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08

Biodiversity

8 Biodiversity

8.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) presents an assessment of likely significant effects from the proposed development on receptors (i.e. all aspects of terrestrial ecology and biodiversity). The assessment, under the heading Biodiversity, considers potential impacts and likely significant effects during the construction, operation, and decommissioning phases on receptors. This chapter sets out the methodology followed, describes the baseline environment and summarises the main characteristics of the proposed development which are of relevance to biodiversity. The evaluation of the potential biodiversity effects of the proposed development are described. Measures are proposed to mitigate and monitor these effects, and any residual effects are described. Cumulative effects are summarised and detailed in full in Chapter 21.

The purpose of this chapter is to:

- Establish and evaluate the baseline ecological environment, as relevant to the proposed development.
- Identify, describe, and assess all potentially significant ecological effects associated with the proposed development.
- Outline the mitigation measures required to address any potentially significant ecological effects and ensure compliance with relevant nature conservation legislation.
- Provide an assessment of the significance of any residual ecological effects.
- Identify any appropriate compensation, enhancement, or post-construction monitoring requirements.

8.1.1 Author Statement

This Biodiversity Chapter was authored by Donnachadh Powell, BSc, Lead Ecologist at Veon Ltd, with expertise in field surveys, ecological assessments, and data analysis.

8.2 Legislation and Guidance

8.2.1 Legislation

Legislation summarised in this section has been considered in this chapter, in the assessment of the effects on ecology and biodiversity.

European Legislation

EIA Directive 2011/92/EU as amended by Directive 2014/52/EU

Directive 2011/92/EU as amended by Directive 2014/52/EU (together, the EIA Directive) requires projects that are likely to have significant effects on the environment to be subject to an environmental impact assessment prior to development consent being given. Biodiversity (for example flora and fauna) is specifically mentioned in Annex IV of the EIA Directive as one of the aspects of the environment which should be addressed in an EIAR. Further information on the EIA Directive is provided in Chapter 2.

EU Habitats Directive 92/43/EEC

The Habitats Directive provides the basis of protection for Natura 2000 sites, or European site, namely Special Areas of Conservation (SACs). The full title of this Directive is 'Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora' (the Habitats Directive). Article 6 of the Habitats Directive requires that any plan or project that may have a significant effect on a Natura 2000 site must be subject to an Appropriate Assessment (AA). An AA is required in order to ascertain the potential impact of a development on the reasons for which the site is designated, and thereby ascertain the potential for adverse impact on the integrity of the site. The report outlining whether or not a development may adversely affect the integrity of a European site is known as a Natura Impact Statement (NIS).

The Habitats Directive also provides for the protection of species listed under Annex IV wherever they occur. The Annex IV species of relevance in the Irish context and to terrestrial ecology include all bat species, otter, natterjack toad and Kerry slug.

In compliance with the Habitats and Birds Directives the potential impacts associated with the proposed development, how these might affect the European sites' conservation objectives, and the mitigation measures that will be implemented to ensure that adverse effects on site integrity do not arise, are considered and assessed in full detail in the Natura Impact Statement (NIS) prepared by the Developer, which is a standalone document independent of the findings of this EIAR. The conclusion of the NIS assessment was that the proposed development will not adversely affect the integrity of any European site, either alone or in combination with other plans or projects.

EU Birds Directive 2009/147/EC

The Birds Directive establishes a system of general protection for all wild birds throughout the European Union. The full title of this Directive is 'Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds' (the Birds Directive). Annex I of the Birds Directive lists 194 bird species that are rare, vulnerable to habitat changes or in danger of extinction within the European Union. For these species, Member States must conserve their most suitable territories in number and size as Special Protection Areas (SPAs), which are considered to be Natura 2000 sites, or European sites. Similar actions should be taken by Member States regarding migratory species, even if they are not listed in Annex I.

In compliance with the Habitats and Birds Directives the potential impacts associated with the proposed development, how these might affect the European sites' conservation objectives, and the mitigation measures that will be implemented to ensure that adverse effects on site integrity do not arise, are considered and assessed in full detail in the Natura Impact Statement (NIS) prepared by the Developer, which is a standalone document independent of the findings of this EIAR. The conclusion of the NIS assessment was that the proposed development will not adversely affect the integrity of any European site, either alone or in combination with other plans or projects.

Irish Legislation

European Communities (Birds and Natural Habitats) Regulations 2011

The European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011 (as amended) (the Birds and Habitats Regulations), transpose the Habitats and Birds Directives into Irish law. It also contains regulations (49 and 50) that deal with invasive species (those included within the Third Schedule of the Birds and Habitats Regulations). Regulations 49 and 50 prohibit the introduction and dispersal of the invasive species of flora and fauna that are included on the Third Schedule list of these regulations.

The Wildlife Act 1976 (as amended)

The Wildlife Act 1976 (as amended) (the Wildlife Act) gives protection to a wide variety of birds, animals, and plants in Ireland. The Wildlife Act also provides a mechanism to give statutory protection to Natural Heritage Areas (NHAs). The amendment in 2000 of the Wildlife Act extends protection under this legislation to most species, including the majority of fish and aquatic invertebrate species which were excluded from the 1976 Act.

The Planning and Development Act, 2000 (as amended)

The role of an EIAR, in the consideration by the competent authority determining an application under the Planning Act and Development Act, 2000 (as amended) (the Planning Acts), is explained in Volume 2, Chapter 2: EIA and Methodology for the preparation of an EIAR. As a key component of an EIAR, the likely significant effects of a project on biodiversity are part of this consideration.

The Flora (Protection) Order, 2022

The Flora (Protection) Order, 2022 (S.I. 235 of 2022), supersedes orders made in 1980, 1987, 1999 and 2015. Under this order it is illegal to cut, uproot or damage the listed species in any way, or to offer them for sale. This prohibition extends to the taking or sale of seed. In addition, it is illegal to alter, damage or interfere in any way with their habitats. This protection applies wherever the plants are found and is not confined to sites designated for nature conservation.

8.2.2 Plans and Policies

The following plans, and their policies relevant to biodiversity, were considered in this chapter and the assessment of effects on terrestrial ecology and biodiversity.

- Tipperary County Development Plan 2022-2028
- Biodiversity Action Plan 2022-2030
- Ireland's 4th National Biodiversity Action Plan 2023-2030
- All-Ireland Pollinator Plan 2021-2025
- All-Ireland Species Action Plan for Bats (NPWS, 2008)

8.2.3 Guidelines

The assessment had regard to the following guidance documents. While a number of these documents have been prepared to assess road developments, the linear nature of the onshore infrastructure of the proposed development means it is relevant to consider these documents in the ecological assessment.

- National Roads Authority (NRA) currently known as Transport Infrastructure Ireland (TII) (2006a)
- Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes. National Roads Authority.
- NRA (2008) Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes.
- National Roads Authority NRA (2009a). Guidelines for the Assessment of Ecological Impacts of National Road Schemes (Rev 2). National Roads Authority, Dublin.
- NRA (2009b) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (Rev 2). National Roads Authority.
- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management (CIEEM).
- EirGrid (2020) Ecology Guidelines for Electricity Transmission Projects: A standard approach to ecological impact assessment of high voltage transmission projects.
- EPA (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Report (May 2022). Environmental Protection Agency, Dublin.

8.2.4 Information Sources

The following sources of information have informed the ecological assessment

- Environmental Protection Agency (EPA) Online Maps
- National Parks and Wildlife Services (NPWS) Online Map viewer
- National Biodiversity Data Centre (NBDC) Biodiversity Maps

- EPA Catchments Database
- Irish Vegetation Classification
- Birds of Conservation Concern in Ireland 2020-2026 (Gilbert, *et al*. 2021)
- Irish Wetland Birds Survey
- NPWS Irish Wildlife Manuals and Red Lists

The following chapters contained within the EIAR have informed the ecological assessment:

- Land and Soils
- Hydrology and Hydrogeology
- Air Quality
- Noise and Vibration

8.3 Methodology

8.3.1 Introduction

The European Commission guidance (EC, 2017) on Environmental Impact Assessment of Projects, Guidance on the preparation of the Environmental Impact Assessment Report explains the concept of biodiversity as; *"Fauna and flora taken individually refer to animal and plant life in a particular zone or time, it involves a somewhat individual perspective, while biodiversity refers to the interactions and variety of, and variability within, species, between species, and between ecosystems; this is, therefore, a much broader concept than simply looking at the impacts on fauna and flora individually."* This is the concept of biodiversity used in the assessment.

An assessment of the existing biodiversity baseline and potential ecological effects of the proposed development was completed based on a desktop review of ecological information, and on ecological surveys. The EIAR has been prepared with due regard to the overarching EIA Directive and guidance as detailed in Chapter 2 - EIA and Methodology for the preparation of an EIAR. The assessment presented in this chapter was also made with reference to the requirements of national and European legislation / guidance.

8.3.2 Study Area

The proposed development site comprises part of the former Lisheen Mine complex, located in Killoran, Moyne, Thurles, Co. Tipperary. The site is bordered by former mine lands to the north, south, and east, with agricultural fields to the west. The Cooleney Stream (EPA Code: 16C14) lies approximately 20 meters south of the proposed development site.

The site covers c. 5.5 hectares (red line boundary) and is classified as brownfield, characterised by recolonised scrub and ground vegetation, with a mature hedgerow along its western boundary. Access to the site is via the L5612 local road, which connects to the R502 and the M8 Motorway. The M8 Motorway, located approximately 7

kilometres southeast of the site, primarily links Dublin and Cork, with Junctions 4 and 5 situated 12 kilometres to the north and south, respectively.

Several buildings are located in close proximity to the application site, including the former Lisheen Mine maintenance depot, which has planning permission (TCC Reg. Ref. 211171) for redevelopment as the Irish Bioeconomy Foundation Research and Development Unit. A vacant office and laboratory building from the mine's operational period is situated near the site's western boundary, while AQS Environmental Solutions operates to the southeast. Additionally, Revive Environmental is constructing a facility (permitted under TCC Reg. Ref. 21709) near the main entrance to the former Lisheen Mine site along the L5612 road.

8.3.3 Zone of Influence

The study area is defined by the Zone of Influence (ZoI) of the proposed development in relation to the ecological receptors that could potentially be affected.

The ZoI, or the buffer distance within which potentially significant effects may occur, will differ across the Key Ecological Receptors (KERs)[1], depending on the potential impact pathway(s). There is no arbitrary distance for the ZoI of a project (although, for the purposes of Appropriate Assessment (AA), it is generally set at 15 km).

The results of both the desk study and the suite of ecological field surveys have established the habitats and species present within, and in the vicinity of, the proposed development site. The ZoI and study area were then informed and defined by the sensitivities of each of the KERs present, in conjunction with the nature and potential impacts associated with the proposed development. Considering the proposed development, the potential ZoI for general construction activities (e.g., habitat loss, habitat fragmentation, risk of spreading/introducing non-native invasive species, dust deposition and disturbance due to increased noise, vibration, human presence and lighting), is generally regarded as being limited to approximately 2 km from the site perimeter. Since the application area is not an ecologically sensitive location, the ZoI is not extended beyond this distance (with the exception of European sites, where this is extended to 15 km).

The ZoI for habitat loss impacts will be confined to the proposed development boundary.

8.3.4 Desk Study

A desk study was undertaken on the 20th of September 2024, to collate available information on the local ecological environment. The following resources were used to inform the assessment presented in this report:

[1] National Roads Authority, (2009). Guidelines for assessment of ecological impacts of national road schemes. National Roads Authority (NRA).

- Data on European sites, Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) held by the National Parks and Wildlife Service (NPWS). Available at https://www.npws.ie/protected-sites and https://www.npws.ie/maps-and-data.
- Records of rare and protected species for the 10km and/or 2km grid square(s), held by the National Biodiversity Data Centre (NBDC). These records are available at http://www.biodiversityireland.ie or through the NPWS.
- Spatial information relevant to the planning process, including land zoning and planning applications from the Department of Housing, Local Government and Heritage (DHLGH) web map portal. Available at https://myplan.ie.
- Ordnance Survey Ireland (OSi) mapping and aerial photography, sourced from the National Geospatial Data Hub. Available at https://geohive.ie.
- Images from Google Earth Pro were analysed using the "Show historical imagery" function, allowing satellite images of the subject site to be reviewed from 2003, 2013, 2018, 2020, 2022, and 2024. This enabled a visual comparison of land use changes over time.
- Data on water bodies, including information on rivers, lakes, groundwater, and water quality, from the Environmental Protection Agency (EPA) web map service. Available at https://gis.epa.ie.
- Information on soils, geology and hydrogeology in the area from the Geological Survey Ireland (GSI) online Spatial Resources service. Available at https://gsi.ie.
- Information on the conservation status of birds in Ireland from *Birds of Conservation Concern in Ireland (BoCCI) 2020-2026 & 2014-2019* (Gilbert, Stanbury & Lewis, 2021; Colhoun & Cummins, 2013). Available at https://birdwatchireland.ie.
- Details on the location, design, and nature of the proposed development were provided by the applicant's design team.
- Other relevant datasets were consulted, as appropriate. These include:

    - Information on Irish wetland sites from the online database produced by Wetland Surveys Ireland and Foss Environmental Consulting. Available at https://wetlandsurveysireland.
    - Online information regarding catchments. Available at https://catchments.ie.
    - Irish Wetland Bird Survey (I-WeBS) data from Bird Watch Ireland (BWI). Available at https://birdwatchireland.ie.
    - Online information from Bat Conservation Ireland (BCI). Available at https://batconservationireland.

8.3.5 Field Surveys

Ecological surveys were carried out by qualified ecologist(s) from Veon Ecology, at the proposed development site in 4th, 9th and 13th September 2024. These surveys were designed to compile comprehensive baseline information regarding the site's existing ecology. The likelihood of additional ecological impacts occurring, which have not been identified in this EIAR, is considered remote. The surveys comprised the following:

- Habitats were mapped according to the classification scheme outlined in the Heritage Council publication *A Guide to Habitats in Ireland* (Fossitt, 2000).
- The proposed development area was surveyed for invasive species.
- All bird species observed during the ecology surveys were recorded.
- Specialised bird surveys were deemed unnecessary given the site's exposure to sustained disturbances from the active wind farm, and low value habitats within the site.
- A general mammal survey was undertaken in conjunction with the habitat survey.
- A general survey for reptiles and amphibians was undertaken in conjunction with the habitat survey.
- Bat surveys were conducted using active acoustic sampling with handheld bat detectors (Wildlife Acoustics Echometer Touch 2).
- No surface watercourses are present within the proposed development site; therefore, aquatic surveys were deemed unnecessary.

Survey limitations

As regards survey limitations, it should be noted that the habitat and floral surveys were conducted towards the end of the ideal growing season for flora, which is considered a minor limitation as the surveys were carried out within the acceptable survey season. The optimal period for habitat surveys is from April - September, the growing season for most plants. The optimal period may be shorter or different where surveys focus on particular habitats or aspects of habitats. Additionally, some habitats noted were in a transitional state.

The lack of evidence of a protected species does not necessarily preclude its presence at the Site, either at the time of the current surveys or in the future. No other survey limitations were identified.

8.3.5.1 Habitat & Flora Survey

A habitat survey was carried out on the 4th September 2024. Habitats were mapped according to the classification scheme outlined in the Heritage Council publication *A Guide to Habitats in Ireland* (Fossitt, 2000) and following the guidelines contained in *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al.,* 2011). Habitats were cross referenced with habitats listed on Annex I of the Habitats Directive.

Information gathered from this survey supplemented the data collected during the habitat surveys. In conjunction with the habitat survey, a walkover botanical survey was completed within the study area, which followed a 'look-see' search methodology (NRA, 2009). This survey aimed to confirm the presence of any plant species are considered rare in both a national and local context.

The botanical survey focused particularly on rare, protected, or annexed habitats/species with reference to the following:

- The Flora (Protection) Order, 2022

- Flora species listed in *The Irish Red Data Book* (Wyse Jackson *et al.,* 2016)
- Species listed in Annex II of the EU Habitats Directive
- Habitats listed in Annex I of the EU Habitats Directive

Vascular and bryophyte plant nomenclature generally follow that of *The National Vegetation Database* (Weekes & FitzPatrick, 2010) and *An Irish Flora* (Webb, 2012 – 8th Edn), with consideration given to more recent taxonomic changes as outlined in the *New Flora of the British Isles* (Stace, 2019) and the British Bryological Society's *Mosses and Liverworts of Britain and Ireland: A Field Guide* (Atherton *et al.*, 2010).

A written description of the habitats within the receiving environment was recorded, detailing the dominant species present. Photographs representative of the individual macro-habitats identified within the survey site are included for illustration purposes. Additionally, an evaluation of the ecological significance of the flora and habitats occurring within the Site, relative to surrounding habitats, was undertaken.

8.3.5.2 Invasive Plant Species Survey

During all ecological surveys conducted within the study area, the presence/absence of Invasive Alien Species (IAS), was documented, with particular focus given to species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011, as amended).

The following species are considered noteworthy for their potential environmental impact:

- Giant-rhubarb (Gunnera tinctoria)
- Brazilian giant-rhubarb (*Gunnera manicata*)
- Three-cornered leek (*Allium triquetrum*)
- Japanese knotweed (*Fallopia Japonica*)
- Himalayan knotweed (*Persicaria wallichii*)
- Himalayan balsam (Impatiens glandulifera)
- Giant hogweed (Heracleum mantegazzianum)
- Rhododendron (Rhododendron ponticum)
- Spanish Bluebell (Hyacinthoides hispanica)

Of the species listed in Part 1 of the Third Schedule, a number of these species are of particular concern due to the location of the survey area and the potential for spread through disturbance. However, **no invasive species were recorded during the site surveys**.

