

EIAR FOR POWERSTOWN BIOENERGY

Volume 2 - Main Body of EIAR

Chapter 11 - Biodiversity

Prepared for:

Greengate Biogas 001 Ltd.



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Unit 6, Bagenalstown Industrial Park, Royal Oak Road,
Muine Bheag, Co. Carlow, R21 XW81, Ireland

T: +353 59 972 3800 | E: info@ftco.ie

CORK | DUBLIN | CARLOW

www.fehilytimoney.ie

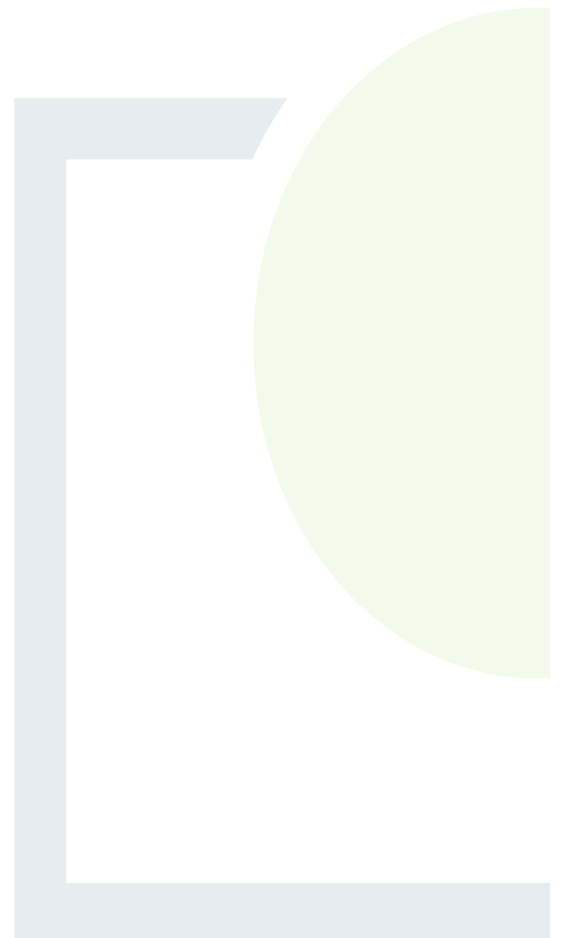




TABLE OF CONTENTS

11. BIODIVERSITY	1
11.1 Introduction.....	1
11.2 Project Description Summary.....	1
11.3 Statement of Authority	3
11.4 Assessment Methodology	4
11.4.1 Legislation, Policy and Guidelines.....	4
11.4.2 Consultation.....	7
11.4.3 Study Area and Zone of Influence.....	9
11.4.4 Desktop Study	12
11.4.5 Field Study.....	15
11.4.6 Evaluation of Ecological Resource	29
11.4.7 Survey Limitations.....	30
11.5 Baseline Environment.....	31
11.5.1 Designated Sites.....	31
11.5.2 Aquatic Ecology.....	35
11.5.3 Habitats	42
11.5.4 Non-volant Mammals	69
11.5.5 Bats.....	71
11.5.6 Birds	84
11.5.7 Herpetofauna	99
11.5.8 Terrestrial Invertebrates.....	100
11.6 Ecological Resource Evaluation	102
11.6.1 Receptor Evaluation.....	102
11.7 Assessment of Likely Significant Impacts	107
11.7.1 'Do Nothing' Impacts	107
11.7.2 Effects on Designated sites	107
11.7.3 Construction Phase Impacts.....	108
11.7.4 Operational Phase Impacts.....	115
11.7.5 Decommissioning Phase Impacts.....	117
11.7.1 Cumulative Impact Assessment.....	118
11.7.2 Summary of Potential Impacts.....	119
11.8 Mitigation Measures	121



11.8.1	General Best Practice Measures	122
11.8.2	Project-Specific Mitigation.....	124
11.8.3	Major Accidents and Natural Disasters.....	129
11.9	Residual Impacts.....	130
11.9.1	Summary of Residual Impacts.....	130
11.10	Biodiversity Compensation.....	133
12.	REFERENCES	134



LIST OF APPENDICES

- Appendix 11.1: Desktop Species Records for the Site & Gas Pipeline
Appendix 11.2: Bird Records for the Site & Gas Pipeline
Appendix 11.3: Information collected from relevés
Appendix 11.4: Biodiversity Enhancement Management Plan (BEMP)
Appendix 11.5: NPWS consultation

LIST OF FIGURES

	<u>Page</u>
Figure 11-1: Mammal survey areas	19
Figure 11-2: Bat survey locations	22
Figure 11-3: Bird survey vantage points and transects	25
Figure 11-4: Herpetofauna survey.....	27
Figure 11-5: European sites and natural heritage sites.....	34
Figure 11-6: Watercourses and drains	37
Figure 11-7: Habitat Map (Proposed Development).....	45
Figure 11-8: Habitat Map (proposed gas pipeline route).....	58
Figure 11-9: Greater knapweed and orchid species locations	65
Figure 11-10: Invasive species locations.....	68
Figure 11-11: Bat activity Round 1	74
Figure 11-12: Bat activity Round 2	75
Figure 11-13: Bat activity Round 3	76
Figure 11-14: Summer bird survey records	85
Figure 11-15: Winter bird survey records	86
Figure 11-16: Flora donor and receptor areas	126

LIST OF TABLES

	<u>Page</u>
Table 11-1: Stakeholder Consultation Responses relevant to ecology and biodiversity	8
Table 11-2: Ecological surveys undertaken within the defined survey areas by the Fehily Timoney and Company ecologists (unless otherwise indicated).....	15
Table 11-3: Consolidated list of habitats recorded at the site and its surrounds.....	43
Table 11-4: Positive Indicators of 6210/*6210	55
Table 11-5: NBDC rare and/or protected flora records for the last two decades for the site and the gas pipeline.....	63
Table 11-6: NBDC invasive species /non-native flora records for the last two decades within 2km grid squares associated with the gas pipeline.....	66



