDD operation.	Direct	Negative	Not significant	Site	Likely	Temporary
WD2 – Mixed Broadleaf/Conifer Woodland	Removal of these habitats to facilitate the Proposed Development. Damage or removal of vegetation that is to be retained.	Direct (habitat loss and damage)	Negative	Moderate	Local	Likely	Long-term

Badger (Meles meles) (Protected Terrestrial Mammal)	Disturbance or potential destruction to nearby setts caused by construction activities including noise and vibration. Disruption to foraging and commuting routes could reduce access to feeding areas and increase movement distances.	Direct (disturbance and barrier to movement)	Negative	Not significant	Local	Unlikely	Short-term
European Otter (*Lutra lutra*)	Silt-laden and contaminated runoff from site clearance, and construction entering watercourses with impacts on habitat, movements and availability of prey species.	Direct (barrier to movement) and indirect (impacts on prey species)	Negative	Not-significant	Local	Unlikely	Short-term
Bat roosts	Destruction of active bat roosts and/or trees of bat roosting potential.	Direct	Negative	Not significant	Local	Likely	Long-term
Bat Foraging	Loss of foraging habitat due to removal of vegetation.	Direct (habitat loss and disturbance)	Negative	Moderate	Local	Likely	Medium-term
Birds (breeding)	Vegetation clearance will lead to direct loss of nests or nesting habitat. Noise and activity from machinery and personnel could disturb breeding behaviour.	Direct and indirect (habitat loss and disturbance)	Negative	Moderate	Local	Likely	Medium-term
Aquatic Fauna	Silt-laden and contaminated runoff from site clearance, and construction entering waterbodies.	Direct	Negative	Not significant	Site	Unlikely	Short-term

With the employment of appropriate mitigation measures with regard to local biodiversity, the residual effect of the construction phase of the Proposed Development on biodiversity is anticipated to be low-adverse, negative, not significant, and short term.

7.9.2 Operational Phase

7.9.2.1 Hedgerows

With the employment of the appropriate mitigation measures regarding hedgerows as outlined above, any residual effects of the operational phase of the Proposed Development on hedgerows are anticipated to be ***negligible-adverse, neutral, not significant*** and ***long-term***.

7.9.2.2 Habitats

With the employment of the appropriate mitigation measures regarding habitats (and their associated flora) as outlined above, any residual effects of the operational phase of the Proposed Development on habitats at a local level are anticipated to be ***negligible-adverse, neutral, not significant*** and ***long-term***.

7.9.2.3 Fauna

7.9.2.3.1 Badgers

With the employment of the appropriate mitigation measures regarding badgers as outlined above, any residual effects of the operational phase of the Proposed Development on badgers and their resting places at a local level are anticipated to be ***negligible-adverse, neutral, not-significant*** and ***long-term***.

7.9.2.3.2 Otters

With the employment of the appropriate mitigation measures regarding otters as outlined above, any residual effects of the operational phase of the Proposed Development on otters and their habitat at a local level are anticipated to be ***negligible-adverse, neutral, not-significant*** and ***long-term***.

7.9.2.3.3 Breeding birds

With the employment of the appropriate mitigation measures regarding breeding birds as outlined above, any residual effects of the operational phase of the Proposed Development on breeding birds and nesting habitat at a local level are anticipated to be ***negligible-adverse, neutral, imperceptible*** and ***long-term***.

7.9.2.3.4 Bats

With the employment of the appropriate mitigation measures regarding bats and bat habitat as outlined above, any residual effects of the operational phase of the Proposed Development on bats at a local level are anticipated to be ***negligible-adverse, neutral, imperceptible*** and ***long-term***.

7.9.2.4 Aquatic Biodiversity

With the employment of the appropriate mitigation measures regarding aquatic biodiversity, in-stream works, surface water run-off and works in proximity to waterbodies as outlined above, any residual effects of the operational phase of the Proposed Development on aquatic biodiversity are anticipated to be ***negligible-adverse, neutral, imperceptible*** and ***long-term***.