8.3.5.3 General Bird Survey

A general bird survey of the Site was conducted alongside the habitat and terrestrial mammal surveys in September 2024. All birds observed and/or heard were recorded to compile a casual species list. Surveys utilised

a 'Roving Records' methodology, similar to that used in the *Bird Atlas 2007-11* (Balmer *et al.*, 2013), ensuring comprehensive coverage of the entire study area. When required, binoculars (Hawke Nature-Trek 8x42) were used to identify bird species. Bird identification follows Mullarney *et al.,* (1999).

The objectives of the general bird survey were to:

- Record any priority species (Annex I, Red, or Amber listed) and assess their status within the Site.
- Identify any areas of habitat with particular significance with regard to avian biodiversity.

8.3.5.4 Non-Volant Mammal Survey

A survey for non-volant mammals (i.e., land-based mammals that cannot fly) was carried out in September 2024, in conjunction with the habitat surveys. This survey focused on protected species, including Badger (*Meles meles*), Irish stoat (*Mustela erminea hibernica*), Irish hare (*Lepus timidus hibernicus*), Pygmy shrew (*Sorex minutus*), Red squirrel (*Sciurus vulgaris*), Hedgehog (*Erinaceus europaeus*), Pine marten (*Martes martes*), and Otter (*Lutra lutra*).

The presence/absence of terrestrial fauna species was determined through the detection of field signs such as tracks, markings, feeding signs, and droppings, as well as by direct observation. The habitats within the site were assessed for signs of usage by protected/red-listed fauna species, and their potential to support these species. Additionally, the survey included checks for the presence of badger setts and otter holts (e.g., resting places of these protected species).

8.3.5.5 Bat Survey

Bat surveys were carried out between the 9th and 13th of September 2024. These included active and passive surveys, with additional consideration given to

The trees and buildings/structures within 100 meters of the site boundary were appraised and inspected for signs of roosting bats (e.g., droppings, oil staining, corpses) on the 4th and 9th of September 2024, by Donnachadh Powell of Veon Ltd.

Following these assessments, dusk activity surveys were conducted, focusing on any potential areas of value to commuting and foraging bats. Observations were also made regarding trees within hedgerows and treelines occurring outside the boundary of the site.

The bat surveys followed the methodologies outlined in the following guidance documents:

- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. Dublin: National Roads Authority (NRA, 2006a).

- Bat Survey Guidelines: Traditional Farm Buildings Scheme (Aughney *et al.,* 2008).
- Collins, J. (ed.) (2023). Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th ed.). The Bat Conservation Trust, London.
- Marnell, F., Kelleher, C. & Mullen, E. (2022). Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

Bat surveys of the application site were carried out by Donnachadh Powell, using hand-held detectors during the emergence/walkover surveys.

8.3.5.6 Reptiles & Amphibians

A general survey for reptiles and amphibians was carried out on 4th September 2024, in conjunction with the habitat surveys. The lands were visually assessed for their suitability for use by reptiles and amphibians. The common lizard (*Zootoca vivipara*), Ireland's only native reptile species, requires a range of basking, foraging, and sheltering areas and can be found in a variety of habitats[2]. Ireland's amphibians are typically associated with wetlands and pond edges, but also forage in terrestrial habitats (King *et al.,* 2011).

8.3.6 Ecological Evaluation & Impact Assessment Methodology

The criteria used to assess the ecological value and significance of the application site for habitats and species are based on the guidelines provided in the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009a) and are consistent with the *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2* (CIEEM, 2018).

This evaluation scheme provides value ratings for ecological receptors, with values ranging from locally important to internationally important in an Irish context. Internationally important receptors include Special Areas of Conservation (SAC) or Special Protected Areas (SPA), while those of national importance would include Natural Heritage Areas (NHAs).

The evaluation scheme was adapted to assess the value of habitats and fauna in the study area. Habitats are evaluated based on their condition, size, rarity, and both legal and conservation status. Fauna are assessed by considering their legal protection, conservation status, and biodiversity value, taking into account factors such as national distribution, abundance, rarity, and associated trends.

Once the values of the identified ecological receptors were determined, the potential impact of the proposed development on these ecological receptors was assessed. The impacts were assessed under a number of

[2] The Herpetological Society of Ireland (2024) *Common Lizard*. Available online at https://thehsi.org.

parameters such as magnitude, extent, duration and reversibility. The significance of the impacts was categorised following EPA Guidelines (EPA, 2022). See **Table 8.3 – 8.4** below.

In accordance with NRA guidelines (2009), impact assessment is undertaken for 'Key Ecological Receptors' (KERs). KERs are within the zone of influence of the development and are '*both of sufficient value to be material in decision making and likely to be affected significantly*'. To qualify as KERs, features must be of local Importance (higher value) or higher. Features of lower ecological value are not assessed.

The highest levels of impact significance for each key ecological receptor 'value' rating are shown in **Table 8.1**. The impact assessment was also guided by the relevant EPA Guidelines[3].

Key Ecological Receptor Value Rating	Highest possible significance Rating
International importance	Significant positive/negative impact at an international level
National importance	Significant positive/negative impact at a national level
County importance	Significant positive/negative impact at a county level
Local importance	Significant positive/negative impact at a local level

Table 8.1: Maximum level of significance of impacts on Key Ecological Receptors.

8.3.6.1 Ecological Evaluation Criteria

All ecological receptors within the project's zone of influence were assessed according to criteria for site evaluation outlined in the NRA *Guidelines for Ecological Impact Assessment of National Road Projects* (NRA, 2009). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The ecological value of a feature was determined using a geographic frame of reference (**Table 8.2**). Professional judgement was used to define the geographic framework based on available guidance, existing criteria, historical trends and information on the distribution, abundance and status of the ecological feature. The assessment takes into account the source-pathway-receptor (S-P-R) model.

Ecological Value	Qualifying Criteria
International Importance:	• 'European Sites' including Special Area of Conservation (SAC),& Special Protection Areas (SPA). • Sites that satisfy the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).

[3] Environmental Protection Agency (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports.

Ecological Value	Qualifying Criteria
	• Features essential to maintaining the coherence of the Natura 2000 Network. • Sites 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 animals and plants listed in Annex II and/or IV of the Habitats Directive. • Ramsar Sites (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). • World Heritage Sites (Convention for the Protection of World Cultural & Natural Heritage, 1972). • Biosphere Reserve (UNESCO Man & The Biosphere Programme). • Major salmon river fisheries. • Major salmonid (salmon, trout or char) lake fisheries.
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 Parks. • 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 Wildlife Acts; and/or – Species listed on the relevant Red Data list. • Sites containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive. • Major trout river fisheries. • Water bodies with major amenity fishery value. • Commercially important coarse fisheries.
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)10 of the following: – Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;

Ecological Value	Qualifying Criteria
	– 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. • Any water body with unpolluted water (Q-value rating 4-5).
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. • Water bodies with no current fisheries value and no significant potential fisheries value.

Table 8.2: Site Evaluation Scheme (based on NRA, 2009).

8.3.6.2 Impact Assessment Criteria

After establishing the value of the ecological receptors (features and resources), the potential effect or impact of the proposed development on the features of ecological significance was assessed. The magnitude of the effect (or impact level) was considered in terms of the spatial and temporal duration of the effect. The spatial character refers to the geographical extent and location as well as habitat function (corridors, habitat fragmentation), while the temporal duration refers to the length of time that the ecological receptors will be affected by the change. The cumulative impact of the proposed development is also assessed.

The ecological significance of the effects of the proposed development are determined following the precautionary principle and in accordance with the guidelines produce by the CIEEM (CIEEM, 2018).

For the purpose of EIA, 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local (CIEEM, 2018).

The EPA Guidelines on information to be included in Environmental Impact Assessment Reports (EPA, 2022) and the Guidelines for assessment of Ecological Impacts of National Road Schemes, (NRA, 2009a) were also considered when determining significance.

The terminology used in the determination of significance follows the suggested language set out in the EPA Guidelines (2022) as shown in **Table 8.3** below.

Quality of Effect	**Definition**
Positive Effect	A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Neutral Effect	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effect	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).
Significance of Effect	**Definition**
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities

Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.
Probability of Effect	**Definition**
Likely Effect	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effect	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

Table 8.3: Criteria for Assessment of Effects, based on (EPA, 2022) guidelines.

The methodology for the assessment of impacts is derived from the Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018). Potential changes and impacts on ecosystem and receptor structure and function make reference to the parameters discussed below in **Table 8.4**.

Characteristics	Definition of Impact Characteristics[4]
Positive or negative	Positive and negative impacts/effects should be determined according to whether the change is in accordance with nature conservation objectives and policy: Positive impact - a change that improves the quality of the environment e.g. by increasing species diversity, extending habitat or improving water quality. Positive impacts may also include halting or slowing an existing decline in the quality of the environment. Negative impact - a change which reduces the quality of the environment e.g. destruction of habitat, removal of species foraging habitat, habitat fragmentation, pollution.
Extent	The extent is the spatial or geographical area over which the impact/effect may occur.
Magnitude	Magnitude refers to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
Duration	Duration should be defined in relation to ecological characteristics (such as a species' lifecycle) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long- lived species, would span at least five generations of some invertebrate species. The duration of an activity may differ from the duration of the resulting effect caused by the activity. For example, if short-term construction activities cause disturbance to birds during their breeding period, there may be long-term implications from failure to reproduce that season. Effects may be described as short, medium or long-term and permanent or temporary. Short, medium, long-term and temporary will need to be defined in months/years.
Frequency and timing	The number of times an activity occurs will influence the resulting effect. For example, a single person walking a dog will have very limited impact on nearby waders using wetland habitat, but numerous walkers will subject the waders to frequent disturbance and could affect feeding success, leading to displacement of the birds and knock- on effects on their ability to survive.

[4] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester

Characteristics	Definition of Impact Characteristics[4]
	The timing of an activity or change may result in an impact if it coincides with critical life-stages or seasons e.g. bird nesting season.
Reversibility	An irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation. In some cases, the same activity can cause both reversible and irreversible effects. For example, placement of a temporary access through an ancient wood could cause the loss of food and shelter for common woodland birds that may be reversible, but the compaction of fragile woodland soils and damage to ancient woodland ground flora along the access route is effectively irreversible.
Cumulative impacts and effects	Cumulative or in-combination effects are experienced where the project may impact or influence an impact to an ecological receptor in combination with other projects / interactions within the zone of influence. Different types of actions can cause cumulative impacts and effects: Additive/incremental - multiple activities/projects (each with potentially insignificant effects) added together to give rise to a significant effect due to their proximity in time and space. The effect may be additive (1+1 = 2) or synergistic (1+1 = 3). Associated/connected - a development activity 'enables' another development activity e.g. phased development as part of separate planning applications. Associated developments may include different aspects of the project which may be authorised under different consent processes. It is important to assess impacts of the 'project' as a whole and not ignore impacts that fall under a separate consent process.
Residual Impacts	After assessing the impacts of the proposed project all attempts should be made to avoid and mitigate ecological impacts. Once measures to avoid and mitigate ecological impacts have been finalised, assessment of the residual impacts should be undertaken to determine the significance of their effects on ecological features.

Table 8.4: Characteristics for Describing Impacts on Ecosystem Structure & Function.

8.3.6.3 Cumulative Effect

The cumulative impacts of the proposed development are assessed in **Section 8.5.4** by discussing the impact of the proposal, in terms of other activities and developments that have planning permission that are under construction or are in existence in the area.

8.3.6.4 Mitigation: Rationale & Design

Where potential effects are assessed to be significant or lower, mitigation measures have been incorporated into the project design to remove or reduce these effects, along with enhancement measures. These are detailed in **Section 8.6** below. The residual effects, following the implementation of mitigation, are then evaluated in **Section 8.7** below.

8.4 Baseline Environment

8.4.1 Site Location

The proposed development is situated within the former Lisheen Mine Site approximately 12km northeast of Thurles and c. 4km northeast of Moyne (**Figure 8.1**). The facility is approximately 950 metres southwest of the Kilkenny border. The proposed biomethane and bio-based fertiliser production facility. The former mine was in service for approximately 20 years but closed in 2015.

Access to the site is via the L5612 local road, which connects with the R502 and the M8 Motorway. The M8 Motorway, approximately 7 kilometres southeast of the site, primarily links Dublin and Cork, with Junctions 4 and 5 located 12 kilometres to the north and south, respectively.

Figure 8.1: Proposed Development Site Location.

8.4.2 Designated Sites

8.4.2.1 European (Natura 2000) Designated Sites

Special Areas of Conservation (SACs) are designated under the EC Habitats Directive (92/43/EEC), as amended, which has been transposed into Irish law through a variety of legislation, including the Birds and Habitats Regulations and the Planning and Development Acts. This legislation provides for the protection of certain habitats (listed in Annex I of the Directive) and/or species (listed in Annex II). Special Protection Areas (SPAs) are designated under the Birds Directive (2009/147/EC), which provides for the protection of bird species listed in Annex I of the Directive, including regularly occurring populations of migratory species such as ducks, geese and waders, as well as areas of international importance for birds. Collectively, these sites are referred to as Natura 2000 or European sites.

There are no European sites within or directly adjacent to the boundaries of the proposed development site; therefore, it does not form part of any European site. There are 5 no. SACs and no SPAs within c. 15km of the proposed development site. The closest European site to the proposed development is Galmoy Fen SAC (Site code: 001858), situated c. 9.8km to the north-east at its nearest point. See **Figure 8.2** a map of European Sites located within the vicinity of the proposed development. The proposed development site is located within the Suir catchment and the Suir_SC_040 sub-catchment. There are no watercourses within the proposed development site. The Cooleeny Stream is located approximately 20 meters south of the site.

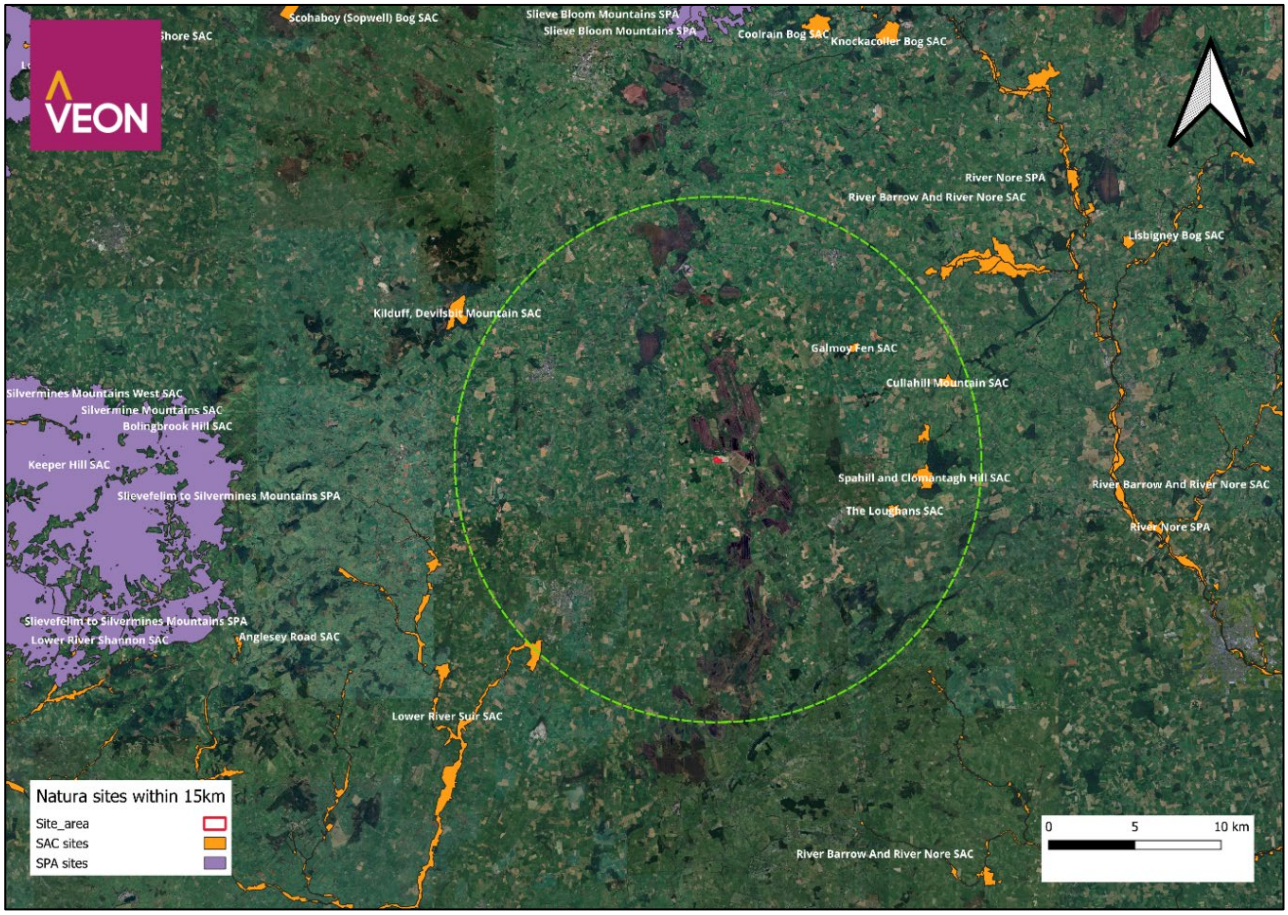

Figure 8.2: SACs and SPAs in relation to proposed development site.

8.4.2.2 Nationally Designated Sites

In Ireland, the basic designation for wildlife conservation is the Natural Heritage Areas (NHA), established under the Wildlife Act 1976, as amended. NHAs are considered important for the habitats present, or which holds species of flora and fauna whose habitat needs protection. A list of proposed Natural Heritage Areas (pNHAs) was published on a non-statutory basis in 1995; however, these sites have not since been statutorily proposed or designated. Prior to statutory designation, pNHAs are subject to limited protection including in the areas of agri-

environmental farm planning schemes, certain Forest Service requirements related to payment of afforestation grants, and recognition of the ecological value of pNHAs by Planning and Licensing Authorities.