Table 11-7:	Historical NBDC mammal records for the last two decades for the site and the gas pipeline	69
Table 11-8:	Historical NBDC bat records for the last two decades for the site and the gas pipeline	71
Table 11-9:	Bat Habitat Suitability.....	72
Table 11-10:	Bat passes recorded during three bat nighttime walkovers	73
Table 11-11:	Total bat passes recorded on static detectors over three sessions	77
Table 11-12:	Summary of findings from roost inspections (to be read with Figure 11-2).....	79
Table 11-13:	Desktop survey results of birds recorded at the Site from NBDC and I-WeBS	87
Table 11-14:	Field survey results of bird species recorded within the Zol of the site	90
Table 11-15:	Desktop survey results of birds recorded along the gas pipeline from the NBDC and I-WeBS data.....	94
Table 11-16:	Field survey results of bird species recorded along the gas pipeline in addition to the species recorded for the site and surrounds in Table 11-14	98
Table 11-17:	Historical NBDC invertebrate records for the last two decades for the site and the gas pipeline	100
Table 11-18:	Evaluation of ecological receptors for the site and gas pipeline	102

LIST OF PLATES

	<u>Page</u>
Plate 11-1:	Sample of reptile refugia placed on site for reptile trapping and surveying 26
Plate 11-2:	Ballynaboley Stream crossing (IDB1)..... 39
Plate 11-3:	River Barrow (IDB2), downstream, upstream and at the Cardinal Moran Bridge respectively 40
Plate 11-4:	Rathornan Stream (IDB3) upstream (west) of the L3038..... 40
Plate 11-5:	Rathornan Stream (IDB3) downstream (east) of the L3038..... 41
Plate 11-6:	Tributary to the River Barrow (IDB4) 41
Plate 11-7:	Land Drain IDB5 42
Plate 11-8:	Land Drain IDB6 42
Plate 11-7:	Spoil and bare ground (ED2) within the site 46
Plate 11-8:	Recolonising bare ground (ED3) developing post-quarrying within the site 47
Plate 11-9:	The larger main pool representing other artificial lakes and ponds (FL8) habitat within the site 47
Plate 11-10:	Other artificial lakes and ponds (FL8) habitat within the site during the drier season (May in 2026) 48
Plate 11-11:	Scrub (WS1) areas within the site 48
Plate 11-12:	Treelines (WL1) within and around the site boundary 49
Plate 11-13:	An example of structures that make up the buildings and artificial structures (BL3) within the site 50
Plate 11-14:	Dry meadows and grassy verges (GS2) covering the old landfill north of the site 50
Plate 11-15:	Mosaic of GS1 and GS2 in the east, within the site 51



Plate 11-16:	Hedgerows (WL2) along the eastern boundary of the site	52
Plate 11-17:	Dry meadows and grassy verges (GS2) covering the old landfill north of the site	53
Plate 11-18:	Arable crops (BC1) within 50m of the site	53
Plate 11-19:	Scattered trees and parkland (WD5).....	54
Plate 11-20:	Improved agricultural grassland (GA1)	54
Plate 11-21:	Dry calcareous and neutral grassland (GS1), 60-120m of the site.....	56
Plate 11-22:	Reed and large sedge swamps (FS1) along the banks of the River Barrow	62
Plate 11-23:	Mixed broadleaved/conifer woodland (WD2) at IDB4 crossing in the northern extent of the pipeline.....	63
Plate 11-24:	Greater knapweed and orchid species found within the site	64
Plate 11-25:	Rare plants within 10m buffer of the gas pipeline.....	66
Plate 11-26:	Himalayan balsam recorded within site.....	67
Plate 11-27:	Mature ash with potential roost feature	78
Plate 11-28:	Mature oak with potential roost feature	83
Plate 11-29:	Cardinal Moran Bridge potentially providing roost features to bats	84
Plate 11-30:	Pools on site supporting frog spawn.....	99
Plate 11-31:	Flooded area along Rathornan Stream with frog spawn	100



11. BIODIVERSITY

11.1 Introduction

This chapter has been prepared to describe the existing biodiversity environment of the project. It examines the potential effects that the Project may have on biodiversity during each phase of the development: construction phase, operational phase and decommissioning phase. Where required appropriate mitigation measures are described to avoid, control or reduce activities that may have potential significant effect(s) on biodiversity and offset measures are provided with the objective of no net loss of biodiversity as a result of the Project.

There is a glossary of terms and list of acronyms used in Chapter 1 Introduction in Volume 2 of this EIAR. In this Biodiversity Chapter:

- The ‘proposed development’ refers to all elements of the proposed commercial anaerobic digestion (AD) plant and ancillary works within the red line boundary including biodiversity enhancement measures.
- The ‘proposed gas pipeline route’ is the proposed route of the gas pipeline and all supporting activities.
- The ‘Project’ considers the proposed development and the proposed gas pipeline route.

This Biodiversity Chapter is supported by appended information presented as Appendix 11 in Volume 3 of this EIAR and includes:

- Appendix 11.1: Desktop Species Records for the proposed development & Gas Pipeline
- Appendix 11.2: Bird Records for the Proposed development & Gas Pipeline
- Appendix 11.3: Information collected from relevés
- Appendix 11.4: Biodiversity Enhancement Management Plan (BEMP)
- Appendix 11.5: NPWS consultation

11.2 Project Description Summary

The proposed development is fully described in Chapter 3 Description of the Proposed Development of Volume 2 of the EIAR. The proposed development is an anaerobic digestion facility for the production of renewable natural gas and biogenic liquefied carbon dioxide from agricultural liquid farmyard manures and solid farmyard manures (or feedstocks). The Biodiversity Enhancement Management Plan (BEMP, Appendix 11.4 in Volume 3 of this EIAR) forms part of the proposed development.

Feedstock having passed through the digestion process produces a product known as digestate which will be returned to farmers as a fertiliser. The proposed development is shown within the planning boundary (RLB) on the proposed site layout drawings in Volume 4 of this EIAR. The commercial-scale anaerobic digestion biogas plant will include the following infrastructure:

- Site entrance and access with internal roads and circulation yard, including weighbridge and weighbridge office.
- Liquids reception building with reception area to receive liquid farmyard manures, fitted with welfare facility, laboratory, mechanical and electrical rooms.



- Solids reception building with reception hall and storage bunker to receive solid farmyard manures, fitted with a pretreatment area, electrical and control room and welfare facility
- Solid digestate building with digestate loading area, separation loft and storage area, fitted with mechanical and electrical room.
- Bunded tank farm supporting primary, secondary and tertiary digesters, and tanks for the various stages of digestate handling and the pump houses.
- Process supporting infrastructure including an odour abatement system with 35m high stack, heating centre with 35m high exhaust stack, desulphurisation plant, gas upgrade plant, CO₂ liquefaction plant, biomethane network entry facility, gas flares, process (also fire water) storage tanks.
- Drainage infrastructure which incorporates storm and rainwater collection, wash water and process water collection areas, foul water facilities and storm water lagoon
- Operational infrastructure, including administration building, ESB substation, chemical stores, fire water supply, site security, and roof-mounted solar panels and heating centre.