Table 7-11 Summary of Operation Phase Likely Significant Effects Post Mitigation

Key Ecological Receptor	Likely Significant Effect	Type of effect	Quality	Significance	Extent	Probability	Duration
Ecological Receptor	**Likely Significant Effect**	**Type of effect**	**Quality**	**Significance**	**Extent**	**Probability**	**Duration**
River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA, River Barrow and River Nore SAC, Mount Hevey Bog SAC	Surface water run-off from limited additional hard-standing area at Kilwarden Offtake Installation and Ballykilleen AGI.	Indirect	Neutral	Imperceptible	Local	Unlikely	Long-term
Grand Canal pNHA, Mount Hevey Bog pNHA	None. The passive nature of the above and below ground components will not results in interactions.	None	Neutral	None	Site	Unlikely	Long-term
WL1 – Hedgerow (Mature Native)	Although re-establishment may occur long-term in areas, fragmentation of habitat could reduce ecological connectivity and biodiversity value.	Direct	Neutral	Not significant	Local	Unlikely	Long-term
WL2 – Treeline	Re-establishment may not occur naturally, and if so, may require decades to return to original state. Fragmentation of habitat could reduce ecological connectivity and biodiversity value.	Direct	Neutral	Imperceptible	Local	Unlikely	Long-term
FW2 – Depositing/Lowland Rivers	Surface water run-off from limited additional hard-standing area at Kilwarden Offtake Installation and Ballykilleen AGI.	Indirect	Neutral	Imperceptible	Local	Unlikely	Long-term
FW3 – Canals	None. The underground pipeline will not interact with the canal.	None	Neutral	None	Site	Unlikely	Long-term
WD2 – Mixed Broadleaf/Conifer Woodland	Re-establishment may not occur naturally, and if so, may require decades to return to original state.	Direct	Neutral	Imperceptible	Local	Unlikely	Long-term

	Fragmentation of habitat could reduce ecological connectivity and biodiversity value.						
Badger (Meles meles) (Protected Terrestrial Mammal)	Limited hardstanding areas will reduce available foraging to imperceptible levels. Some disruption to biodiversity corridors via hedgerow/treeline section removal in short-medium term.	Direct	Neutral	Imperceptible	Local	Unlikely	Long-term
European Otter (*Lutra lutra*)	Surface water run-off from limited additional hard-standing area at Kilwarden Offtake Installation and Ballykilleen AGI.	Indirect	Neutral	Imperceptible	Local	Unlikely	Long-term
Bat roosts	Reduction in available potential roosting habitat through tree removal.	Direct	Negative	Imperceptible	Local	Likely	Permanent
Bat Foraging	Loss of foraging habitat due to removal of vegetation will likely recover in many areas, although likely not to the original levels and over a significant duration of time.	Direct	Neutral	Imperceptible	Local	Unlikely	Long-term
Birds (breeding)	Loss of nesting habitat due to removal of vegetation will likely recover in many areas, although likely not to the original levels and over a significant duration of time.	Direct	Negative	Negligible	Local	Likely	Long-term

With the employment of appropriate mitigation measures with regard to local biodiversity, the residual effect of the operational phase of the Proposed Development on biodiversity is anticipated to be negligible-adverse, neutral, not significant, and long term.

7.10 References

- BRE (2003) Controlling Particles, Vapours & Noise Pollution from Construction Sites
- Department of Housing, Planning & Local Government (DHPLG) (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment
- Department of the Environment Heritage and Local Government (DEHLG) (2004) Quarries and Ancillary Activities, Guidelines for Planning Authorities
- Dublin City Council (DCC) (2018) Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition
- Environmental Protection Agency (2006) Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)
- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- Environmental Protection Agency (2024) Air Quality in Ireland 2022 (& previous annual reports)
- European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report
- German VDI (2002) Technical Guidelines on Air Quality Control – TA Luft
- Government of Ireland (2023) Clean Air Strategy for Ireland
- Institute of Air Quality Management (IAQM) (2020) A Guide To The Assessment Of Air Quality Impacts On Designated Nature Conservation Sites (Version 1.1)
- Institute of Air Quality Management (IAQM) (2024) Guidance on the Assessment of Dust from Demolition and Construction (Version 2.2)
- Met Éireann (2024) Met Éireann website: https://www.met.ie/
- The Scottish Office (1996) Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings
- Transport Infrastructure Ireland (2022) Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes - CC-ENV-01104
- Transport Infrastructure Ireland (2022) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106
- Transport Infrastructure Ireland (2024) TII Road Emissions Model (REM): Model Development Report – GE-ENV-01107
- UK Office of Deputy Prime Minister (ODPM) (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance
- USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures
- World Health Organisation (2006) Air Quality Guidelines - Global Update 2005 (and previous Air Quality Guideline Reports 1999 & 2000)
- World Health Organisation (2021) Air Quality Guidelines 2021