There are no NHAs and 6 no. pNHAs within 15km of the proposed development site. No potential impacts on NHAs/pNHAs have been identified. There are no NHAs within or directly adjacent to the boundaries of the proposed development site.

There are no pNHAs within or directly adjacent to the boundaries of the proposed development site. The nearest pNHA site to the proposed development is the Galmoy Fen pNHA (001858) which is situated c. 9.5km south of the proposed development site. See **Figure 8.3** showing the NHAs/pNHAs located within the vicinity of the proposed development site.

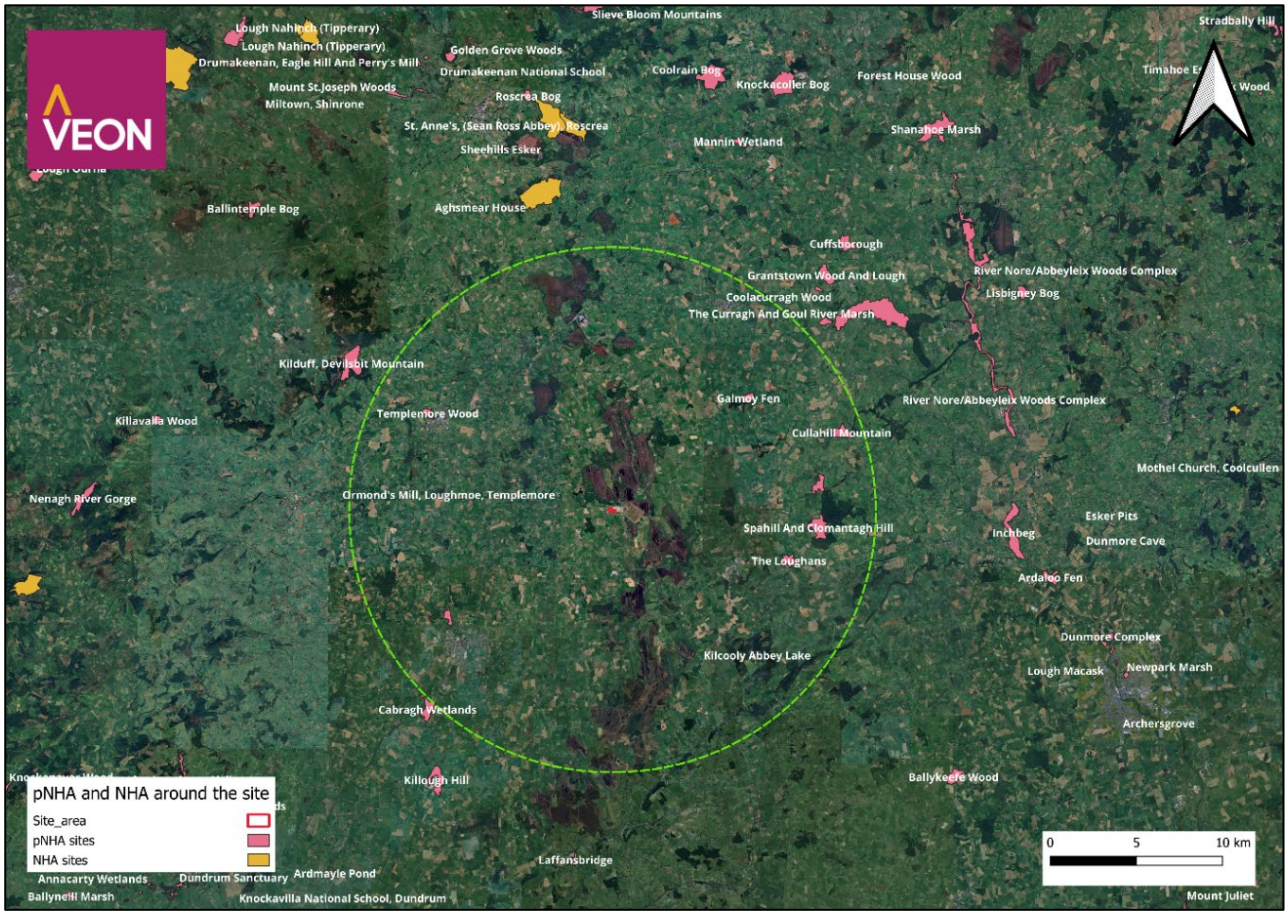

Figure 8.3: NHA and pNHA sites in relation to proposed development site.

All relevant designated conservation sites within a 15km radius of the proposed development site have been compiled and listed in **Table 8.5** below.

SAC's within 15km		
Designated Site	Site Code	Approximate Distance from Proposed Works (km)
Galmoy Fen SAC	001858	9.5 km
Loughans SAC	000407	9.7 km
Spahill and Clomantagh Hill SAC	000849	10.8 km
Cullahill Mountain SAC	000831	12.9 km
Lower River Suir SAC	002137	14.8 km

Table 8.5: Designated Sites and their proximity to the Proposed Development.

8.4.3 Habitats

During the habitat survey, the various habitats present within the study area were recorded, and their condition was assessed. Habitat mapping followed the methodology outlined in the Heritage Council's, *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al.,* 2011). The terrestrial and/or aquatic habitats within or adjacent to the proposed development site were classified using the classification scheme provided in the Heritage council's *A Guide to Habitats in Ireland* (Fossitt, 2000), and cross referenced with Annex I Habitats where applicable.

A total of 5 no. macro habitats were identified within the study area (see **Figure 8.4**). The area consists of a mosaic of habitats ranging from low to high ecological value, with recolonising bare ground (Fossitt habitat code: ED3) being the most prominent habitat. The ecological value of these habitats within the study area, along with their Fossitt (2000) classification codes, are provided in **Table 8.6**.

The ecological value of these habitats is determined according to the classification scheme outlined in the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009a).

No rare or threatened plant species were recorded on, or in the vicinity of the site, nor are they expected to occur, given that the habitats within the study area are common and highly modified.

The habitats identified within and in close proximity to the survey area are outlined below:

- Scrub (WS1)
- Recolonising bare ground (ED3)
- Buildings and artificial surfaces (BL3)
- Depositing lowland rivers (FW2)
- Hedgerows (WL1)

The location of these habitats within and proximal to the site are illustrated in **Figure 8.4**.

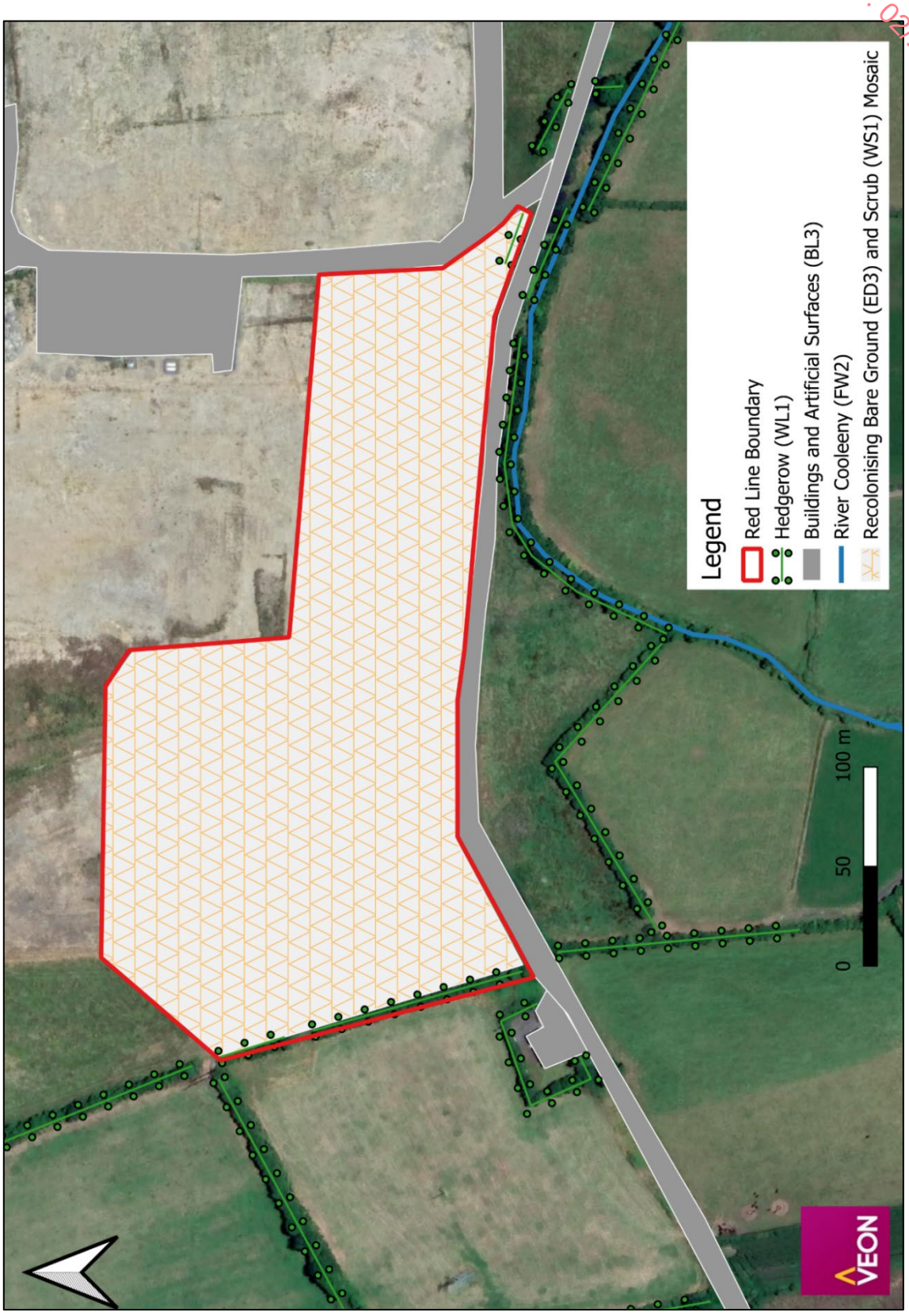

Figure 8.4: Habitats recorded on site.

Habitat	Evaluation Rating (NRA Guidelines)	Rationale
Buildings and artificial surfaces (BL3)	Local Importance (lower value)	Provides negligible habitat value due to the lack of natural features and vegetation that could support significant biodiversity.
Scrub (WS1)	Local Importance (lower value)	Scrub can provide important habitats for local wildlife such as birds, insects and bats. However, the scrub habitat within the site is generally species poor with a high proportion of non-native species.
Depositing lowland rivers (FW2)	Local Importance (higher value)	Provides valuable habitats for local wildlife, including birds, insects, and fish, amphibians, aquatic and semi-aquatic mammals.
Hedgerows (WL1)	Local Importance (lower value)	Hedgerows are important for local wildlife, including birds, insects, and bats, as they provide connectivity between habitats and offer potential nesting and roosting sites.
Recolonising bare ground (ED3)	Local Importance (lower value)	Of very little habitat value.

Table 8.8.6: Habitat Evaluation.

8.4.4 Flora

8.4.4.1 Desk Study

The desk study involved a review of data from the National Biodiversity Data Centre (NBDC) and the National Parks and Wildlife Service (NPWS) online database on rare and protected plants within the relevant 10km grid square. The search specifically targeted plant species listed under Annex II of the EU Habitats Directive, species protected by the Flora Protection Order species (FPO) (2022), and species listed in *The Irish Red Data Book* (Wyse Jackson, *et al.,* 2016) within the Ordnance Survey National Grid 10km hectad S26, which covers the study area.

A total of 146 no. flowering plant species are listed by the NBDC as present in the grid square S26, with only one of these designated as a threatened species, recorded within the 10km grid square S26: Fly Orchid (*Ophrys insectifera*) This species was not recorded within the study area.

8.4.4.2 Invasive Plant Species

Non-native plants are defined as species introduced outside their native range by humans and their activities, either intentionally or accidentally. Invasive non-native species are so-called because they typically exhibit one or more of the following characteristics/features: (1) prolific reproduction through seed dispersal and/or re-growth from plant fragments; (2) rapid growth; and (3) resistance to standard weed control methods.

When a non-native species exhibits invasive qualities and is not properly managed, it can potentially: (1) outcompete native vegetation, affecting plant community structure and habitats for wildlife; (2) cause damage to infrastructure, including roads, footpaths, walls, and foundations; and, (3) negatively impact landscape quality.

Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 make it an offence to plant, disperse, allow dispersal, or cause the spread of certain species (e.g. Japanese knotweed and Rhododendron). It is also illegal to keep these plants for the purpose of sale, breeding, reproduction, propagation, distribution, introduction, or release, or to possess anything from which the plant can be reproduced or propagated without a granted licence. Additionally, the Wildlife (Amendment) Act 2000 states that anyone who plants or otherwise causes to grow in a wild state in any place in the State any species of (exotic) flora, or the flowers, roots, seeds or spores of (exotic) flora shall be guilty of an offence.

The NBDC online database lists 2 no. invasive plant species as present within grid square S26 (see **Table 8.7**).

Species Name	Designation
Cherry Laurel (Prunus laurocerasus)	Invasive species - risk of High Impact
Sycamore (Acer pseudoplatanus)	Invasive species - risk of Medium Impact

Table 8.7: Non-native invasive plant species recorded in hectad S26.

8.4.4.3 Field Study

No rare plant species were recorded during the site survey, nor are any expected to occur, given that the habitats within the study area are common and highly modified. No invasive plant species were identified during surveys on site.

8.4.5 Fauna

A desk study and field surveys were conducted to assess the usage of the proposed development site by protected/red-listed fauna species, as well as its potential to support them. The desk study compiled records of rare, threatened, or protected species, from the 10km and 2km grid squares overlapping the study area, using data from the National Biodiversity Data Centre's online map viewer.

8.4.5.1 Non-volant Mammals

Desktop Study

A search of the NBDC database returned records of the following non-volant mammal species, protected under the EU Habitats Directive and/or Wildlife Acts within the 10km grid square that overlaps the proposed development site.

Protected Non-volant Mammal Species recorded in 10km²	
Common Name/Scientific Name	Designations/Conservation Status
Eastern Grey Squirrel (*Sciurus carolinensis*)	Invasive Species
Eurasian Badger (*Meles meles*)	Protected Species: Wildlife Acts
Eurasian Red Squirrel (*Sciurus vulgaris*)	Protected Species: Wildlife Acts
European Rabbit (Oryctolagus cuniculus)	Invasive Species
Fallow Deer (*Dama dama*)	Invasive Species, Protected Species: Wildlife Acts
Irish Hare (Lepus timidus subsp. hibernicus)	Protected Species: Wildlife Acts
Pine Marten (Martes martes)	Protected Species: Wildlife Acts
Red Fox (Vulpes vulpes)	
West European Hedgehog (*Erinaceus europaeus*)	Protected Species: Wildlife Acts

Table 8.8: Protected Mammal species recorded in 10km grid square S26.

The proposed development site is close to areas of mature treelines and woodland, habitats that are known to support several species listed in **Table 8.8** for foraging, commuting, and resting. Thus, it cannot be ruled out that these species may use the site for foraging and/or passageway between areas.

Field Survey Results

The site walkover surveys included an assessment of the presence and likely occurrence for protected non-volant mammal species within the proposed development site and its surroundings. Habitat assemblages within the proposed development site were assessed for field signs and patterns of usage by fauna including scat, spraint, droppings, hair, foraging tracks and paths, in addition to resting places and breeding sites.

Badger (*Meles meles*) and their setts are protected under the Wildlife Act 1976, (as amended), and it is an offence to intentionally, knowingly, or unknowingly kill or injure a protected species, or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. Badger setts consist of complex networks of interlinked tunnels, and therefore works in proximity to setts can potentially cause damage to the species. No signs of badger or setts were recorded during the site visits.

Otters (*Lutra lutra*), along with their breeding and resting places, are protected under the Wildlife Act 1976, (as amended). They also receive additional protection through their inclusion in Annex II and Annex IV of the Habitats Directive, which has been transposed into Irish law. Otters are further listed under Appendix II of the Berne Convention on the Conservation of European Wildlife and Natural Habitats, and they are included in the Convention on International Trade in Endangered Species (CITES).

Although otters are rare in parts of Europe, they are widely distributed in Ireland, inhabiting both marine and freshwater environments. Otters are solitary and nocturnal or crepuscular, and as such are rarely seen. As a result, surveys for otters rely on detecting signs of their presence. These signs include spraints (faeces), anal gland secretions, paths, slides, footprints and remains of prey. Spraints are of particular value as they are used as territorial markers and are often found on prominent locations such as grass tussocks, stream junctions and beneath bridges. Moreover, spraints are relatively easy to identify.

A review of existing records within a 10km radius of the study area (hectad S26) showed that otter has not been recorded previously. No signs of otter were recorded during the recent site visits, and the proposed development site does not contain habitats suitable for otters.

Due to the absence of more suitable habitat types within the site boundaries, it is considered unlikely that Irish Hare (*Lepus timidus subsp. hibernicus*) occurs regularly within the site but may commute through the site occasionally. In addition, the presence of Red Squirrel (*Sciurus vulgaris*) is also considered unlikely. The habitats within the site boundary are utilised by species such as Pygmy Shrew (*Sorex minutus*), Hedgehog (*Erinaceus europaeus*), Rabbit (*Oryctolagus cuniculus*) and Fox (*Vulpes vulpes*). Droppings and prints of both Rabbit and Fox were recorded on site.

No other signs of terrestrial non-volant mammal activity were recorded within the proposed development site.

8.4.5.2 Bats

Desktop Study

All bats, and their breeding and resting places, are protected under the Wildlife Act 1976, (as amended). All bat species are listed in Annex IV of the EU Habitats Directive, and the lesser horseshoe bat (*Rhinolophus hipposideros*) is additionally listed in Annex II. These species receive strict protection under the Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations, 2011. According to the Ireland Red List No. 12: Terrestrial Mammals (Marnell *et al.,* 2019), all Irish bat species are classified as 'Least Concern'.