Landscaping will incorporate managing scrub areas and linear habitats around the boundary and managing the biodiversity enhancement measures. This is detailed in the Landscape Plan included in Volume 4 Drawings.

The facility will be appropriately illuminated internally and externally by appropriate energy efficient lighting, which is considered in this Biodiversity Chapter given the nocturnal nature of some fauna (for example bats). The facility lighting will be designed to minimise light pollution beyond the facility boundary. The detailed lightning plan is provided Chapter 3 Description of the Proposed Development in Volume 2 of the EIAR.

The gas pipeline, outside the boundary for development consent (RLB), will be constructed within the road curtilage. Approximately 100 metres of pipeline will be laid per day by standard cut and cover construction and horizontal directional drilling (HDD) installation. The gas pipeline will leave the proposed development site at the southwest corner of the site and:

- Follows the R448 public road south, crossing the Ballynaboley Stream (Ballynaboley Stream_010) (EU Code: IE_SE_14B080700) at crossing IDB1 within the bridge deck of the road
- Continues south along the R448, crossing the River Barrow (Barrow_180) (EU Code: IE_SE_14B012700) at the Cardinal Moran Bridge (IDB2), via horizontal directional drilling (HDD) under the river, with launch and receptor pits located within the road curtilage.
- After crossing the River Barrow, the gas pipeline turns north onto the L3038, crossing over the tributary at the Rathornan Bridge (henceforth the Rathornan Stream - Rathornan_010) (IE_SE_14R430830) at crossing IDB3 within the bridge deck of the road, and then crossing under the M9 motorway by HDD.
- The gas pipeline then continues along the L3038 and into the L3039, crossing over a Tributary to the River Barrow (Barrow_180) (EU Code: IE_SE_14B012700) at crossing IDB4 within the bridge deck of the road.
- The gas pipeline then turns west onto Milford Park and then north onto the L3043, where it crosses two culverted land drains (IDB5 and IDB 6 respectively), will be crossed either by open cut method or HDD.
- The gas pipeline then finally turns west onto the L7031 where it terminates at an existing Gas Networks Ireland (GNI) above ground installation (AGI) in Clogrennan, Co. Carlow.



11.3 Statement of Authority

This Biodiversity Chapter was prepared by Barbara Kasl and Jason Cahill of Fehily Timoney. Chapter 1 Introduction in Volume 2 of this EIAR provides details of contributors with CVs appended as Appendix 1.1. in Volume 3 of this EIAR. Ecologists Jason Cahill, Yumi Mihara, Kate O'Regan, Danny Franklin and Orla Commings of Fehily Timoney completed the various ecological surveys, other than the bird surveys which were completed by external ornithologist, Cian Cardiff.

Barbara Kasl is a Senior Ecologist at Fehily Timoney and holds a BSc. (Hons) in Zoology and a PhD in Animal, Plant and Environmental Sciences from University of the Witwatersrand (Johannesburg, South Africa). She has over 20 years' experience in the environmental consulting sector as a terrestrial fauna specialist and behavioural ecologist, with experience in impact assessment and technical reporting for various projects [renewable energy, mining and processing, servitudes (roads, pipelines, powerlines), supporting infrastructure and town-related development (housing and industrial)], including specialist input into national, district and municipal plans and frameworks.

Jason Cahill is a Project Ecologist with Fehily Timoney and holds a B.Sc. (Hons) in Field Biology with Wildlife Tourism, Institute of Technology Tralee (now MTU). He has five years postgraduate experience. Jason has experience in various field surveys including bird, bat, mammal, habitat, invasive species, and freshwater surveys. He also has experience undertaking Appropriate Assessments and Environmental Impact Assessments for developments including wind farms, solar farms, and various urban developments. Jason has worked as an Ecological Clerk of Works on a large-scale infrastructure development and several smaller projects.

This Biodiversity Chapter was reviewed and checked by Fehily Timoney Principal Ecologist and Senior Associate Director, Rita Mansfield. Rita holds a BSc. (Hons) in Applied Ecology and a H. Dip Environmental Protection and Pollution Control. Rita is experienced as a technical ecology lead within the environmental and planning services sector. She is a qualified ecologist with responsibility for environmental impact assessment, planning applications (conventional and strategic infrastructure development), Appropriate Assessment, foreshore licensing, and stakeholder engagement for large scale plans and projects in Ireland.

Yumi Mihara is a Senior Project Ecologist at Fehily Timoney. Yumi holds a MSc in Environmental Science from Hokkaido University and a BSc in Environmental Science from Tokyo University of Agriculture. She has specialised in botanical field surveys, with over 8 years' experience working in ecological consultancy section across Japan and Ireland. She has also prepared reports for wind farms, solar farms, greenways and small residential developments in Ireland.

Kate O'Regan is a Project Ecologist with three years' experience in consultancy with FT. She holds a first-class BSc. in Zoology and first-class MSc in Marine Biology from University College Cork. Since joining Fehily Timoney, Kate has prepared Appropriate Assessments and Ecological Impact Assessments for waste facilities and road improvement schemes along with ornithological chapters and collision risk models for renewable energy projects. Kate has previous experience in data management, statistical analysis, mapping and technical report writing. Kate has also completed a wide range of site work including habitat, ornithological, bat, freshwater aquatic, intertidal, subtidal, insect and mammal surveys.

Danny Franklin is a Project Ecologist with Fehily Timoney and holds a B.Sc. (Hons) in Zoology, University College Cork (UCC) and a M.Sc (Hons) in Wildlife Conservation and Management, University College Dublin (UCD). He has four years postgraduate experience. Danny has three years of ecological consultancy experience in the forestry industry preparing Appropriate Assessment documents as part of the Forestry Service licencing process and one year preparing Appropriate Assessments, Ecological Impacts assessments and ornithological chapters for a range of projects. Danny has previous experience in data management, mapping and technical report writing. Danny has completed a wide range of site work including habitat, bat, amphibian and mammal surveys.



Orla Commins is a Project Ecologist (was a Graduate Ecologist at commencement of the ecological surveys) with Fehily Timoney and Company. She holds a first-class BSc in Ecology and Environmental Biology from University College Cork. Since joining Fehily Timoney, she has prepared comprehensive Appropriate Assessments, Ecological Impact Assessments and has completed ornithological reports and bat reports, a wide range of field surveys, mapping and data management.

Cian Cardiff has been working as a full-time professional ornithologist since 2019. He has studied bird biodiversity and population monitoring methods through Oxford University. He has worked closely alongside environmental and ecological consultants/companies, such as Veale Ecology, APEM Group, Fehily Timoney, Natural Power and Arup Group, on a broad range of developments, including wind and solar energy projects. Cian has a wide range of experience in conducting a variety of bird surveys, including vantage point watches, breeding bird transects, species specific surveys and investigations. Cian is also a bird tour guide, photographer, writer, public speaker and all-round ornithological enthusiast.

11.4 Assessment Methodology

11.4.1 Legislation, Policy and Guidelines

The guidelines and methodology for impact assessment are detailed in Chapter 1 Introduction in Volume 2 of this EIAR. Legislation and policies relevant to the Project are detailed in Chapter 2 Need for the Proposed Development and Planning and Policy in Volume 2 of this EIAR and only ecology-relevant legislation and policies are detailed herein.

11.4.1.1 *European Legislation*

The EU Habitats Directive (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) (as amended) (the 'Habitats Directive') together with the Birds Directive (Council Directive 2009/147/EC on the Conservation of Wild Birds) (as amended) (the 'Birds Directive') are the main legislative instrument for the protection and conservation of biodiversity within the European Union (EU).

The Habitats Directive lists habitats and species that must be protected within Special Areas of Conservation (SAC) within Annexes I and II, respectively. The Habitats Directive also identifies plant and animal species within Annex IV which are subject to strict protection anywhere they occur.

The Birds Directive provides for the identification of a network of Sites in all member states to protect birds at their breeding, feeding, or roosting areas. The Birds Directive identifies in Annex I species that are rare, in danger of extinction, or vulnerable to changes in habitat and which require special protection and areas for their conservation: Special Protection Areas (SPA).

The Habitats Directive and Birds Directive have been transposed into Irish law, by Part XAB of the Planning and Development Act 2000 (as amended) and by the European Communities (Birds and Natural Habitats) Regulations 2011, as amended.



The EU Water Framework Directive (2000/60/EC) (as amended) requires all Member States to protect and improve water quality in all waters in order to achieve good ecological status by 2015 or, at the latest, by 2027. This was transposed into Irish Law by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003) and by the European Communities Environmental Objectives (Surface Waters) Regulations 2009 as amended and European Union Environmental Objectives (Freshwater Pearl Mussel) (Amendment) Regulations 2009 as amended. The Directive applies to rivers, lakes, groundwater, and transitional coastal waters. The Directive requires management plans to be prepared on a river basin basis and specifies a structured method for developing these plans. Ireland's third cycle River Basin Management Plan 2022-2027 ('The Water Action Plan 2024: A River Basin Management Plan for Ireland') was published on 3 September 2024.

11.4.1.2 *National Legislation*

The primary domestic statute providing for wildlife protection in Ireland is the Wildlife Act of 1976 as amended (the 'Wildlife Act') and associated Statutory Instruments. All bird species are protected under the Wildlife Acts from offences including intentional killing or injury and disturbance during the breeding season (to include eggs, young, and nests which are also protected). A range of mammal species, three amphibian species (smooth newt, common frog and toad), one butterfly species (marsh fritillary), and one reptile species (common lizard) are all similarly protected from intentional killing or injury, whilst the breeding or resting sites of these species are also protected. The amendment to the Act in 2000 broadens its scope to include fish and aquatic invertebrate species. The Act also provides a mechanism to give statutory protection to Natural Heritage Areas (NHAs). The Act also requires that public bodies, in the performance of their functions, have regard to the National Biodiversity Action Plan.

A number of vascular (i.e. flowering) and non-vascular plant species (i.e. nonflowering) are afforded legal protection under the Flora (Protection) Order, 2022 enacted under Section 21 of the Wildlife Act, 1976. It is an offence to cut, pick, collect, uproot, or otherwise take, injure, damage, or destroy any specimens of the species listed under the Flora Protection Order.

The Third Schedule to the European Communities (Birds and Natural Habitats) Regulations 2011, as amended lists invasive alien plant species. These regulations make it an offence to plant, disperse, allow or cause to disperse, spread, or otherwise cause to grow any of the scheduled species. The more recently published European Union (Invasive Alien Species) Regulations 2024 (S.I. No. 374 of 2024) complements the Third Schedule of the European Union (Birds and Natural Habitats) Regulations 2011 by providing a legal framework for managing invasive alien species, particularly those of Union and National concern.

Beyond the national statutes which transpose the Water Framework Directive into national law, there are several older national Acts which are intended for the protection of fisheries and the aquatic environment as follows:

- Section 171 of the Fisheries (Consolidation) Act 1959 creates the offence of throwing, emptying, permitting or causing to fall onto any waters deleterious matter. Deleterious matter is defined as not only as any substance that is liable to injure fish but is also liable to damage their spawning grounds or the food of any fish or to injure fish in their value as human food or to impair the usefulness of the bed and soil of any waters as spawning grounds or other capacity to produce the food of fish.
- Under Section 3 of the Local Government (Water Pollution) Act, 1977 (as amended by Sections 3 and 24 of the 1990 Act) it is an offence to cause or permit any polluting matter to enter waters.