A search of the NBDC database returned the following records of bat species within a 10km radius of the study area (hectad S26), as listed in **Table 8.8**. It is important to note that other bat species, not included in this database, may also be present in the surrounding area.

Protected Bat Species recorded in 10km²	
Common Name/Scientific Name	Designations/Conservation Status
Common Pipistrelle (Pipistrellus pipistrellus)	Annex IV, Wildlife Acts
Daubenton's Bat (*Myotis daubentonii*)	Annex IV, Wildlife Acts
Leisler's Bat (Nyctalus leisleri)	Annex IV, Wildlife Acts
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	Annex IV, Wildlife Acts

Table 8.9: Protected Bat species recorded in 10km grid square surrounding the site.

Given the low value habitats present in the surrounding environment, it is unlikely that bat roosts are located within or adjacent to the site. Veon Ecology conducted bat surveys and recorded low to negligible levels of bat activity, as well as low species diversity. Two bat species (Common Pipistrelle and Leisler's Bat) were the only species recorded during surveys, and all bats were recorded outside the redline boundary of the site.

Bats were recorded most often close to hedgerows approximately 50 meters northwest of the site. No removal of trees or hedgerows are proposed.

Bat Landscapes

Bat Conservation Ireland (BCI) produced a landscape conservation guide for Irish bat species using their database of species records collated during the 2000-2009 survey seasons. An analysis of the habitat and landscape associations of all bat species resident in Ireland was conducted and reported in Lundy *et al.*, 2011[5]. The NBDC map viewer is a visualisation of the results of the analyses based on a 'habitat suitability' index. The index ranges from 0 to 100, with 0 being least favourable and 100 most favourable for bats. The maps are constructed using spatial units of the OSi National Grid. The index presented is for all species combined, in addition to the individual species' indices. The different ratings for individual bat species are listed in **Table 8.10** below.

[5] Lundy, M.G., Aughney, T., Montgomery, W.I., & Roche, N., (2011) Landscape conservation for Irish bats & species specific roosting characteristics. Bat Conservation Ireland.

Suitability index for different bat species:		
Common Name	Scientific Name	Suitability Score
Soprano pipistrelle	Pipistrellus pygmaeus	36
Brown long-eared bat	Plecotus auritus	32
Common pipistrelle	Pipistrellus pipistrellus	41
Lesser horseshoe bat	Rhinolophus hipposideros	1
Leisler's bat	Nyctalus leisleri	33
Whiskered bat	Myotis mystacinus	17
Daubenton's bat	Myotis daubentonii	26
Nathusius' pipistrelle	Pipistrellus nathusii	2
Natterer's bat	Myotis nattereri	29
Total Score for All Bat Species		24.11

Table 8.10: Bat Suitability Index for the site and its surrounding area (NBDC, 2024).

Field Survey Results

Bat surveys were carried out on-site by Veon Ecology on 9th and 13th September 2024. As part of the pre-construction surveys a preliminary roost assessment (PRA) for bats was undertaken. This involved a walkover survey, to record whether there is suitability for roosting bats on site. The surveys followed guidance for bat surveys provided by the Bat Conservation Trust (BCT) in Bat Surveys for Professional Ecologists: Good Practice Guidelines, 4th Edition (Collins, 2023)[6].

Bat surveys carried out within the proposed development site in September 2024 included the following:

- Preliminary Roost Assessment (PRA) Survey
- Emergence Survey

No. 2 emergence/activity surveys were carried out, utilising hand-held bat detectors (Wildlife Acoustics Echometer Touch 2 Bat Detector), while walking transects through the Site. The surveys began/ended at approximately 19:45/22:00. Survey conditions were good throughout the surveys, with a starting temperature ranging from 10°C - 17°C, no wind - light breeze and little to no rain.

The following equipment was used during the PRA and activity surveys:

- Wildlife Acoustics Echometer Touch 2 Bat Detector (Android).
- High-powered Maglite© hand torch and LED head torch.
- Endoscope (Explorer Premium) Wireless inspection camera.

[6] Collins, J. (ed.) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edn). The Bat Conservation Trust, London.

No bats were recorded within the site boundaries at any time during surveys. No bats were observed emerging from the trees in the hedgerows nearby. The majority of the buildings near the proposed development are actively used in the day to day running of the wind farm, and are likely subject to regular sustained levels of disturbance (noise, vibration etc.). This further reduces the value of the site and surrounds to roosting bats. The lack of foraging habitats also reduces the site's suitability for bats.

The trees and hedgerows proximal to the site did not exhibit any high or moderate Potential Roost Features (PRFs) that could support significant numbers of roosting bats.

2 no. species of bat: Common pipistrelle (*Pipistrellus pipistrellus*) and Leisler's bat (*Nyctalus leisleri*), were identified during surveys of the proposed development site and its vicinity, foraging within or passing over the proposed development site. A low number (1-2) common pipistrelle bats were observed commuting across the site during the survey on 9th September 2024. A single Leisler's bat was noted flying over the site on the same date in September. The survey on 13th of September yielded similar results. The two species (i.e., Common pipistrelle and Leisler's bat) were recorded outside the proposed development site. These species are common and widespread throughout Ireland.

The habitats within the proposed development site are of low suitability for foraging bats. Bats appear to avoid the proposed development site itself (i.e. within the redline boundary), possibly due to the light spill from the active windfarm, as well as a lack of suitable foraging habitats and poor connectivity to the wider landscape (no linear features within the site).

The habitats within the site, particularly the woodland habitats, are suitable for foraging and commuting bats. Based on the assessment of the suitability of the proposed development site for roosting and foraging bats, and completion of bat activity surveys within the site, the local bat populations are considered to be of *Local importance* (*higher value*) for bats.

8.4.5.3 Avifauna

Desktop Study

The NBDC online database lists 85 no. bird species within the 10km grid square overlapping the site. Of these species, a number are listed under Annex I of the Birds Directive. A comprehensive desk study was undertaken by Veon Ecology prior to the surveys beginning in August 2024 to gather relevant information on species of conservation concern that may potentially use the study area. The assessment included a review of available ornithological data, including:

- On-line map viewer: National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC), Irish Wetland Bird Survey (I-WeBS), and Bird Watch Ireland (BWI).
- Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons *et al.*, 1993; Balmer *et al.*, 2013).

- Birds of Conservation Concern in Ireland (BoCCI) 2020-2026 & 2014-2019 (Gilbert, Stanbury & Lewis, 2021; Colhoun & Cummins, 2013).
- I-WeBS: Results of Waterbird Monitoring in Ireland in 2016/17 and 2017/18 (Fitzgerald, Burke & Lewis, 2021).

The desk study aimed to collate information on bird species and their supporting habitats within the study area and the surrounding lands. Records of protected species in the environs of the proposed project were identified. This information was obtained by accessing the website of the National Parks & Wildlife Service (NPWS), and the database of the National Biodiversity Data Centre (NBDC).

Bird species listed in Annex I of the Birds Directive are considered a conservation priority. Certain bird species are listed by BirdWatch Ireland as Birds of Conservation Concern in Ireland (BOCCI). These are bird species suffering declines in population size. BirdWatch Ireland and the Royal Society for the Protection of Birds have identified and classified these species by the rate of decline into Red and Amber lists. Red-listed bird species are of high conservation concern, whose population or range has declined significantly over time, and who need urgent action to reduce threats faced and to maintain and support these vulnerable populations. Amber-listed species are species of medium conservation concern, whose population or range has been in decline over recent years, which makes them vulnerable/threatened species. Green-listed species are regularly occurring bird species whose conservation status is currently considered favourable.

Field Survey Results

Bird surveys for general bird usage were carried out in conjunction with the habitat/bat surveys in on 4th, 9th and 13th September 2024 within the entire development footprint. Additional observations from other survey dates were recorded where relevant. The surveys indicate that the site supports a bird community primarily composed of small passerine and corvid species. The proposed development will require localised earthworks, predominantly within disturbed ground and built land. The internal boundaries on the site are generally of low value for nesting, roosting and feeding passerine birds.

Most birds recorded at the site were either large, mobile species or passerine species foraging in open areas, or species associated with better vegetative cover provided by nearby woodland and treelines (approx.. 50 meters north of the site boundaries), The number and diversity of birds associated with the site was relatively low.

Bird activity within the proposed development site and its surrounding environs was typical for the habitat assemblages present, i.e., recolonising bare ground, built land, scrub, linear treeline habitats, and woodland. To that end, the greatest levels of bird activity was associated with habitats affording suitable cover, i.e. treelines and areas of woodland which were located outside the site. The open areas of disturbed ground, shrub and built land, which makes up the majority of the proposed development footprint, are largely unsuitable for breeding passerine birds, ground nesting waders, and wildfowl.

Surveys conducted in September 2024 recorded a range of common bird species within the proposed development site and surrounding areas (see **Table 8.11**). The majority of species, identified singing, foraging, or roosting within the site, are green-listed on BoCCI. Birds were most frequently observed in or along the adjoining woodland, trees, and scrub habitats within the site.

Swallows (*Hirundo rustica*), an amber-listed species on the BoCCI and a summer migrant to Ireland, were observed foraging over the site in 2024. No nests for swallows or swifts (*Apus apus*), a red-listed species on the BoCCI, were identified within the proposed development site.

The site contains some foraging habitats, but the scrub habitats are unlikely to support nesting birds as the vegetation is sparse with high exposure to potential predators. For this reason, the bird fauna at the site is of *Local importance* (*higher value*).

Bird Species Recorded during the Site surveys	
Common Name/ Scientific Name	Designations/Conservation Status
Blackbird (Turdus merula)	Green Listed
Blue Tit (Cyanistes caeruleus)	Green Listed
Chaffinch (Fringilla coelebs)	Green Listed
Feral Pigeon (Columba livia f. domestica)	Green Listed
Goldcrest (Regulus regulus)	Amber Listed
Goldfinch (Carduelis carduelis)	Green Listed
Hooded Crow (*Corvus cornix*)	Green Listed
Jackdaw (Corvus monedula)	Green Listed
Long-tailed Tit (Aegithalus caudatus)	Green Listed
Magpie (*Pica pica*)	Green Listed
Pied Wagtail (Motacilla alba yarrellii)	Green Listed
Robin (Erithacus rubecula)	Green Listed
Rook (Corvus frugilegus)	Green Listed
Song Thrush (Turdus philomelos)	Green Listed
Swallow (Hirundo rustica)	Amber Listed
Woodpigeon (Columba palumbus)	Green Listed
Wren (Troglodytes troglodytes)	Green Listed

Table 8.11: Bird species recorded during the site visits.

8.4.5.4 Reptiles & Amphibians

Desktop Study

A search of the NBDC database returned the following records of reptile and amphibian species protected under the EU Habitats Directive and/or Wildlife Acts within 10km of the proposed development site:

Protected Reptile & Amphibian Species recorded in 10km^2	
Common Name/Scientific Name	Designations/Conservation Status
Common Frog (Rana temporaria)	Annex V, Wildlife Acts
Smooth Newt (Lissotriton vulgaris)	Wildlife Acts

Table 8.12: Protected Reptile & Amphibian species recorded in hectad S26.

Field Survey Results

The Wildlife Acts provide protection to Ireland's only native terrestrial reptile species, the common lizard (*Zootoca vivipara*), and three amphibian species: the common frog (*Rana temporaria*), the natterjack toad (*Epidalea calamita*), and the smooth newt (*Lissotriton vulgaris*). These species are listed as 'least concern' (King *et al*., 2011).

The suitability of habitats within and immediately adjacent to the proposed development, were assessed for breeding and/or hibernating reptile species, specifically the common lizard (*Zootoca vivipara*), as part of the initial surveys undertaken in August 2024. No species-specific surveys were carried out, as no evidence of the common lizard, or its preferred habitat was recorded within the proposed development site. Similarly, the suitability of habitats within and immediately adjacent to the proposed development site, were assessed for breeding and/or hibernating amphibian species, including the common frog (*Rana temporaria*) and the smooth newt (*Lissotriton vulgaris*). No species-specific surveys were undertaken, as no evidence of these protected species or their preferred habitat was recorded within the proposed development site.

The proposed development site is of low suitability for the common lizard. Although there are potential basking and sheltering locations, the species was not observed during any surveys conducted in 2024. As a result, the common lizard is considered to be of *Local importance* (*lower value*).

Amphibians require access to aquatic habitats, including ephemeral ponds, for breeding. No common frogs or smooth newts were observed on the site during the surveys. The proposed development site lacks aquatic habitat features and therefore, does not provide suitable habitat for breeding amphibians. Although local populations of common frogs and smooth newts are of *Local importance* (*higher value*), they are not considered to be key ecological receptors due to the lack of suitable habitat, provided that there are no indirect off-site effects.

8.4.6 Summary of Ecological Evaluation

Table 8.13 below summarises all identified Key Ecological Receptors (KERs). KERs have been identified as at risk of potentially significant impacts via a source-pathway-receptor link. KER's are valued as *Local importance* (*higher value*) or above, according to the criteria set out in **Section 8.3.6**.

Ecological Receptor	Ecological Evaluation	KER
Designated Sites		
European Sites	International	No
Proposed Natural Heritage Areas (pNHAs)	National	No
Habitats		
Buildings and artificial surfaces (BL3)	Local Importance (lower value)	No
Scrub (WS1)	Local Importance (lower value)	No
Depositing lowland rivers (FW2)	Local Importance (higher value)	Yes
Hedgerows (WL1)	Local Importance (lower value)	No
Recolonising bare ground (ED3)	Local Importance (lower value)	No
Fauna Species		
Non-volant Mammals	Local importance (higher value)	Yes
Bats	Local importance (higher value)	Yes
Avifauna	Local Importance (higher value)	Yes
Reptiles & Amphibians	Local Importance (higher value)	No - due to lack of suitable habitat

Table 8.13: Ecological evaluation of Key Ecological Receptors.

8.5 Characteristics of the Proposed Development

Nua Bioenergy Limited intends to apply for permission to construct a biomethane and bio-based fertiliser production facility, with an annual intake of up to 98,000 tonnes of feedstock per annum, at this site of c. 5.5 hectares at lands located at the former Lisheen Mine Site, Killoran, Moyne, Thurles, Co. Tipperary.

Details of the proposed development are set out in **Volume 2: Chapter 6** and the statutory notices accompanying the application. An overview of key features is provided below:

Landscape and Maintenance
The landscaped areas around the Tipperary biogas facility are designed with ecological enhancement in mind, featuring native species like willow to promote local biodiversity. The approach focuses on natural recolonisation, with minimal soil disturbance to encourage habitat connectivity across the site. Maintenance requirements are kept low to reduce operational upkeep while maximising the site's ecological value. This approach delivers a dual benefit—minimising long-term maintenance while supporting native biodiversity and enhancing the natural environment.

Bunding
The proposed development includes a central bund to contain the primary digester tanks, storage tanks, and other processing equipment. Designed to sit approximately 1.5 meters below the surrounding ground level, the bund can contain 110% of the largest tank's volume, ensuring robust containment in case of a spill or failure in accordance with IPC Guidance on Storage and Transfer of Materials for Scheduled Activities (EPA, 2004.

Runoff from the bunded area is managed through an underground pipe network, directing it to a central pump station, where it is then routed to the storage lagoon for reuse within the biomethane process. This bund design provides enhanced safety, environmental protection, and efficient management of potential spills or excess process water. Maintenance vehicle access to the bund will be provided via a ramp. Bunding is also provided to the proposed fuel tank for refuelling machinery located on-site.

Proposed Wastewater Strategy
The only wastewater generated on-site will come from the office and administrative building. This wastewater will be directed to a domestic pump station located east of the office. From there, it will be pumped through a fully enclosed rising main to the primary digester within the bund, integrating it into the biomethane process for re-use.

The proposed pumping station will be a custom-designed package plant sized to handle daily wastewater loads for six staff, with a total estimated load of 360 liters per day. The system will also include a sump or tank providing 24-hour emergency storage of 0.36 m^3. With the biomethane process reusing all wastewater produced, **no external wastewater discharge is required**.

Surface Water Drainage Strategy Summary

The surface water drainage strategy for the proposed biomethane facility at Lisheen is designed to manage runoff sustainably, with a focus on separation of process and non-process water. The site is divided into two distinct drainage catchment areas:

- **Non-Process Area Runoff:** This includes runoff from roofs, car parks, and non-processing yards. Runoff is directed to an above-ground storage basin and discharged at a controlled rate (Qbar rate) into a field boundary drain to the south, ultimately flowing towards the Black River. Sustainable Drainage Systems (SuDS) features, such as bioretention swales, improve water quality and manage flow rates, with the system designed to handle a 1-in-100-year storm event plus a 20% allowance for climate change.
- **Process Area Runoff:** Runoff from areas directly involved in biomethane production, such as bunded areas and process yards, is contained in a dedicated above-ground lagoon. This runoff is reused within the biomethane process, with no outflow required. The surface water will not be discharged off-site, but will rather be re-used within the biomethane development process. The lagoon is sized to handle average rainfall, with additional capacity for drought conditions, and ensures full recycling of water for operational needs. Emergency storage tanks and buffer tanks provide added resilience against extreme weather events.

The entire surface water network complies with local and national drainage guidelines and has been designed in consultation with the Local Authority, with a strategy that minimises impact on downstream watercourses and supports on-site water reuse.

Summary of SuDS Measures for Proposed Development

The proposed biomethane facility employs several SuDS measures to manage surface water sustainably and support on-site water reuse:

- Bioretention Swales: These swales capture and filter rainwater from roadways and hardstanding areas, improving water quality and reducing runoff flow rates.
- Detention Basins: Above-ground basins provide on-site storage for excess runoff during heavy rainfall, controlling discharge rates and mitigating downstream flood risk.
- Rainwater Harvesting Lagoon: Runoff from process areas is directed to a dedicated lagoon for reuse in the biomethane process, eliminating the need for off-site discharge and providing an additional water source during dry periods.