11.4.1.3 Policies

Policies considered in the compilation of the Biodiversity Chapter include:

- Ireland's fourth National Biodiversity Action Plan (NBAP) was launched in January 2024 and sets the national biodiversity agenda for the period 2023-2030. This plan includes targeted actions for public authorities in relation to their obligations for biodiversity. One particularly important policy change in the plan (Objective 1) relates to the mainstreaming of biodiversity into decision-making across all sectors. Specifically, there is an obligation on all Public Authorities to "move towards no net loss of biodiversity through strategies, planning, mitigation measures, appropriate offsetting, and/or investment in Blue-Green infrastructure". This and other relevant policies in the plan have informed the valuation of ecological features, assessment of potential effects, and development of mitigation in this EIAR. The Plan includes five strategic objectives as follows:
 - Objective 1 Adopt a Whole-of-Government, Whole-of-Society Approach to Biodiversity
 - Objective 2 Meet Urgent Conservation and Restoration Needs
 - Objective 3 Secure Nature's Contribution to People
 - Objective 4 Enhance the Evidence Base for Action on Biodiversity
 - Objective 5 Strengthen Ireland's Contribution to International Biodiversity Initiatives
- The Wildlife (Amendment) Act 2023 introduced a new public sector duty on biodiversity. The legislation provides that every public body, as listed in the Act, is obliged to have regard to the objectives and targets in the National Biodiversity Action Plan.
- Carlow County Development Plan (CDP) 2022-2028 has incorporated biodiversity into its overall strategy through sustainable development goals, climate action plan initiatives, ecosystem services and natural capital considerations and enhancement of green infrastructure, including specific policies and objectives related to biodiversity, the focus of this Biodiversity Chapter. In terms of the landscape character area (Chapter 9 of the Carlow CDP), the Project is well-placed within the 'Central Lowlands', which includes the major settlements and rural farming areas. Chapter 10 of Carlow's CPD: Natural and Built Heritage has the aim "To protect, conserve, manage and enhance the natural and built heritage features of the County, to ensure the survival of their intrinsic value for future generations and to ensure they contribute to the future sustainable development of the County." It has policies in place for designated areas as well as non-designated areas. The specific objectives include:
 - Natural heritage, NH. 01: Implement relevant actions from the National Biodiversity Action Plan 2017-2021 (and any superseding plan) and to prepare a County Heritage Plan and Biodiversity Action Plan during the lifetime of this County Development Plan in accordance with RPO 126 in the RSES, to ensure the protection and appreciation of heritage and nature at local level including recognition of rich biodiversity of designation of existing special areas of conservation i.e. Blackstairs Mountains, Slaney River Valley and River Barrow and River Nore SAC.
 - Natura 2000 Sites, NS. 01: Strictly protect areas designated or proposed to be designated as Natura 2000 sites, including any areas that may be proposed for designation or designated during the period of this Plan.
 - Woodland, Trees and Hedgerows, WT. 01: Promote the Native Woodland and Neighbourhood schemes and other initiatives that aim to establish and enhance woodlands for recreational and wildlife benefits.
 - Wetlands, WL. 01: Carry out a Wetlands Survey of the County during the lifetime of this Plan.
 - Invasive Alien Species, IS. 01: Prepare an Invasive Alien Species Management Strategy, in conjunction with a Hedge and Road Verge Maintenance Strategy, during the lifetime of this Plan.



- Invasive Alien Species, IS. O2: To raise awareness of the potential threat of invasive alien species in the County, and to inform the public of appropriate management measures for the prevention, containment, and control of invasive alien species.
 - Invasive Alien Species, IS. O3: Undertake a programme of mapping of invasive alien species in the County and initiate control programs with relevant stakeholders and landowners on the prevention, containment and control of invasive alien species.
- County Carlow Biodiversity Action Plan 2023-2025 (2026-2031 is under development). The Project supports the following objectives, either directly or through the mitigation measures proposed in this Biodiversity Chapter:
 - 3.3 To control Invasive Species across Carlow.
 - 4.1 To identify opportunities for habitat creation in areas of low biodiversity across Carlow
 - 5.4 To replace all public lighting in Carlow with bat/wildlife friendly lighting.
- County Carlow's Green Infrastructure Strategy, which has reflected the same objectives detailed in the Carlow CDP 2022-2028.
- All-Ireland Pollinator Plan (AIPP) 2021-2025: objectives pertaining to making private land pollinator friendly.
- All-Ireland Species Action Plan for Bats 2008

11.4.1.4 *Guidelines*

The following guidelines have been considered in the overall assessment of ecological receptors, impact assessment and technical reporting alongside the EPA (EPA, 2022) guidelines:

- CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.3 updated September 2024. Chartered Institute of Ecology and Environmental Management (CIEEM, 2018).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' (Department of Housing, Planning and Local Government, 2018)

Other specific guidelines on survey techniques, analysis for the ecological baseline assessments and species-specific mitigation are included in each specific section as applicable.

11.4.2 Consultation

Chapter 5 Scoping and Consultation of Volume 2 of this EIAR provides the full details of consultation completed to date which commenced in early 2025 with the initial stakeholder consultation document sent to various stakeholders in April 2025, followed by a public consultation event in Carlow in April 2025. A revised stakeholder consultation document was sent in November 2025.

The full list of stakeholders are also included in Chapter 5 Scoping and Consultation of Volume 2 of this EIAR and include biodiversity-relevant private and public stakeholders, including Department of Housing, Local Government and Heritage and the National Parks and Wildlife Services (NPWS), Inland Fisheries Ireland (IFI), Local Authority heritage and biodiversity officers, Local Authorities Water Programme, Bat Conservation Ireland, Birdwatch Ireland, Irish Wildlife Trust, and Biodiversity Ireland.



Various pre-application consultations were undertaken during 2025 and 2026 detailed in Chapter 5 Scoping and Consultation of Volume 2 of this EIAR, including a meeting with NPWS, held on Thursday, 15 January 2026 14:00-15:00.

Only limited responses have been received to date (Table 11-1).

Table 11-1: Stakeholder Consultation Responses relevant to ecology and biodiversity

Consultee and Date of Response	Summary of Comments Provided
Development Application Unit, National Parks and Wildlife Service Response 1: No Response Response 2: 19 November 2025 Consultation Meeting: 15 January 2025	Response: NPWS agreed to meet regarding the Project. Consultation Summary: A consultation meeting was held between the project coordinators and the NPWS on 15 January 2026, which included a short presentation on the Project, and a presentation on the status of ecological studies to date. Topics discussed included ecological surveys around birds, flora, fauna, and habitats. Ecological surveys discussed included consideration of specific species and groups such as plant species (including knapweed and bee orchid), herpetofauna (including newts), mammals (including badgers and bats), invasive alien species (including Japanese knotweed), and invertebrates (including the small skipper butterfly). Queries were also made regarding the potential for Annex I habitats within the ZOI for air emissions and related impacts, and potential for impacts around lighting, cumulative effects (such as emissions from the Project in combination with emissions from traffic and agriculture), effects of wheel washing and leaking trucks on streams, and potential effects should culvert/water crossing removal be required. Additional surveys have been undertaken in line with NPWS queries (Section 11.4.5) and findings are incorporated under the baseline section of the report (Section 11.5). A comprehensive impact assessment has incorporated NPWS concerns (Section 11.7). A follow up summary memo was issued to NPWS on 16 June 2026 setting out findings of the additional surveys undertaken further to the meeting held on 15th January 2026. The memo presented the findings of the bat, reptile and mammal surveys as well as assessment of the grasslands along the R448 public road for conformity to Annex I habitat types (confirmed not to be Annex I). NPWS reverted on 25 June 2026 querying proposals for Greater Knapweed sowing and orchid relocation, which were clarified on the same day by return email. NPWS confirmed receipt of these clarifications on 26th June 2026 and noted no further comments.
Bat Conservation Ireland Response 1: 02 April 2025 Response 2: 20 November 2025	Response: Unfortunately, as Bat Conservation Ireland is a very small organisation, with limited resources, we do not have the capacity to get involved in planning issues.
Birdwatch Ireland Response 1: No response Response 2: 19 November 2025	Response: Email forwarded to Birdwatch Ireland's Policy Officer.
Irish Wildlife Trust Response 1: 03 April 2025 Response 2: 19 November 2025	Response: We do not have the staff capacity to respond to this consultation at the moment, but we will endeavour to respond if possible.



Consultee and Date of Response	Summary of Comments Provided
Heritage Officer, Carlow County Council	No response to date
Inland Fisheries Ireland	No response to date
Biodiversity Ireland	No response to date

11.4.3 Study Area and Zone of Influence

As per CIEEM guidelines (CIEEM, 2018), the zone of influence (Zoi) for the Project is the spatial and temporal scale of the potential biophysical changes which might occur as a result of the Project, which includes the construction phase, the operational phase and decommissioning phase, and takes into account the characteristics, size and location of the Project and the potential overlap / connectivity to identified and potential ecological receptors. The potential extent of the zone of influence (Zoi) is used to determine the ecological survey areas.

In determining the Zoi, the following guidelines and desktop information is considered (as is information provided by the specialist disciplines contributing to Volume 2 of this EIAR), as needed for the specific ecological receptors as identified in this Biodiversity Chapter:

Terrestrial habitats

- The potential for direct biophysical change by damage / degradation to terrestrial habitats is taken as the development footprint of the works and will be within the site and gas pipeline.

Aquatic habitats

- Inland Fisheries Ireland (2020) guidelines¹ on the protection of watercourses through the use of buffer zones states that to protect waterbodies, "the recommended buffer zone width from larger river channels (>10m) is 35m to 60m and from smaller channels (<10m) is 20m or greater". For the purpose of this assessment, it is assumed that where the construction works occur within 60m of a watercourse then there is potential for construction related material to enter the watercourse e.g. sediment runoff and hydrocarbons. Studies on sedimentation pressures on the aquatic environment (e.g. (Ashdown, et al., 2022) and (Williams, RD et al., 2022)) demonstrate that construction-phase effects are typically localised to the source but are likely ecologically significant in that zone (depending on receptor sensitivity), with the highest risk zone generally within the first few tens of metres (assessed in the literature as between 10m and 80m) downstream of the source (in this case the watercourse crossings along the proposed gas pipeline route). The above distances are taken as the potential Zoi of impacts on the aquatic environment.

¹ Inland Fisheries Ireland (2020) 'Planning for Watercourses in the Urban Environment: A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning'.



Groundwater dependent terrestrial ecosystems (GWDTE)

- A 250m construction stage Zol has been considered for potential groundwater dependent terrestrial ecosystems (GWDTE) having regard to 'Guidance on Assessing the Impacts of Developments on Groundwater Dependent Terrestrial Ecosystems' (SEPA, 2024). These guidelines prescribe the following distances of dewatering effects in assessing risk to Groundwater Dependent Terrestrial Ecosystems GWDTE: 10m for all construction works activities, 100m for subsurface activities <1m deep and 250m for subsurface activities >1m depth (provided the dewatering rates do not exceed 10m³/day, which is the case for the proposed development). As such a Zol of 250m has been adopted when assessing the potential for impacts on GWDTE.
- For operation phase effects on GWDTE it is noted that a groundwater source of 120m³/day of process water may be required at the site when water is not available at the surface water lagoon. A pump test was undertaken as part of the ground investigation to confirm the capacity of the underlying aquifer to supply the required process water for the operational phase of the proposed development. A pumping rate of 10m³/hour (equivalent to 240m³/day) was maintained throughout the 72-hour pump test, which recorded a 1.0m fall in the water level within the pumping well during the pump test. The results of the pump test show that the required 120m³/day of process water can be supplied by the pump well within the site. The groundwater level recovered to the pre-pump test level within 30 minutes of completion of the test. Monitoring at two of the installed standpipes across the site indicated no change in the groundwater level at those two locations, i.e. there was localised draw down only confined to the well location. The results indicate that the proposed development will have no pathway for effect on groundwater flows or recharge in the catchment or beyond the site.

Air Quality

- The International Air Quality Institute (IAQM, 2024) states that for ecological receptors, effects from dust soiling are 'High' to 'Medium' up to 20m from the source (depending on sensitivity of ecological receptor) and reduces to 'Medium' to 'low' over 50m from the source. The guidelines state that ecological receptors should be considered within 50m of the project and within 250m of site entrances where trackout² may occur. A such a 250m Zol for dust effects is considered from the Proposed Development.
- In relation to the potential Zol of traffic to the proposed development site during construction, operation and decommissioning, TII guidelines states that road links meeting specific changes in traffic criteria (types and / or quantities of vehicles, speed or road alignment) can be defined as being 'affected' by changes in traffic. However, the construction (including decommissioning) and operational phase of the project will not meet these specific changes in the nature of traffic to an extent that will contribute to emission-related effects that could cause significant deterioration of ecological receptors.

² The movement of dust and dirt from a construction/demolition site onto the public road network.



- The EPA Note (IN2) on Assessing the Impact of Ammonia Emissions to Air and Nitrogen Deposition from EPA licensable activities on European Sites (DRAFT) (EPA, 2024) stipulates that a detailed air dispersion model is required where a European site is within 250m of a proposed development. As such a 250m potential Zol has been initially adopted, and an air dispersion model has been prepared. The process contributions (PC) from the proposed development have been modelled at ecological receptors within the model study area and were compared to the relevant critical level (in line with guidance from the IAQM (IAQM, 2020), UK Environment Agency (Environment Agency (UK), 2025) and the EPA (EPA, 2024) guidance). As per the IN2 guidance where a PC is greater than 1% of the critical level, the effects of the operation of the proposed development must be further assessed. Chapter 8 Air Quality in Volume 2 of this EIAR assessed the modelled results for NO_x and NH₃ dispersion and for, nitrogen and acid deposition (as N). The modelled outputs are taken as the Zols for the proposed development.