These measures enhance water quality, manage stormwater effectively, and promote water recycling on-site.

8.6 Potential Impacts of the Proposed Development

In accordance with the relevant guidelines, potential significant impacts have been assessed for key ecological receptors (KERs), as listed in **Table 8.13** above. An impact is considered ecologically significant if it is predicted to affect the integrity or conservation status of a KER at a specified geographical scale. All impacts are described in the absence of mitigation. Additionally, the definitions of duration are applied as follows:

Parameter	Description
Duration	Temporary – effects lasting less than a year
	Short-term – effects lasting 1 to 7 years
	Medium term – effects lasting 7 to 15 years
	Long term – effects lasting 15 to 60 years
	Permanent – effects lasting over 60 years

8.6.1 Do-Nothing Impact

In the Do-Nothing scenario, the proposed development would not proceed (discussed further in Chapter 6: Description of Proposed Development). As a result, the existing habitats would remain largely unchanged, with no immediate significant changes to the area's terrestrial and aquatic biodiversity (flora and fauna), as no construction activities would take place.

Most of the habitats likely to be affected by the proposed development have been significantly altered from their natural state by human activity. In areas left unmanaged, scrub encroachment is occurring. The natural succession from recolonising bare ground to scrub is expected to continue. In the absence of development, the unused areas of the site would likely succeed into dense scrub with a mix of native and non-native species over time.

The site of the proposed development is supported in principle by the land use zoning objective for industrial land use of the Tipperary County Development Plan 2022 – 2028. In the absence of this proposal, a similar development is likely to proceed. In a development scenario, the impacts would likely be comparable to those described in this chapter.

8.6.2 Construction Phase

The proposed development will involve the construction of a biomethane and bio-based fertiliser production facility, with an annual intake of up to 98,000 tonnes of feedstock on a site of c. 5.5 hectares situated on lands at the former Lisheen Mine Site in Killoran, Moyne, Thurles, Co. Tipperary.

For full construction related details, please refer to the Construction Management Plan (CMP) prepared by Donnachadh O'Brien Consulting Engineers (Ref. 2429-DOB-XX-SI-RP-C-0003) dated September 2024 and enclosed as part of the Planning Application.

8.6.2.1 Potential Impacts on Designated Sites

There are no European Designated Sites (Natura 2000 sites) located within or immediately adjacent to the proposed development site. Additionally, there is no source-pathway connectivity between the Site and any Natura 2000 Site(s) (i.e. via surface water, groundwater, or other environmental vectors).

The proposed development site does not comprise of any habitats that are important to the species designated as Qualifying Interests (QIs) of the relevant European sites. There are no Annex I habitats listed under the EU Habitats Directive within the site boundary. Additionally, no botanical species protected under the Flora (protection) Order, 2022, listed in the EU Habitats Directive (92/43/EEC), or listed in the Irish Red Data Books were recorded within the survey area.

There are five European sites within 15km of the proposed development. However, only the Lower River Suir SAC (002137) has a hydrological connection to the site through the Cooleeny Stream (EPA code: 16C14).

The proposed development is not located within a designated conservation site. However, runoff from site works and construction activities could potentially impact on the Cooleeny watercourse, with potential for downstream water quality impacts. The designated conservation site linked with this hydrological network is the Lower River Suir SAC, located approximately 18.2 km downstream. Given the considerable instream distance between the proposed development and this European site, natural mixing, dilution, and sedimentation are expected to occur within the watercourse network, minimising potential impacts. With the implementation of prescribed protective measures, no significant effects are anticipated.

The accompanying AA Screening and NIS report concludes: "It is clear that, given the application of prescribed protective measures for the avoidance of impacts and the implementation of the required mitigation measures, the proposed works will not give rise to adverse effects on the integrity of any of the identified European Sites evaluated herein.

It has been objectively concluded, following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed development during construction, operational and decommissioning phases, **that the proposed development will not adversely affect (either directly or indirectly) the integrity of any European site, either alone or in combination with other plans or projects, and there is no reasonable scientific doubt in relation to this conclusion.**"

8.6.2.2 Potential Impacts on Habitats and Flora

8.6.2.2.1 Habitat loss, Disturbance and Fragmentation

Habitats will be disturbed and lost under the proposed development footprint. Habitats adjacent to and surrounding the proposed development site primarily consist of hedgerows, scrub and built land, all of which are habitats of low botanical diversity and of low biodiversity value and low ecosystem functionality.

Hedgerows outside the site boundary of the proposed development site will be avoided and retained intact. Overall impacts on these areas will be reduced through modified design and sensitivity during construction.

No Annex I habitats or other high-value terrestrial habitats will be directly or indirectly affected by the proposed development, and no rare flora were recorded at the site.

Habitat	Ecological value (NRA Guidelines)	Potential Impact Prediction Assessment
Buildings and artificial surfaces (BL3)	Local importance (lower value)	This habitat will be altered as part of the proposed development. Negative, imperceptible, long-term.
Scrub (WS1)	Local importance (lower value)	This habitat will be lost under the proposed development footprint. Negative, slight, long-term.
Depositing Lowland River (FW2)	Local importance (higher value)	This habitat will not be lost under the proposed development footprint. Neutral.
Hedgerow (WL1)	Local importance (lower value)	The site does not contain hedgerows but some are located nearby, which are proposed to be retained where possible. Positive, slight, long-term.
Recolonising bare ground (ED3)	Local importance (lower value)	This habitat will be lost under the proposed development footprint. Negative, imperceptible, long-term.

Table 8.14: Predicted impacts on habitats as a result of the proposed development.

8.6.2.3 Potential Impacts on Fauna

8.6.2.3.1 Disturbance & Displacement of Fauna

Disturbance to fauna will primarily occur during the construction phase of the proposed development. Localised earthworks and excavation required during the construction phase will occur predominantly on recolonising bare ground, scrub, and built land, all of which are habitats of low botanical value and of little ecological importance for local fauna. These habitats are largely unsuitable to support important breeding or resting habitats for fauna. Therefore, the proposed development is unlikely to contribute direct impacts to protected fauna. Additionally, appropriate buffers will be established around any identified breeding or resting sites to further mitigate potential impacts. Construction works may lead to temporary indirect disturbance to fauna using the site for commuting or foraging. These impacts are expected to be indirect, temporary and imperceptible.

8.6.2.3.2 Mammals (Non-volant)

The scrub, hedgerow and tree habitats near to the proposed development site are likely to support small mammal species such the pygmy shrew and hedgehog. Given the relatively low numbers of individuals of each species that are likely to be affected, and that they are highly mobile species, construction at the site is unlikely to result in injury or mortality that would affect the species' conservation status.

The proposed works may cause short-term displacement of mammal species due to increased human presence, noise, and vibration. This displacement could affect both breeding and resting sites, as well as foraging habitats. However, given the short duration of the disturbance and the relatively small number of individuals the habitats are likely to support, significant short-term effects on the local mammal population or their conservation status are extremely unlikely. Therefore, disturbance/displacement during construction is unlikely to result in a significant negative effect, at any geographic scale.

No protected terrestrial mammals were recorded on site. Habitat loss and fragmentation may affect some common mammalian species. The site walkover survey did not identify any badger activity within the proposed development site. No setts or other evidence of breeding or residing badgers were found within the study area. Historic records for badger are all outside the footprint of the project area. The proposed development site and its wider surrounds provide limited suitable badger foraging and commuting habitat. The loss of habitats on site are considered to result in temporary, imperceptible, minor negative, impacts on badgers at the local scale. The availability of suitable foraging and commuting habitats in the lands surrounding the proposed development site are likely to offset any impacts realised to badger over the short term.

The site walkover surveys did not identify otter activity within the proposed development site. No evidence of breeding, feeding, or resting sites for otters were recorded within the study area.

Overall, the impact on local non-volant mammals in habitats adjoining the proposed development site is predicted to be negative, not significant, long-term.

8.6.2.3.3 Bats

Bats, along with their breeding and resting places, are strictly protected under the Birds and Habitats Regulations and the Wildlife Acts. It is an offence under this legislation to intentionally kill or injure bats or to interfere with or destroy their breeding or resting places. Within the site, potential roosting locations were absent. The majority of the trees within the hedgerows outside the site were considered to have low to negligible suitability for roosting bats. No roosting bats were found during the activity surveys.

The loss of scrub habitat will result in the permanent loss of any potential foraging habitat for bat species within the proposed development area. However, the more significant feeding habitats and linear commuting routes within the wider landscape will be retained. As such the proposed development will not result in fragmentation of suitable foraging habitat. It is therefore predicted that, despite any temporary effects, the loss of foraging/commuting habitat associated with the proposed development is unlikely to affect the conservation status of the local bat population and will not result in a likely significant negative effect at any geographic scale, given that common pipistrelle (*Pipistrellus pipistrellus*) and Leisler's bat (*Nyctalus leisleri*) are known to have a widespread distribution across the region and in Ireland (Roche *et al.,* 2014) and both species are showing an increase in their population trends.

An increase in existing light levels during the construction phase within and adjacent to the proposed development site may potentially impact bat species that use the site for foraging and/or commuting. However, given the absence of bats recorded within the site, the local bat population is not expected to be impacted significantly. The species recorded outside the proposed development site, Leisler's bat and common pipistrelle bat, are among the least sensitive species to artificial light. Additionally, any effects associated with artificial lighting during construction of the proposed development, are likely to be short-term. Considering the protection afforded bats and given that the site is not used by bat species for commuting/foraging purposes a precautionary approach has been adopted and mitigation measures have been provided in **Section 8.7.3** below to address any potential impacts as a result of light spill. Therefore, despite any short-term effects, disturbance from artificial lighting associated with construction of the proposed development is unlikely to affect the conservation status of the local bat population and will not result in a likely significant negative effect at any geographic scale.

8.6.2.3.4 Avifauna

The surveys carried out at the site have established that the proposed development area supports a bird community characterised primarily by small passerine and corvid species typical of habitats on site and within the wider landscape. The proposed development will require localised earthworks, predominantly within scrub/recolonising bare ground and built land habitat. The internal site boundaries are generally of low value for nesting, roosting and feeding passerine birds.

The proposed construction works will temporarily make the site relatively unattractive for many of the small passerine species currently using the site.

The sections of scrub within the site boundary that will be removed to facilitate the development provide low/negligible value nesting habitat for birds. Due to their small size and absence of tree cover, these areas are unlikely to provide significant nesting opportunities for local bird species. Although the development will result in the loss of common bird foraging habitats, these habitats are considered to have low to moderate ecological value for birds.

Some displacement of feeding birds may occur during construction due to increased noise and disturbance. Disturbance can cause sensitive species to deviate from their normal, preferred behaviour, resulting in stress, increased energy expenditure, and, in some cases, mortality.

The area surrounding the proposed development site is already subject to disturbance from the existing operational wind farm; thus, any birds that utilise the area are likely to be habituated to moderate levels of daytime disturbance. Given the availability of similar habitats in the surrounding area and the ability of birds to move away from disturbance, the overall impact on local avifauna is predicted to be slight. During the operational phase, activity levels are anticipated to stabilise, allowing birds in the surrounding landscape additional habitat at the site. As trees and shrubs mature, they will provide nesting and foraging habitats for common bird species. As a result, the impact on avifauna, in habitats adjoining the proposed development site is predicted to be negative, slight, and long-term.

8.6.2.3.5 Other Species

The proposed development site is expected to primarily support common invertebrate species. Given that the site is likely to support only common invertebrate species, the overall impact on invertebrate populations is anticipated to be neutral.

As the area is unlikely to hold standing water, its use is likely to be limited to adult Common Frog (*Rana temporaria*) and it would not provide breeding habitat for amphibians. Overall impacts on amphibians are predicted to be neutral.

The site is not expected to support reptile species. As no suitable habitats for reptiles are present and only small areas of relatively common habitats will be affected, any potential impact on reptiles is expected to be negligible.

8.6.2.4 Potential Impacts on Water Quality

During the construction phase, there may be an increased risk of silt discharging from the proposed development site. In the absence of appropriate design and mitigation measures, high levels of silt in surface water run-off could theoretically occur.

Construction activities have the potential to contribute surface water impacts to the receiving and surrounding environment, in the absence of mitigation. Such impacts include the risk of pollution from fuel spillages, oil

leakages, release of particulate matter, and other accidents with potential to lead to serious impacts causing the contamination of surface water run-off and the degradation of water quality in the vicinity of the site, consequently impacting the habitats and species present in any affected waterbody.

Although not anticipated, the potential exists for a range of pollutants (petrol, diesel and oils from machinery) to enter watercourses during the construction phase of the development, that may have a significant impact on the habitats and species downstream. Silt fencing and bunding will be implemented as part of the mitigation measures to prevent any impacts on the Cooleeny Stream.

Without mitigation, the stripping of vegetation, ground disturbance and storage of stripped soils and aggregates near watercourses or drainage channels increase the risk of materials being washed into watercourses during periods of heavy or prolonged rainfall or flood events. This could impact water quality through increased turbidity levels and sedimentation, as well as the potential mobilisation of a variety of substances that may be contained within the soils. Additionally, construction activities have the potential to cause alterations to localised groundwater levels and surface water flows through extraction activities and discharge of water.

However, given the existing site layout and proposed mitigation measures, no significant impact on local water quality from surface water run-off and/or risks of flooding is predicted to occur. The impact on local water quality is predicted to be imperceptible in the short and long term.

8.6.3 Operational Phase

While potential impacts are more likely to occur during the construction phase of the proposed development, additional impacts associated with the operational phase are also outlined below. The primary impacts associated with the operational phase of the proposed development are impacts on water quality via wastewater/foul effluent discharge and surface-water run-off.

The site network is proposed to be drained to an above-ground storage lagoon located in the western corner of the subject site. **The surface water will not be discharged off-site**, but will rather be re-used within the biomethane development process. The surface water is proposed to be routed in a series of gravity networks to the lagoon, where it will be temporarily stored and pumped in a rising main from the lagoon back to the process usage tank in the bund.

The proposed digesters, feed hoppers and supplementary storage tanks have been designed within a bund which is c. 1.3m minimum below the external proposed ground level. Any surface water runoff from this area is proposed to be routed by an underground pipe network to a centrally located pump station at the eastern corner of the bund whereafter it is proposed to be pumped to surface level and outfall in the closest Process Area Runoff manhole and further flow by gravity to the storage lagoon.

The facility will operate continuously, 24 hours a day, 7 days a week, as anaerobic digestion is an uninterrupted biological process. Generally, feedstock deliveries will occur between 07:00 and 19:00, Monday to Friday, and

between 07:00 and 16:00 on Saturdays. However, during peak periods, such as harvest seasons, feedstock may be accepted outside of these hours, including evenings, weekends, and bank holidays, to accommodate seasonal demands

8.6.3.1 Potential Impacts on Designated Sites

There are no European Designated Sites (Natura 2000 sites) located within or immediately adjacent to the proposed development site.

The proposed development site does not comprise of any habitats that are important to the species designated as Qualifying Interests (QIs) of the relevant European sites. There are no Annex I habitats listed under the EU Habitats Directive within the site boundary. Additionally, no botanical species protected under the Flora (protection) Order, 2022, listed in the EU Habitats Directive (92/43/EEC), or listed in the Irish Red Data Books were recorded within the survey area.

The drainage network for the site is designed to direct surface water to an above-ground storage lagoon located in the western corner of the site. This surface water will be retained onsite and reused within the biomethane production process. Water will be routed through gravity-fed pipes to the lagoon, where it will be temporarily stored and then pumped via a rising main back to a process usage tank located within a bunded area. With the implementation of prescribed protective measures, no significant effects are anticipated.

The accompanying AA Screening and NIS report concludes: “It is clear that, given the application of prescribed protective measures for the avoidance of impacts and the implementation of the required mitigation measures, the proposed works will not give rise to adverse effects on the integrity of any of the identified European Sites evaluated herein.

It has been objectively concluded, following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed development during construction, operational and decommissioning phases, **that the proposed development will not adversely affect (either directly or indirectly) the integrity of any European site, either alone or in combination with other plans or projects, and there is no reasonable scientific doubt in relation to this conclusion.**”

The proposed development is not expected to have any measurable impact on water quality within the local environment, as the foul water discharges generated from the proposed development during operation would equate to a very small percentage of the overall discharge volumes sent to the relevant wastewater treatment plant (WWTP) for treatment.

8.6.3.2 Potential Impacts on Fauna

8.6.3.2.1 Disturbance & Displacement of Fauna

As with the construction phase, changes in water quality due to wastewater and surface-water run-off during the operational phase could lead to the displacement of fauna identified as Key Ecological Receptors (KERs) by reducing prey abundance present or through habitat deterioration. Indirect disturbance/displacement as a result of changes in water quality during the operational phase is expected to have temporary to short-term, slight negative effects.

The operational phase will not have the same level of impact on fauna identified as KERs as the construction phase, given that there will be no significant alteration to current conditions, particularly in terms of human activity and vehicular traffic. While some temporary increases in disturbance or displacement due to noise and human activity from periodic maintenance work may occur, these impacts are anticipated to be temporary to short-term, slight negative effects.

During the operation, noise and disturbance are likely to increase. However, given the absence of significant habitats suitable for protected species within the proposed development site, no significant disturbance effects are expected during the operational phase.

Overall, the operational phase of the proposed development is not anticipated to contribute significant disturbance impacts to fauna.

8.6.3.2.2 Mammals (Non-volant)

This section describes the potential for the proposed development to result in likely significant effects on terrestrial mammals (non-volant) that may use the site during the operational phase.

In addition to displacement effects associated with increased human presence, the operation of the proposed development could potentially displace mammal species from their breeding/resting places and foraging habitats. However, given the relatively low number of individuals that the on-site habitats are likely to support, it is extremely unlikely to result in any short-term effects on the local mammal population or their conservation status. Therefore, disturbance or displacement during operation is unlikely to have significant negative effects at any geographic scale.