Noise and Visual Disturbance

- The potential disturbance (noise and visual disturbance) to birds beyond the proposed development has been established as 500m, having regard to (Goodship, et al., 2022) For the site the disturbance Zol considers the appropriate *ex-situ* habitats overlapping this 500m Zol.
- A 150m disturbance Zol was considered for mammals based on the 'Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (TII, 2006, reissued 2025) and 'Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (TII, 2006, reissued 2025).
- Bats are disturbed at their roosts by light (well researched and documented), direct human interference and likely noise and vibration (although tolerance has been indicated, these disturbances and tolerance are not as well understood) (Reason, et al., 2025). For bats, a disturbance Zol of 50m, has been considered for construction and operation phases having regard to the 'UK Bat Mitigation Guidelines' (BCI, 2026)

These preliminary Zols represent the spatial extent within which specific ecological receptors may be affected via specific source-impacts from the Project. The site findings, species specific information (home ranges, forage ranges, core sustenance zones, known responses to disturbances, known successful protective buffers), information from guidelines utilised to compile this Biodiversity Chapter and input from disciplines such as the hydrology, hydrogeology, air quality and noise assessments are used to inform the Project's detailed Zol.

It is noted that the adoption of the above Zols has not inadvertently excluded relevant pathways—particularly in relation to hydrological connectivity, sediment pollution transport pathways, and landscape connectivity, as where such Zols have been applied their suitability for adoption in the context of the project has been assessed as well the ecological sensitivity of the receiving environment.



11.4.3.1 Connectivity or Ecological Continuity

Connectivity or ecological continuity refers to the degree to which different parts of a landscape, ecosystem, or habitat are physically or functionally linked, allowing the movement of organisms, nutrients, energy, or ecological processes across space. Consideration is therefore given to whether there is a landscape³ or ecological⁴ feature which provides connectivity / continuity for habitats and species. As such, the lands within the various zones of impact as described above are assessed for their potential to form part of ecological or landscape continuity.

- Consideration is given to the potential for the habitats within the Zols of the project (as described above) to be part of the ecological continuity of habitat for protected bird species. Regards is had to the Guidance on 'Assessing Connectivity with Special Protection Areas (SPAs)' (SNH, 2016) which prescribes dispersal and foraging distances for a range of bird species, and allows for assessment of significance of the effects of temporary displacement/disturbance of bird species from the habitats within the Zol relative to the likely importance of these habitats as part of the broader ecological continuity in the environment. As such, the core foraging ranges of SPA birds as prescribed in this guidance document and their dominant feeding, roosting and breeding habitat associations are considered to determine the potential for the habitats within the 500m disturbance distance of the project to support SPA species.
- Given that there will be no in-stream works required, there will be no movement between the watercourses across the various river basins and there will be no pathway to introduce and therefore to spread invasive species, including the species crayfish plague (*Aphanomyces astaci*), recorded within the Powerstown Stream, along water courses. Therefore, there is no pathway to compromise the interconnected watercourses and associated aquatic ecosystems.
- Consideration is given to the potential for the habitats within the Zol of the Project to be part of the ecological continuity of habitat for otter. Otter (*Lutra lutra*) is a mobile species with a potential territory of 20 km in food poor areas e.g. upland streams (Marnell, et al., 2011). However, in areas with an abundance of food and other resources (as is the case in the River Barrow, ref. IFI WFD monitoring data) territories are smaller, with NPWS noting that 'otters only need to maintain small territories (1- 2km)' in such food-rich circumstances. As such, it is assumed that otter are likely to hold smaller territories in the Barrow catchment (where they are present).
- For bats, habitat continuity is defined having regard to the Bat Conservation Trust's (BCT) 'Bat Species Core Sustainance Zones and Habitats for Biodiversity Net Gain' (BCT, 2020) and a 2km landscape / ecological continuity zone is used.

11.4.4 Desktop Study

A desktop study was carried out to collate and review available information, datasets and documentation pertaining to the natural environment at and around site and the gas pipeline. The desktop resources used are detailed in the following sections.

³ Landscape connectivity is a combined product of structural and functional connectivity, i.e. the effect of physical landscape structure and the actual species use of the landscape.

⁴ Ecological connectivity is defined as a measure of the functional availability of the habitats needed for a particular species to move through a given area. Examples include the flight lines used by bats to travel between roosts and foraging areas or the corridors of appropriate habitat needed by some slow colonising species if they are to spread.



11.4.4.1 Designated and Protected Sites

11.4.4.1.1 European Sites

Special Areas of Conservation (SACs) and Special Protection Areas for Birds (SPAs) are designated under the EU Habitats Directive and EU Birds Directive, respectively and are collectively known as 'European sites'.

In relation to European sites, a Natura Impact Statement (NIS) has been prepared to provide the Competent Authority with the information necessary to complete an Appropriate Assessment of the Project in compliance with Article 6(3) of the Habitats Directive. The potential for likely significant effects on European Sites and adverse impacts on the integrity of European Sites is fully assessed within the AA Screening Report (AASR) and NIS, respectively, that accompany this application. The NIS was prepared in accordance with the following additional guidance:

- Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC. Official Journal of the European Union, C 437, 28 October 2021. Information and Notices: Volume 64. Commission Notice 2021/C 437/01, Brussels, (EC, 2021).
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin (2009, updated 2010) (DEHLG, 2009, updated 2010).
- Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC. European Commission. Brussels, (2019/C 33/01). OJ C 33, 25.1.2019 (EC, 2019).
- OPR Practice Note PN01 Appropriate Assessment Screening for Development Management, (OPR, 2021).

The assessments of the AASR and NIS are not iterated in this Biodiversity Chapter, only the pertinent findings and conclusions where appropriate.

The most recent GIS spatial datasets for designated sites were sourced from the NPWS website⁵ and a preliminary list of designated sites obtained, considering the relevant ZOI (Section 11.4.3) and the waterbody as mapped on the EPA mapping website⁶. Consideration was given to the impact sources, pathways and the ecological receptors for which the sites were designated to obtain a final list of designated sites for assessment.