8.6.3.2.3 Bats

This section describes the potential for the proposed development to result in likely significant effects on bat populations that may use the site during the operational phase.

Disturbance and displacement effects may arise from the introduction of artificial lighting, noise, and increased human activity during operation. As discussed in **Section 8.4.5.2**, bat species recorded on site, such as common pipistrelle (*Pipistrellus pipistrellus*) and Leisler's bat (*Nyctalus leisleri*), are associated with rural, sub-urban and urban environments and are considered to be tolerant of disturbances such as lighting and noise in these environments. Additionally, the proposed planting will provide a visual barrier between the development and areas likely to be used by commuting and foraging bats. Therefore, the proposed development is not predicted to result in a significant negative impact on local bat populations during operation at any geographic scale.

Considering the protection afforded to bats and given that the site is used by a number of bat species for commuting/foraging purposes a precautionary approach has been adopted. Mitigation measures to address potential impacts from light spill are detailed in **Section 8.7.3** below.

Lighting

During the operational phase of the proposed development, increased light levels have the potential to disturb or displace bat species that use the site. Higher light levels can delay emergence from roosts and restrict foraging and commuting activity to darker areas. It is noted that many areas within the surrounding area are already permanently lit by artificial lighting and under light spillage given that the project site is within an active wind farm/industrial environment, therefore it can be assumed that bat species utilising the site are accustomed to this level of lighting disturbance. Nonetheless, it is likely that the increased lighting during the operational phase will result in long-term slight to moderate negative effects on bat species.

8.6.3.2.4 Avifauna

This section describes the potential for the proposed development to result in likely significant effects on birds that may use the proposed development site during the operational phase.

The loss of potential foraging/nesting habitat for birds during the operational phase is not considered significant at any geographic scale, given the areas of retained hedgerow and woodland habitats and the suitability of the surrounding habitats beyond the proposed development site for foraging/nesting birds.

It is possible that birds currently using habitats within the site and its environs may be disturbed due to increased noise and human activity levels during the operational phase. A range of bird species utilise the habitats within the site, and while there is some potential for short-term disturbance at the early stage of operation, it is anticipated that birds will acclimatise to human presence. This is because the site is located in an environment already subject to high levels of human activity, and the bird species recorded are generally common and widespread in Ireland. Overall, the development is not predicted to result in a significant impact on birds during the operational phase at any geographic scale.

8.6.3.3 Potential Impacts on Water Quality

The potential impacts from the proposed development will be negligible given the current operating conditions of the Irish Water network(s) infrastructure. Therefore, no impact on water quality from wastewater discharges is predicted to occur.

Feedstocks will be transported to the proposed facility using heavy goods vehicles (HGVs) equipped with enclosed trailers and sealed vacuum tankers, ensuring safe and secure transit.

Only feedstocks meeting stringent acceptance criteria and fully compliant with Environmental Protection Agency (EPA) and Department of Agriculture, Food and the Marine (DAFM) licence conditions will be accepted on-site. All suppliers must complete a Feedstock Acceptance Agreement (FAA) prior to delivery.

Upon arrival, each feedstock delivery will be weighed and logged at the weighbridge near the site entrance, adhering to EPA and DAFM regulatory requirements. The weighbridge, made of steel and mounted on load cells in a reinforced concrete pit, is integrated with an automated data management system for accurate record-keeping.

Following weighing, haulier drivers will proceed to the office to review and submit all required commercial documentation for feedstock transport. A visual inspection of the feedstocks will then be conducted to ensure conformity with FAA standards.

Once approved, feedstock will be unloaded as follows:

- Whole crop feedstocks will be stored in concrete-walled and floored clamps, where they are compacted and covered with a plastic tarp to create an airtight seal.
- Equine, farmyard, and broiler manure will be housed in storage sheds specifically designed to manage moisture levels and odour control prior to processing.
- Liquid feedstocks will be pumped into a dedicated liquid feedstock tank within a bunded area to prevent leakage and ensure safe storage.

These measures ensure the secure handling, storage, and compliance of all feedstock materials upon arrival and during storage.

8.6.3.3.1 Surface-Water Run-off

As in the construction phase, high levels of silt in surface water run-off could theoretically occur during the operational phase in the absence of appropriate design and mitigation measures.

There are no mapped EPA watercourses or drainage ditches within or immediately adjacent to the proposed development site. No other receptors, such as turloughs or sinkholes, were identified or are mapped within or in the immediate vicinity of the site.

During the operational phase, the primary pollutants at risk of entering watercourses via surface-water run-off are hydrocarbons and oils from vehicles. The introduction of such pollutants can impact water quality of aquatic habitats. This risk is particularly notable in areas with hardstanding elements, such as car-parking facilities, where pollutant-laden surface water is more likely to flow into nearby watercourses rather than percolate into the ground.

Although it is highly unlikely, there is a potential for temporary to short-term slight negative effects on the habitats and species within and downstream of the proposed development, depending on the frequency and intensity of uncontrolled surface-water run-off.

Attenuation of surface water runoff will be necessary using above-ground basins/lagoons to reduce the impact of surface water discharge on downstream networks and rivers.

The site network is proposed to be drained to an above-ground storage lagoon located in the western corner of the subject site. **The surface water will not be discharged off-site**, but will rather be re-used within the biomethane development process. The surface water is proposed to be routed in a series of gravity networks to the lagoon, where it will be temporarily stored and pumped in a rising main from the lagoon back to the process usage tank in the bund.

Overall, the development is not predicted to result in a significant impact on water quality during the operational phase at any geographic scale.

8.6.4 Potential Cumulative Effects Assessment

Cumulative effects are defined by EPA Guidelines (EPA, 2022) as: 'The addition of many minor significant effects, including the effects of other projects, to create larger, more significant effects.' In-combination and cumulative impacts of the project and plans within the project Zone of Influence (ZoI) are considered below. The proposed development has been assessed in combination with other plans and projects in the locality to assess potential cumulative and in-combination effects. The potential cumulative effects to biodiversity have been assessed as per the methodology detailed in Chapter 21 Cumulative Effects.

As part of this assessment, other offsite developments and proposed offsite developments as detailed in Chapter 21 of this EIAR were reviewed and considered for possible cumulative effects with the proposed development.

Stage 1: Cumulative Effects Assessment (CEA) Long List

A long list of "other existing and/or approved projects" deemed potentially relevant to the proposed development is presented in Chapter 3 Site Location and Context and Chapter 21 Cumulative Effects. This has taken into account any existing environmental issues relating to areas of particular importance likely to be affected or the use of natural resources.

Stage 2: Screening of the Long List of 'Other Projects'

A screening exercise of the long list of "other existing and/or approved projects" was carried out in order to determine whether any projects have the potential to give rise to likely direct or indirect significant cumulative effects with the proposed development from a biodiversity perspective.

Stage 3: Cumulative Effects Assessment

Following Stage 2, those projects which were "screened in" have been carried forward for assessment. The results of the Stage 3 CEA are presented below.

8.6.4.1 Screening

A distinguishing factor with regard to biodiversity is the potential for ecological connectivity between the sites. Sites that are ecologically connected to the proposed development area, such as those with ecological corridors or hydrological connectivity have been screened in for assessment. This includes projects located upstream, downstream, or within the same WFD waterbody catchment. Many of these sites are within the Suir catchment, which poses a potential for cumulative impacts on biodiversity, including species and habitats of conservation concern. Conversely, two projects in Kilkenny were screened out, as no potential ecological connectivity was found, reducing the likelihood of significant cumulative biodiversity impacts.

8.6.4.2 Cumulative Effects Assessment

Construction Phase

During the construction phase, in a worst-case scenario there is potential for negative cumulative impacts to hydrologically connected waterbodies. These potential impacts include the accumulation of excess sediment and the mobilisation of contaminants from multiple source projects, both of which can affect the water quality of surface and groundwater bodies. In the absence of mitigation measures, there is a potential 'negative', 'moderate', 'medium-term' impact on the receiving waterbodies including the Cooleeny Stream, River Drish, Thurles Groundwater Body (GWB) and downstream systems.

Cumulative impacts on fauna primarily relate to increased noise and activity levels. In-combination impacts from noise/disturbance are likely to be most pronounced during the construction phase. This is a short-term, localised impact.

Operational Phase

During operation, all foul water from the proposed development will be directed into the anaerobic digestion process, with no discharge to surrounding waterbodies, thereby avoiding potential cumulative impacts on aquatic

habitats and species dependent on them. As a result, effects on the hydrological environment are expected to be "neutral," "imperceptible," and "permanent," with no adverse impact on local biodiversity.

Surface water from the proposed development will be treated and attenuated prior to discharging to the Cooleeny Stream located approximately 20m south of the site. The 2023 AER for the Lisheen Mine (EPA, 2024) recorded continued non-compliances of COD, Suspended Solids, Zinc and Ammonia at the SW1 discharge from the Cloheen Pond to the Cooleeny Stream. Based on the dilution which will occur within the Cooleeny Stream, it is considered that the discharge of treated, clean surface water runoff from the proposed development will reduce the overall pollutant load in the stream and there will be a cumulative 'positive', 'slight', and 'long term' impact of the receiving water quality. This improvement would be beneficial for aquatic biodiversity.

During operation, a localised increase in traffic and noise is predicted. Given its setting in an active industrial area, the proposed development is not predicted to significantly increase long term noise and disturbance levels. Therefore, no significant cumulative impacts have been identified.

8.6.4.3 Land-use and Ongoing Activities

The proposed development site is situated in an industrial environment characterised by buildings, artificial surfaces, and high levels of human activity. The current land-use in and around the site includes disturbed recolonising bare ground, agricultural land, and hardstanding and artificial surfaces. Sections of the site boundary are already illuminated at night due to light spill from artificial lighting.

Given the existing conditions, it can be assumed that local fauna present within and in proximity to the proposed development are habituated to background noise and artificial lighting. Any increases in noise-related or light-related disturbance are likely to occur during the construction phase of the proposed development. Therefore, cumulative impacts in terms of faunal disturbance due to noise and light disturbances are considered to be temporary, slight-moderate negative effects.

8.6.4.4 Planning Applications & Permissions

There are other proposed and permitted developments in the general vicinity of the proposed project. As all of these relevant developments have been assessed by the Appropriate Authority, it has been determined that they are not likely to result in likely significant effects on any designated European site(s) or notable Ecological Features. Similarly, as it can be shown objectively that the proposed project, will not have a likely significant effect on any European site(s) or notable Ecological Features, it can be concluded that the proposed development will not contribute to any likely significant cumulative effects when considered in combination with the other developments in the wider area.

In addition, related projects are accompanied by stage 2 Appropriate Assessment (NIS) Statements and Construction and Environmental Management Plans (CEMP), as appropriate. These documents aim to identify

and mitigate potential impact sources to the relevant European Sites or notable Ecological Features within the project's Zone of Influence.

All proposed developments considered within the Zone of Influence of the proposed development are subject to the statutory planning process. Where required, they are accompanied by the appropriate planning and environmental assessment documentation, including Appropriate Assessment (AA), Ecological Impact Assessment (EcIA), and Environmental Impact Assessment (EIA) reports. Therefore, other projects, programmes, and plans within the project Zone of Influence have been designed with careful consideration of potential impacts on the receiving and surrounding environment. These projects are tasked with avoiding and minimising such impacts through the AA and EIA processes.

Provided that the overarching policies and objectives of the plans and programmes are adhered to, and that best practices and mitigation measures are implemented for individual projects, there is no potential for the relevant plans and projects to have a cumulative impact on features of biodiversity interest in combination with the proposed development.

There are a number of other permitted developments within the surrounding area. These developments combined will likely reduce the open spaces and habitat availability in the wider landscape, thereby cumulatively impacting local bird and mammal populations. However, with the implementation of the proposed mitigation measures the most ecologically important parts of the site will be retained and enhanced, as appropriate.

If construction works for other projects run concurrently with the proposed development, there could be slight, short-term, cumulative disturbance effects on local fauna.

A range of mitigation measures will be implemented during construction to effectively prevent adverse effects on water quality. These measures will control any significant discharges of hydrocarbons or excess silt, ensuring that no in-combination impacts occur. Additionally, operational design measures, including stormwater and foul water management measures, will ensure there are no impacts on water quality or flooding risk, and therefore no in-combination impacts from operational surface water discharges will occur.

As the proposed development is not predicted to cause a significant increase in long-term noise, disturbance levels, or adversely impact water quality, no significant cumulative impacts have been identified.

With the full implementation of the mitigation measures detailed in **Section 8.7**, it is not anticipated that there will be any significant cumulative effects. The risk of cumulative impacts from other local projects and schemes is considered not significant due to the scale and location of the proposed project.

The proposed development will not result in any significant residual effects on ecological receptors or designated sites. Therefore, there is no potential for the proposal to contribute to any significant cumulative impacts when considered in combination with other plans and projects.

No significant negative cumulative impacts are anticipated to occur during the construction, or operational phases of the proposed development, provided that the mitigation and monitoring measures outlined in this EIAR are properly implemented.

8.7 Collated Mitigation Measures

This section outlines the mitigation measures that will be implemented during the construction and operation of the proposed development to avoid or reduce the potential impacts on the receiving environment.

The likelihood of success for the proposed mitigation measures is high, either in their current form or as they are adapted on-site to achieve the desired result. These measures have been developed in accordance with current best practices and include avoiding sensitive habitats at the design stage. It is evident that the mitigation measures are designed to lower or reduce the risk of impacts to acceptable levels. While the proposed methods of mitigation may be amended or supplemented, the risk that the proposed mitigation measures will not function effectively in preventing significant ecological impacts is low.

All of the proposed mitigation measures will be implemented in full and are best practice, tried and tested effective control measures to protect the receiving environment. In order to avoid and protect the existing ecological features on Site and the surrounding area, the following mitigation measures are recommended below.

8.7.1 Design Phase Mitigation

As part of the proposed development, sensitive habitats will be avoided where possible to minimise ecological disturbance. The project footprint will be kept to a minimum, ensuring that construction and operational activities are confined to the least sensitive areas. Additionally, existing trees and hedgerows outside the site will be preserved where possible through the implementation of appropriate exclusion zones.

A detailed Construction and Environmental Management Plan (CEMP) has been prepared by Donnachadh O'Brien & Associates Consulting Engineers as part of this application. This plan outlines the proposed construction and operational methodologies and provide a framework for implementing mitigation measures and conducting environmental monitoring. The CEMP will ensure that the changes resulting from the proposed development comply with environmental quality standards and project objectives. It will specify responsibilities and timelines for the implementation of measures and management controls across all relevant environmental disciplines addressed in the planning application.

8.7.1.1 Mitigation by Avoidance & Design

The following measures are integrated into the proposed project design to reduce impacts on designated sites, flora, and fauna through avoidance and design:

- Where required, silt fencing / bunding will be installed around stockpiles to ensure no soils and sediments are washed out overland to the existing surface water networks, or directly into the Cooleeny Stream located approximately 0.02km south of the site. The silt fencing / bunding will be monitored daily by the appointed contractor and silt will be removed as required.
- Attenuation of surface water runoff will be necessary using above-ground basins/lagoons to reduce the impact of surface water discharge on downstream networks and rivers. Further details and assessment of the management of surface water at the proposed development is provided in Chapter 10 of this EIAR.
- Fuel storage areas and refuelling points will be bunded and located away from surface water drainage and features. The bunds will comply with the Environmental Protection Agency guidelines 'Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013).
- The design of the project was carried out with cognisance to ecological features.
- The project design and layout has been selected to avoid instream works and associated indirect effects, such as siltation.
- Site lighting has been designed to minimise light pollution and potential disturbance to wildlife.
- Stormwater and foul water management systems are included in the design to prevent runoff and protect local water quality.
- Construction access routes and site layout have been planned to minimise disruption to surrounding areas and avoid impacting sensitive ecological zones.

8.7.2 Construction Phase Mitigation

8.7.2.1 Protection of Habitats

To prevent incidental damage to trees and habitats designated for retention during the site clearance stage, these areas will be securely fenced early in the construction phase. The fencing will be made clearly visible to machine operators to ensure effective protection.

To mitigate the risk of Japanese Knotweed (*Fallopia japonica*) being inadvertently introduced to the site, the contractor will be required to inspect vehicles before they are used on-site, with particular attention to caterpillar tracks and areas where trucks and dumpers are stored. The supplier of any fill material will need to provide a guarantee that the fill does not contain invasive alien species. Additionally, the fill will be inspected for signs of invasive alien species before being imported to the site.

The inspection of topsoil and fill material will follow the guidelines set out in the British Standard Specification for topsoil, as detailed in BS 3882:2015, which provides requirements for the inspection and use of topsoil. Guidance from the Invasive Non-Native Specialists Association (INNSA) Code of Practice for Managing Japanese Knotweed (INNSA, 2017) should also be adhered to. In Ireland, the procedures for managing invasive species, are also informed by Ireland's Invasive Alien Species Soil and Stone Pathway Action Plan 2023–2027. This plan outlines specific actions to prevent the spread of invasive species through soil and stone movements and should be adhered to ensure compliance with national regulations and best practices.

8.7.2.2 Protection of Soil, Surface Waters & Groundwater

Storm water will be managed carefully during construction. In general, stormwater will be infiltrated into the ground via silt traps and managed soakaways. Laydown areas will be suitably drained, and any areas involving the storage of fuel and refuelling will be paved and bunded. Hydrocarbon interceptors will be installed to ensure that no spillages will get into groundwater. The employment of good construction management practices will minimise the risk of pollution to soil, stormwater run-off, surface water, or groundwater.

Pollution management measures will be implemented to prevent contamination by machinery pollutants, such as fuels, oils and lubricants during construction and operation activities. These measures will be informed by guidance provided in relevant documents, such as the CIRIA guides to environmental good practice on site.

To prevent any pollution incidents that might potentially cause deterioration of the aquatic environment it is proposed that a series of best practice measures are introduced throughout the construction works, in accordance with CIRIA's guideline documents C532 (CIRIA, 2001) and C741 (CIRIA, 2015), and C649 (CIRIA, 2006).

The following measures will protect soil, surface waters and groundwater during the construction phase of the proposed development as per the CEMP:

- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding;
- Run-off will be controlled to minimise the water effects in outfall areas;
- All concrete mixing and batching activities will be located in areas away from watercourses and drains;
- Good housekeeping (site clean-ups, use of disposal bins, etc.) will be implemented on the site.

8.7.2.3 Dust Control

The following measures are proposed to control dirt and dust generated by the proposed project.

Dust control measures are outlined below:

- During the construction process, water suppression shall be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays / local extraction should be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment shall be minimised, if necessary fine water sprays will be employed.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and / or windy conditions.

- Vehicles exiting the site shall make use of a wheel wash facility prior to entering public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction will be enforced rigidly. A speed limit of 20 kmph will be enforced on site roads.
- Public roads and footpaths outside the site will be regularly inspected for cleanliness and cleaned, as necessary. If sweeping using a road sweeper is not possible due to the nature of the surrounding area, then a suitable smaller scale street cleaning vacuum will be used.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used, as required, if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- Hoarding or screens shall be erected around works areas to reduce visual impact. This will also have an added benefit of preventing larger particles of dust from travelling off-site and impacting receptors.

8.7.2.4 Noise & Vibration Control

A monitoring regime shall be implemented and recorded as required for various elements of the works.

This monitoring regime shall include the following:

- Noise Monitoring
- Vibration Monitoring

Noise levels will be kept to a minimum to comply with BS5228: Noise control on construction and open sites - Part 1 Code of practice for basic information and procedures for noise control and Appendix 1, Schedule D: Code of Practice for noise and air pollution control.

During the construction works, the Main Contractor will adhere to current regulations, codes of practice, and guidelines for noise and vibration monitoring. Risk assessments will be undertaken to assess the potential noise levels for building operatives. Noise arising from activities on site will be controlled in accordance with the requirements of British Standard BS5228.

Noise Control at Source:

All items of plant should be subject to regular maintenance. This maintenance can prevent unnecessary increases in plant noise and help prolong the effectiveness of noise control measures. Construction activities related to the proposed development are expected to occur during normal working hours.

Wherever possible, noise should be controlled at source:

- Avoid unnecessary revving of engines and switch off equipment when not required.
- Minimise drop height of materials.
- Start-up plant and vehicles sequentially rather than all together.

8.7.2.5 Considerate Construction

Prior to construction commencing, the pollution preventative measures outlined above will be inspected and certified by the site Environmental Manager or an appropriately qualified person appointed by the client. This person shall have overall responsibility for implementation of environmental protection measures. On appointment and prior to commencement of construction works the name and contact details for this person shall be supplied to Tipperary Council.

A site Liaison Officer (LO) should be appointed for the project as part of the site management team. The LO will act as a single point of contact to engage with the local community and respond to concerns, while keeping local residents informed via email of progress and timing of particular construction activities that may impact them. The Project Manager will be charged with the responsibility of keeping people informed of progress and by setting down procedures for dealing with complaints.

The Main Contractor should promote and encourage a safe, considerate, clean and responsible construction site.

8.7.2.6 Waste Management

The Main Contractor will effectively manage, and control waste generated by the project in line with the *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* (DEHLG, 2006). The site-specific Waste Management Plan will detail the exact nature of the procedures.

Typical construction waste generated by the development will include:

- Stripped topsoil, which will be appropriately stockpiled for reuse within the landscaped areas.
- Excavated material, which will be utilised in the regrading/filling of the site.
- Non-hazardous construction waste, such as timber waste, scrap metal, concrete, blocks and bricks, plastic, paper/cardboard, canteen waste and litter will be segregated and recycled where practicable.
- Hazardous construction waste, such as adhesives and sealants, aerosols, batteries, chemicals, cleaning products, oil, paints and thinners shall be disposed of at a suitable location in accordance with the relevant legislation for such materials.
- Surface water run-off, which will be intercepted before discharge to remove sediment/silt.

No material, other than inert material, will be removed from the site.

A register for all trucks entering and leaving the site, including time, date, and other relevant details, will be maintained and updated daily from waste docket records submitted by each truck.

Waste collection dockets will detail:

- Customer
- Site address
- Name of waste carrier
- Waste collection permit
- Vehicle registration number
- Excavation reference
- Time of departure
- Waste classification
- Composition and nature of waste
- Weight of waste (to be completed by waste facility)

In addition to the inherent design measures during the construction phase, the following mitigation measures are proposed:

- The Contractor will minimise waste disposal, so far as is reasonably practicable.
- Waste from the proposed project will be transported by authorised waste collectors, in accordance with the Waste Management (Collection Permit) Regulations, 2007 (as amended).
- Waste from the proposed project will be delivered to authorised waste facilities, in accordance with the Waste Management Acts 1996 (as amended).
- Where possible, metal, timber, glass and other recyclable materials will be segregated during construction works and removed off-site to a permitted/licensed facility for recycling. Colour coding and photographs of wastes to be placed in each container, as required, will be used to facilitate segregation. Where waste generation cannot be avoided, this will maximise the quantity and quality of waste delivered for recycling, facilitate its movement up the waste hierarchy away from landfill disposal, and reduce its environmental impact.
- Where reasonably practicable, materials will be delivered on a 'just-in-time' basis to minimise wastage by ensuring that materials arrive at the construction site only when they are needed, rather than being stored on-site for extended periods.
- Where reasonably practicable, the Contractor will engage with the supply chain to provide products and materials that use minimal packaging, and segregate packaging for reuse.
- The Main Contractor will record the quantity and types of waste and materials leaving site during the construction phase.

8.7.2.7 Refuelling

- Construction plant and equipment shall only be parked over-night within the construction compound. Construction plant and equipment shall be checked daily for any visual signs of oil or fuel leakage, as well as wear and tear.
- Fuels stored on-site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume for the duration of the construction phase.
- For any liquid other than water, this shall include storage in suitable tanks and containers which shall be housed in the designated area surrounded by bund walls of sufficient height and construction so as to contain 110 per cent (110%) of the total contents of all containers and associated pipework. The floor and walls of the bunded areas shall be impervious to both water and oil.
- All liquids, solids and powder containers will be clearly labelled and stored in sealable containers.
- Where contractors are required to refuel vehicles on-site, this will be carried out at the designated refuelling location by competent personnel. All refuelling areas will be on areas of hard standing at designated areas agreed by an appropriately qualified person. Spill kits will be provided in all areas where liquids are stored and at any refuelling areas.
- The local authority shall be informed immediately of any spillage or pollution incident that occurs on-site during the construction phase.
- All small plant, such as generators and pumps, will be stood in drip trays capable of holding 110% of their tank contents.
- All small plant will be positioned as far as practicable from the relevant watercourses.
- Waste oils, empty oil containers, and other hazardous wastes will be disposed of in accordance with requirements of the Waste Management Act, 1996.

8.7.2.8 Site Tidiness & Housekeeping

A 'good housekeeping' policy will be employed by the Main Contractor at all times. The site induction will communicate the importance of site housekeeping and tidiness. In addition to measures outlined in the previous sections, the following measures shall be implemented to maintain site tidiness.

- Construction works will be carried out according to a defined schedule agreed upon with the client and the relevant contractors, with regard to the specified hours of work. Any delays or extensions required will be communicated to the client and contractors at the earliest opportunity.
- Contractors will ensure that road edges and footpaths are swept on a regular basis, this includes the local roadways adjacent to the proposed development site. A road sweeper will be deployed if required.
- All contractors shall be responsible for the clearance of their plant, equipment and any temporary buildings upon completion of construction. The site will be left in a safe condition.
- All mobile equipment brought to the site shall be thoroughly power washed and cleaned prior to arrival at site, to avoid transport of alien invasive species.
- Ensure general maintenance of working areas and cleanliness of welfare facilities and storage areas.

- Provide a site layout map showing key areas such as first aid posts, material storage, spill kits, material and waste storage, welfare facilities, etc.
- Display details of site managers, contact numbers (including out of hours contacts), and public information signs (including warning signs) at the boundaries of the working areas.
- Keep the construction compound, access routes and designated parking areas free of excess dirt, rubbish piles, scrap wood, etc. at all times.
- Ensure provision of adequate welfare facilities for site personnel.
- Provide appropriate waste management facilities and arrange regular collections.
- Implement effective measures to prevent infestation from pests or vermin, including arrangements for regular disposal of food and materials that may attract pests.
- Maintain public rights of way, diversions, and entry/exit areas around working sites for car users, pedestrians and cyclists where practicable, and to ensure inclusive access, as necessary.
- Material handling and/or stockpiling of materials, where permitted, will be appropriately located to minimise exposure to wind.
- Maintain self-contained wheel washing facilities at the construction compound and other contaminant measures as required.
- Open fires will be prohibited at all times.
- All flammable waste materials, such as timber, should be removed regularly to reduce risk of fire.

8.7.3 Protection of Flora and Fauna

Measures will be implemented to ensure that there is no negative ecological impact on the site and its surrounding environs. This will include protocols and procedures to prevent contamination of groundwater and watercourses through the implementation of sediment control, temporary mounding, cut off trenches, and water monitoring, as necessary. All chemicals will be stored securely in appropriate bunded areas. Fire and emergency procedures and controls will be established, and spill kits will be readily available to facilitate immediate action. Disposal of any chemical or oil will be removed and disposed of at an approved hazardous waste facility.

The contractor will appoint a suitably qualified person to act as Ecological Clerk of Works (ECoW) to oversee the implementation of measures for the prevention of pollution to the receiving environment.

Excavated inert material may be temporarily stockpiled in a designated area for later reuse within the development. This material will be reused where possible within the development site. Stockpiled material is to be located a minimum of 50m from any drainage route off-site.

There will be on-going monitoring of wildlife in the vicinity of the construction site. Any unusual species, dead species or damaged habitats should be reported immediately to the Construction Manager and/or Environmental Officer. This will be co-ordinated with the appointed Ecologist for the project.

Good working practices concerning environmental factors affecting ecology will be maintained during the construction phase. For example, construction noise and construction phase lighting will be kept to a minimum.

The spread and introduction of invasive species and noxious weeds will be prevented by adopting mitigation measures as per guidance issued by the NRA (2010).

If unexpected ecological habitats are uncovered, site contractors must adhere to the habitat protection protocol. This protocol is designed to ensure that ALL personnel working on the construction site are fully aware of their legal obligations under the Wildlife Act 1976, as amended. This Act affords protection to a range of wildlife in Ireland, including wild birds, animals, and plants. Where a project has received permission to proceed, this does not override certain laws that prevent wilful harm to protected species.

The following measures are applicable to the proposed development site:

- Should the removal of scrub, hedgerow, tree felling, or delimbing be required, this will be carried out outside of the bird breeding season (1st March to 31st August inclusive). A pre-works check by a qualified ecologist should be undertaken to ensure nesting birds are absent.
- All birds, along with their eggs, nests and young - with the exception of certain species - are protected under the Wildlife Acts. Any areas of the site found to contain nests will be cordoned off to a distance of 20m from the nests, and all plant and construction activities will remain outside of this cordon until the young have fledged (left the nest entirely). The 20m radius will be centred on the nest site, and each nest would be protected by an equivalent circle. All other areas are safe for operations.
- Sufficient on-site cleaning of vehicles prior to arrival and upon leaving the site, as well as on nearby roads, will be carried out, particularly during groundworks. Contractor's vehicles and equipment will be thoroughly cleaned and then dried using high-pressure steam cleaning, with water >65 °C, in addition to the removal of all vegetative material.
- Following cleaning, all equipment and vehicles will be visually inspected to ensure that all adherent material and debris have been removed manually.
- No removed material or run-off will be allowed to enter a waterbody of any sort.
- For any material entering the Site, the supplier must provide an assurance that it is free of invasive species.
- Ensure all site users are aware of invasive species management, biosecurity and treatment methodologies. This can be achieved through 'toolbox talks' before works begin on the Site.
- Adequate site signage, hoarding and fencing will be erected in relation to the management of non-native invasive species as required.
- Plant and equipment to be used during works, will be in good working order, fit for purpose, regularly serviced/maintained, and have no evidence of leaks or drips.
- Any recommendations laid out by Inland Fisheries, shall be implemented to ensure the protection of the relevant watercourses, associated aquatic fauna, and any fisheries hydrologically connected to the site.
- Weather conditions shall be considered during all construction operations, and no plant will enter within 100 metres of the relevant watercourses during or following heavy rain or other conditions likely to lead to large-scale or additional water flow that would carry soil or silt into the watercourses.
- Recent surveys did not identify any bat roosts within the site footprint. Contractors may discover bat roosts and if any bats are found, the Construction Manager and/or Environmental Officer are to be contacted immediately.

8.7.3.1 Mammals (non-volant)

The following measures shall be implemented to prevent impacts on non-volant mammals:

- Stringent and robust mitigation measures are proposed for the avoidance of impacts affecting water quality.
- A site speed limit of 20 km/h will be strictly enforced to prevent vehicular traffic fatalities.
- Monitoring will continue throughout the construction phase.
- It is recommended that a pre-construction survey be undertaken no later than 6 months prior to construction and ideally immediately prior to the commencement of works within the study area to reconfirm the existing environment and survey results.
- Implement any mitigation and monitoring identified as being required following pre-construction mammal survey (if carried out).
- In general, works close to badger setts may only be conducted under the supervision of a qualified expert and under licence from the NPWS.
- No heavy machinery will be used within 30m of badger setts (unless carried out under licence); lighter machinery (generally wheeled vehicles) should not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance should not take place within 10m of sett entrances. During the breeding season (December to June inclusive), none of the above works should be undertaken within 50m of active setts.
- Fencing will be maintained and regularly checked to ensure effectiveness throughout the construction phase.
- As best-practice, all construction-related rubbish on site (e.g., plastic sheeting, netting, etc.) should be kept in a designated area on-site and off the ground level to protect Hedgehogs and other small mammals (e.g., Pygmy Shrew) from entrapment and death.
- Works likely to cause disturbance during Hedgehog hibernation – for example removal of hibernation habitats such as log piles and dense scrub –should not take place from November to March.
- Vegetation will be removed in sections, working in a consistent direction to prevent entrapment of protected fauna that may be present.
- An ecologist will supervise areas where vegetation, scrub and hedgerow removal will occur prior to and during construction as appropriate (e.g., an ecologist may be required during some clearance works of areas where vegetation is too dense to check beforehand).
- Construction operations will take place during the hours of daylight to minimise disturbances to faunal species at night.
- Vehicular traffic during the construction phase along the site access roads may result in fatalities, however, this is not expected to be significant due to the mainly diurnal requirement for access and speed restrictions which will be in place.
- During construction, open trenches/excavations must incorporate facilities for badgers (and other wildlife, such as otters, foxes, hedgehogs etc.) to escape, by means of gently sloping earth inclines to be left at the end of each workday at each end of any open trenches/excavations.
- An emergency response procedure must be implemented if signs of otter are discovered. All works must cease if animals or their shelters are found until appropriate measures are taken.

- In the event that an issue arises, the NPWS will be updated and consulted with, relevant guidelines shall be followed and any licences/amendments to licences will be sought from NPWS.

8.7.3.2 Bats

A bat survey of the proposed development site was conducted by Veon Ecology. There are no trees or buildings located within the proposed development site footprint. Some trees within the nearby hedgerow habitats were assessed for the presence of Potential Roost Features (PRFs) and their potential use as commuting and/or foraging routes.

Recent surveys did not identify any bat roosts within the site footprint. However, if any bats are found, the Construction Manager and/or Environmental Officer must be contacted immediately.

External lighting should be kept to a minimum at locations where it is likely to disturb bats, and where possible will follow the Bat Conservation Ireland's *Guidance Notes for: Planners, engineers, architects and developers* on bats and lighting (BCI, 2010).

Lighting for Bats

Lighting should only be installed where it is needed, illuminated during the required time period, and set to levels that enhance visibility. In order to preserve the commuting/foraging potential of all treelines and hedgerows to be retained and to minimise disturbance to bats utilising the surrounding landscape, the lighting and layout of the proposed development will be designed to minimise light-spill onto habitats potentially used by the local bat population, foraging or commuting. This will be achieved by ensuring that the design of lighting is in accordance with the guidelines presented in the Bat Conservation Trust and Institute of Lighting Professionals 'Bats and Lighting in the UK'[7].

The IPL and BCT (2023)[8] guidelines provide a list of recommendations in relation to luminaire design, which is based on extensive research completed to-date on the potential impact of lighting on bats, and therefore provides best practice mitigation measures.

Bat activity within the site was absent, and any bats observed were primarily recorded along the hedgerow to the northwest of the site. These areas should not be illuminated; however, where lighting is unavoidable, the design strategy should aim to reduce the potential impact of lighting on bats by incorporating the following measures:

- The avoidance of direct lighting of existing trees or proposed areas of habitat creation/landscape planting.
- Do not provide excessive lighting. Use only the minimum amount of light needed for safety.

[7] BCT (2008) Bats and Lighting in the UK. Bats and the Built Environment Series.
[8] Bat Conservation Trust and Institute of Lighting Professionals (2023) Guidance Note 08/23: Bats and artificial lighting in the UK. ILP, Rugby.

- Minimise light spill. Eliminate any bare bulbs and any upward pointing light. The spread of light should be kept near to or below the horizontal. Flat cut-off lanterns are best.
- Use narrow spectrum bulbs to lower the range of species affected by lighting. Use light sources that emit minimal ultra-violet light and avoid the white and blue wavelengths of the light spectrum to avoid attracting lots of insects. Lighting regimes that attract lots of insects result in a reduction of insects in other areas, like parks and gardens, that bats may use for foraging.
- Lights should peak higher than 550 nm[9] or use glass lantern covers to filter UV light. White LED lights do not emit UV but have still been shown to disturb slow-flying bat species.
- Reduce the height of lighting columns. Light at a low level reduces impact. However, higher mounting heights allow lower main beam angles, which can assist in reducing glare.
- For pedestrian lighting, use low level lighting that is as directional as possible and below 3 lux at ground level, but preferably below 1 lux.
- Increase the spacing of lanterns.
- Use embedded lights to illuminate paths.
- Limit the times that lights are on to provide some dark periods.
- Use lighting design software and professional lighting designers to predict where light spill will occur.
- Avoid using reflective surfaces under lights.

8.7.3.3 Avifauna

The following measures shall be implemented to prevent impacts on birds:

- Any clearance of vegetation should be carried out outside the main breeding season, i.e., 1st March to 31st August, in compliance with the Wildlife Act 2000. Should any vegetation removal be required during this period, the NPWS will be consulted, and instruction taken from them.

To mitigate daytime noise disturbance, the following measures will be implemented:

- Select plant with low inherent potential for generating noise.
- Site plant as far away from sensitive receptors as permitted by site constraints.
- Avoid unnecessary revving of engines and switch off plant items when not required.
- Keep plant machinery and vehicles adequately maintained and serviced.
- Properly balance plant items with rotating parts.
- Keep internal routes well maintained and avoid steep gradients.
- Minimise drop heights for materials or ensure a resilient material underlies.
- Use alternative reversing alarm systems on plant machinery.
- Where noise originates from resonating body panels and cover plates, additional stiffening ribs or materials should be safely applied where appropriate.

[9] Van Langevelde, F *et al.*, 2011. Effect of spectral composition of artificial light on the attraction of moths. Biol. Conserv. doi:10.1016/j.biocon.2011.06.004

- Limit the hours during which site activities likely to create high levels of noise are permitted.
- Appointing a site representative responsible for matters relating to noise.
- Monitor typical noise levels during critical periods and at sensitive locations.

The following general dust control measures will be followed for the duration of the construction phase of the proposed development to ensure no significant dust related impacts occur to nearby sensitive receptors, including local faunal species:

- In situations where the source of dust is within 25m of sensitive receptors, screens (permeable or semi-permeable) will be erected.
- Haulage vehicles transporting gravel and other similar materials to the site will be covered by a tarpaulin or similar.
- Access and exit of vehicles will be restricted to certain access/exit points.
- Vehicle speed restrictions of 20km/h will be in place.
- Bowsers will be available during periods of dry weather throughout the construction period.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the soil stability, thereby reducing the amount of dust.
- Stockpiles will be stored in sheltered areas of the site, covered, and watered regularly, or as needed if exposed during dry weather.
- Gravel should be used at site exit points to remove caked-on dirt from tyre tracks.
- Equipment will be washed at the end of each workday.
- Hard surfaced roads will be wet swept to remove any deposited materials.
- Unsurfaced roads will be restricted to essential traffic only.
- If practical, wheel-washing facilities should be located at all exits from the construction site.
- Dust production as a result of site activity will be minimised by regular cleaning of the Site access roads using vacuum road sweepers and washers. Access roads should be cleaned at least 0.5km on either side of the approach roads to the access points.
- Public roads outside the site will be regularly inspected for cleanliness, at a minimum daily, and cleaned as necessary. A road sweeper will be made available to ensure that public roads are kept free of debris.
- The frequency of cleaning will be determined by the site agent and is weather and activity dependent.
- The height of stockpiles will be kept to a minimum, and slopes should be gentle to avoid windblown soil dust.

The following will be dampened during dry weather:

- Unpaved areas subject to traffic and wind
- Stockpiles
- Areas where there will be loading and unloading of dust-generating materials

Under no circumstances will wastewater from equipment, wheel, or surface cleaning be allowed enter the surface water drainage network.

Nesting Birds

The preferred mitigation is to leave scrub and vegetation in place until after the bird nesting season. At the end of the season, it is important to continue checking for birds, as some bird species continue to nest after the recognised season (March to August incl.) ends.

For green-listed species a buffer zone of c. 10m-20m, or an ECoW determined buffer, shall be installed for all nests found. For red- and amber-listed species, appropriate buffers of c. 50m to 600m shall be determined by the ECoW.

All project personnel should receive an environmental induction on a scale relevant to their work activities. This induction should include specific considerations for avifauna, focusing on the potential impacts of construction activities on the relevant bird species and their habitats.

8.7.3.4 Biosecurity

There is a potential risk that terrestrial and/or aquatic invasive species (e.g., Japanese knotweed or Giant hogweed) or pathogens (e.g., crayfish plague) could be accidentally introduced to a location via contaminated vehicles and/or equipment, in particular tracked vehicles, which have previously been used in areas containing invasive species.

Biosecurity measures will be strictly adhered to throughout the proposed works. Measures will be in accordance with IFI (2010) Biosecurity Protocol for Field Survey Work.

The following best practice avoidance measures will help contain and/or prevent the introduction of invasive species:

- Prior to arrival on site, the contractors' vehicles and equipment will be thoroughly cleaned and then dried using high-pressure steam cleaning, with water >65°C, in addition to the removal of all vegetative material. Items that are difficult to soak/spray will be wiped down with a suitable disinfectant (e.g., solution of 1% Virkon® Aquatic).
- Evidence that all machinery has been cleaned must be maintained and available for review by the statutory authorities. The level of evidence required of the contractor will be registration plates of vehicles on-site and a register detailing when, how, and where each of these were cleaned before they arrived on site.
- Visual inspections will be carried out on all machinery and equipment to check for attached plant or animal material, or adherent mud or debris. Any attached or adherent material will be removed before entering or leaving the site and securely stored (away from traffic) for removal to an appropriate waste storage area at the end of the workday.
- No removed material or run-off will be allowed to enter a waterbody of any sort.
- Following cleaning, all equipment and vehicles will be visually inspected to ensure that all adherent material and debris has been removed manually.

- Each field vehicle must carry a 'disinfection box' as appropriate. This will contain Virkon Aquatic or another proprietary disinfectant, a spraying mechanism, cloths or sponges, a scrubbing brush and protective gloves. Protective gloves must be worn when using any disinfectant solution.
- Spot checks on the adequacy of cleaning will be carried out by the ECoW.
- Disinfectants must be used strictly in accordance with the manufacturer's instructions. They must be disposed of safely and never close to open waters such as drains etc.
- For any material entering the site, the supplier must provide an assurance that it is free of invasive species.
- Ensure all site users are aware of the invasive species management plan, biosecurity and treatment methodologies (as appropriate). This can be achieved through 'toolbox talks' before works begin on site.
- Ensure that all operatives are familiar with the relevant non-native invasive species. A comprehensive list and details can be found on the Inland Fisheries Ireland website at: https://www.fisheriesireland.ie.
- Adequate site signage, hoarding and fencing will be erected in relation to the management of non-native invasive species.

8.7.4 Operational Phase Mitigation

The operational phase of the project is anticipated to generate minimal waste. Any debris resulting from maintenance or cleaning activities will be promptly removed from the site by the contractor. Waste disposal will be conducted in strict adherence to the Waste Management Act, 1996, ensuring proper handling and processing of all waste materials.

The primary types of waste anticipated at the proposed development include general packaging, office waste, and municipal waste from on-site canteen facilities. All waste will be segregated appropriately and collected by a qualified waste contractor for disposal or recycling.

The new lighting proposed for the project will be carefully managed to prevent any adverse impacts on local wildlife, in particular bats.

The proposed surface water drainage strategy incorporates a new internal drainage network with sustainable drainage systems (SuDS) features to collect runoff from relevant hardstanding areas where feasible. Since infiltration of surface water runoff to the ground is not viable, SuDS components will channel excess runoff into a dedicated surface water collection network. This network will discharge to a nearby field boundary drain located approximately 90 meters south of the site. Runoff will be released at a controlled Qbar rate, with temporary storage for excess volumes provided in an aboveground basin to manage flow and prevent flooding.

The design of the proposed development incorporates limited sources of contamination during the operational phase. Surface water will be managed without infiltration to the ground, utilising an attenuation design in line with SuDS and GDSDS (Greater Dublin Strategic Drainage Study) standards to treat and control water before offsite discharge. Regular monitoring and maintenance of the drainage system and SuDS features will be part of the site's

comprehensive management plan, ensuring stable water quality and maintaining flow conditions during the operational phase, without adverse impacts on water quality or flow regime.

A bund system will ensure any contaminated water is prevented from discharging from process areas into the surface water drainage network.

The only wastewater generated on-site will come from the office and administrative building. This wastewater will be directed to a domestic pump station located east of the office, where it will be pumped via a fully enclosed rising main to the primary digester within the bund for integration into the biomethane production process.

The proposed pumping station will be a custom-designed package plant sized to handle daily wastewater loads for six staff, with a total estimated load of 360 liters per day. The system will also include a sump or tank providing 24-hour emergency storage of 0.36 m^3. With the biomethane process reusing all wastewater produced, **no external wastewater discharge is required**.

The site will adhere to Environmental Management System (EMS) procedures and IE Licence conditions. Emergency protocols developed per the IE Licence and EMS will be implemented, with spill kits available throughout the site and all staff trained in emergency response to accidental fuel spills.

The landscaped areas around the facility are designed with ecological enhancement in mind, featuring native species like willows (*Salix* spp.) to promote local biodiversity. The approach focuses on natural recolonisation, with minimal soil disturbance to encourage habitat connectivity across the site. Maintenance requirements are kept low to reduce operational upkeep while maximising the site's ecological value. With minimal upkeep requirements, this design not only supports native biodiversity but also enhances the natural environment, providing long-term ecological value while ensuring efficient, sustainable maintenance.

8.8 Residual Impacts

Overall, the development will primarily affect low-value and highly modified habitats. There will be a net loss of a small number of non-native trees. No impact on aquatic habitats is predicted. No significant difficulties in the effective implementation of the prescribed mitigation measures have been identified.

With the exception of localised impacts and short-term impacts during construction, no significant impacts on fauna are anticipated. It is anticipated that bats will utilise the newly provided roosting habitat, and bird boxes will be provided for barn owl and swift. The spread of invasive species will be controlled, and any impact on air quality will be negligible. No adverse impact on designated sites or their conservation objectives will occur.

Provided that the recommended mitigation measures set out in **Section 8.7** above are implemented in full and remain effective throughout the construction and operational phases of the proposed development, the potential for significant residual impacts related to disturbance/displacement of fauna and the loss or alteration of habitats identified as Key Ecological Receptors (KERs) are not anticipated.

8.9 Interactions

Interactions exist between this Biodiversity Chapter and those pertaining to Population and Human Health (Chapter 7), Land, Soils and Geology (Chapter 9), Hydrology and Hydrogeology (Chapter 10), and Landscape and Visual Impact (Chapter 18).

8.9.1 Population and Human Health

The potential impact of the proposed development on human health intersects with biodiversity considerations, particularly regarding dust and air quality management. An assessment of the potential impact of the proposed development on human health is included in Chapter 7 of this EIAR. There is a potential risk of dust generated from excavation and stockpiling of soil during the construction phase of the proposed development posing a human health risk in the absence of standard avoidance and mitigation measures which will be implemented to be protective of human health. Appropriate industry standard and health and safety legislative requirements will be implemented during the construction phase of the proposed development that will be protective of site workers.

8.9.2 Lands, Soil and Geology

An assessment of the potential impacts of the proposed development on the existing land, soils and geological environment is set out in Chapter 9 Land, Soil and Geology of this EIAR. In terms of land, soils and geology, there is overlap with the biodiversity chapter in that the potential impacts of the construction works, through excavation, construction etc., have the potential to adversely affect the receiving environment; both geological

and ecological. The mitigation measures outlined in both chapters exhibit a degree of overlap, as they are designed to safeguard the receiving environment from the potential impacts of construction and operational activities. This includes specific measures aimed at preventing pollution and sedimentation to any receiving waterbodies.

8.9.3 Hydrology and Hydrogeology

An assessment of the potential impacts of the proposed development on the hydrological and hydrogeological environment is detailed in Chapter 10 of this EIAR. In the absence of avoidance, remedial, and mitigation measures, construction activities may potentially create pathways for potential sources of contamination to enter underlying groundwater. Construction activities will involve the use of potentially hazardous materials such as cementitious materials, fuels, oils, and other substances. An uncontrolled release of these materials, whether through containment failure or handling accidents, could have significant negative impacts on the surrounding environment.

The Cooleeny Stream (EPA code: 16C14) is linked to the Lower River Suir SAC, and so potential impacts to ecological receptors downstream of the Site are considered. The risk of the construction phase adversely affecting receiving waterbodies and local ecology is addressed through the proposed mitigation measures outlined in this chapter. There is notable overlap between the mitigation measures in both chapters, as they are designed to protect the receiving environment from the potential impacts of construction and operational activities. This includes specific measures aimed at preventing pollution and sedimentation to receiving waterbodies.

8.9.4 Landscape and Visual

During both the construction and operational phases of the proposed development, the site landscape will transition from undeveloped brownfield land to an industrial area featuring associated landscaping. An assessment of the potential impact of the proposed development on the receiving landscape is provided in Chapter 18 of this EIAR.

In terms of landscape and visual considerations, the proposed landscaping will interact with the site's biodiversity and ecology, leading to changes in the existing habitats and flora. The landscaping proposals will involve both losses and contributions to vegetation, which will consequently affect the site's ecology. Currently, the site does not possess high ecological value, and the proposed landscaping is not expected to result in significant adverse effects in this regard.

8.10 Conclusion

A comprehensive ecological impact assessment was undertaken to evaluate the layout, nature, and construction methods of the proposed development, as well as all associated activities during both the construction and operational phases. This assessment thoroughly examined the potential for adverse effects on the local ecology in detail.

The key findings of the ecological impact assessment of the proposed development are summarised below:

- The layout and design of the proposed development have been carefully planned with consideration for the terrestrial and aquatic ecology of the existing environment. By limiting direct/indirect impacts from disturbance and water pollution events, such as siltation and run-off of suspended solids, the potential for adverse effects on ecological features in the vicinity of the proposed development will be significantly reduced.
- A total of 3 no. macro habitats were identified within the footprint of the proposed development site: Recolonising bare ground (ED3), Scrub (WS1), and Hedgerows (WL1). Additionally, 2 no. macro habitats were noted in close proximity to the redline boundary: Buildings and artificial surfaces (BL3) and Depositing/lowland rivers (FW2). None of these habitats on-site were classified as Key Ecological Receptors (KERs). The most prominent habitats on the site are low value Scrub (WS1) and Recolonising bare ground (ED3).
- Faunal species were recorded during surveys conducted for the development, and from the NBDC database for hectad S26, which includes the project site. Key Ecological Receptors (KERs) identified include non-volant mammals, bats, and avifauna.
- The proposed development site does not support significant habitats or species that are classified or recognised as rare or restricted and none of the habitats or associated species are considered to be evaluated as being county, regional, national or International (European) importance.
- There are no European sites within or directly adjacent to the boundaries of the proposed development site; therefore, it does not form part of any European site. However, there are 5 no. European sites located within 15 km of the proposed development. The closest of these is the Galmoy Fen SAC (Site code: 001858), situated approximately 9.5 km to the northeast at its nearest point. Notably, the Lower River Suir SAC (Site code: 002137) has a potential hydrological connection to the site, located c. 18.2 km downstream via the Cooleeny Stream (EPA code: 16C14). Given the separation distance from the proposed development and the lack of a hydrological pathway to other European sites, it has been determined that the proposed development, individually or in combination with other plans or projects (assuming that prescribed protective measures to avoid impacts and the full implementation of required mitigation measures are adhered to) would not be likely to have a significant effect on any European site, in view of the sites' Conservation Objectives.
- Given the distance from the proposed development and the lack of a hydrological connection, it has been determined that no adverse impacts on the 6 no. pNHAs within 15 km of the proposed development are anticipated.

- While no likely significant negative impacts were identified related to habitat loss during the construction phase of the proposed development, disturbance and displacement of species, particularly bats, were noted. Mitigation measures will be implemented to further reduce any potential impacts.
- Potentially significant negative impacts were identified regarding water quality due to pollutants such as sediments, cementitious materials, fuels, oils, and chemicals during the construction phase of the proposed development. These impacts could result in the disturbance or displacement of fauna and the loss or alteration of habitats identified as Key Ecological Receptors. However, with appropriate mitigation measures in place, including the development of a CEMP that incorporates all pollution control recommendations within the EIAR, these impacts are considered unlikely to be significant.
- The increase in artificial lighting within the site boundaries may reduce the value of retained habitats for local wildlife, in particular bats. However, operational lighting alongside additional landscape planting has been designed to reduce impacts on foraging bats (and other nocturnal wildlife). As retained habitats mature, they are likely to create additional foraging areas for birds and bats.
- During construction, there will be increased noise and disturbance which could potentially affect birds and mammals. However, these impacts will be short-term and not significant. Given the availability of alternative habitats in the vicinity, any impacts on birds, mammals, and other wildlife are likely to be slight and short-term.
- Cumulative impacts from other plans, projects, and activities in the wider environment were assessed and could potentially result in significant impacts in combination with the proposed development. However, with the implementation of appropriate mitigation measures and adherence to best practice guidelines, significant cumulative impacts are not anticipated.
- No significant residual ecological impacts are anticipated as a result of the construction and operational phases of the proposed development.
- It can be concluded that the proposed development will not result in any adverse effects on the integrity of any ecological features, provided best practice guidance is followed, and specific mitigation measures are implemented. Both the construction and operational phases will be carried out to avoid adverse effects on water quality, habitats, flora, fauna, and all other relevant ecological features.

8.11 References

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