11.4.4.1.2 National Sites

Natural Heritage Areas (NHAs) are designated under Section 18 the Wildlife (Amendment) Act 2000 and their management and protection is provided for by this legislation and planning policy. Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. Nationally designated Sites that are also designated as European Sites are considered as assessed under the European designations within the Appropriate Assessment Screening Report and NIS, with the relevant conclusions recorded and referenced in this chapter.

⁵ <https://www.npws.ie/maps-and-data/designated-site-data/download-boundary-data>

⁶ <https://gis.epa.ie/EPAMaps/Water>



11.4.4.1.3 Other Protected Sites

Other designated areas (sites designated under national and international agreements such as RAMSAR sites⁷ and UNESCO Biospheres⁸) and protected areas have also been considered where these lie within the Project's ZoI (500m maximum ZoI for potential disturbance in Section 11.4.3).

11.4.4.2 Habitats and Species

The desktop assessment involved obtaining data from various established and recognised sources, including:

- Various mapping and web-based data sources:
 - Aerial imagery of the proposed development through drone footage (2025) provided by Greengate Biogas
 - Tailte Éireann National Land Cover Map
 - OSI Aerial photography and 1:50000 mapping
 - Geological Survey Ireland (GSI) maps and data
 - OPW drainage and flood maps
 - Flora (Protection) Order Map Viewer – Vascular Plants, Charophytes and Lichen
 - Flora Protection Order Map Viewer – Bryophytes
 - Spatial data of EU Habitats Directive, Annex Habitats as per Article 17 Report (NPWS, 2025) - Terrestrial Habitats Storymap (only the 2019 mapping available at time of compilation)
 - Wetland survey Ireland wetland maps
 - GIS dataset for Irish Semi-natural Grassland Survey 2007-2012 (updated in 2025) and National Survey of Native Woodlands (updated in 2025).
- National Biodiversity Data Centre:
 - The NBDC website⁹ was most recently accessed on the 18 May 2026 to obtain historical (the last two decades) ecological data for the proposed development (2km² Grid S76E) and the gas pipeline (2km² grids S76D, S66Y, S66Z and S67V). The data has been summarised in Table A in Appendix 11.1 in Volume 3 of this EIAR.
 - The NBDC Bat Landscapes tool¹⁰ was used to obtain species-specific information for bats, last accessed in March 2026.
- Botanical Society of Britain and Ireland (BSBI)
 - BSBI Plant Atlas 2020¹¹ was last accessed April 2026 and has been summarised in Table B in Appendix 11.1 in Volume 3 of this EIAR.
- National Parks and Wildlife Services:
 - A request for sensitive species information was sent on 20 January 2026. The data was received the 14 April 2026. None of the records fall within the proposed development's 2km² Grid S76E and records are only relevant to the gas pipeline. The relevant information has been incorporated and addressed.
- Bat Conservation Ireland:
 - The BCI were contacted on the 20 March 2026 via e-mail to request bat data for a 10km search radius from proposed development which encompasses the gas pipeline. The data was received the 24 March 2026 and has been incorporated into the impact assessment.
- Birdwatch Ireland: The Irish Wetland Bird Survey (I-WeBS):

⁷ <https://www.irishwetlands.ie/irish-sites/>

⁸ <https://www.ireland.ie/en/oecd-unesco/paris/ireland-and-unesco/biospheres/>

⁹ Generated reports at <https://maps.biodiversityireland.ie/Map> for the relevant 2km² grids

¹⁰ Access the 'Bat Landscapes' layer at <https://maps.biodiversityireland.ie/Map>

¹¹ Available at: <https://plantatlas2020.org/>



- I-WeBS Data Request was made via e-mail on the 22 January 2026 and the information received has been incorporated into the desktop assessment and the species lists are presented in Table C, Table D and Table E of Appendix 11.1 in Volume 3 of this EIAR, indicating species recorded in sub-sites along the River Barrow upstream, alongside and downstream of site respectively.
- Carlow County Heritage Officer:
 - A request was submitted with the Heritage Officer pertaining to any information on barn owls that may be utilising the surrounds on 20 January 2026. The barn owl survey report (Cully, et al., 2023) was provided to facilitate the desktop assessment.
- Inland Fisheries Ireland
 - Historical fish records and data was obtained from the IFI's website accessed on the 20 January 2026¹² and is summarised in Table F of Appendix 11.1 in Volume 3 of this EIAR.
- EPA catchment data¹³, including Q values¹⁴ and EPA Maps¹⁵ and associated information links:
 - The Q values for the River Barrow from upstream to downstream monitoring stations accessed the 21 January 2026, as summarised in Table G of Appendix 11.1 in Volume 3 of this EIAR.
 - The EPA maps was used for WFD and EPA information related to hydrology and hydrogeology.

11.4.5 Field Study

The field surveys were designed following the findings of the desk study and scoping consultation. Table 11-2 provides details of the surveys undertaken at the proposed development and along the proposed gas pipeline route (referred to as the gas pipeline). Table 11-2 also indicates the dates surveys were undertaken and the ecological survey areas relevant to each specialist study (referred to generally as the survey area in this Biodiversity Chapter). Survey methodologies are set out in the sections below the table.

Table 11-2: Ecological surveys undertaken within the defined survey areas by the Fehily Timoney and Company ecologists (unless otherwise indicated)

Ecological Survey	Site	Gas pipeline
Habitats & flora species, including invasive species	29 May 2025 13 & 14 May 2026 Encompassed semi-natural and natural habitats within 500m buffer.	23-25 Sep 2025 Encompassed 10m buffer where natural/seminatural/linear habitat was present, supported by aerial imagery
Mammals	5 Mar 2025 29 May – 11 Jun 2025: trail camera deployed at potential sett entrance Encompassed 150m buffer where natural/seminatural/linear habitat was present	23-25 Sep 2025 Encompassed 150m up and downstream of crossings IDB1 to IDB6
Potential bat roost features / GLTA	29 May 2025 Encompassed immediate neighbouring features	23-25 Sep 2025 Encompassed immediate neighbouring features

¹² Obtained from the 'WFD Fish Ecological Status for Rivers, Lakes and Transitional Waters 2008 to Recent' accessed from 'Apps & Maps' at <https://opendata-ifigeo.hub.arcgis.com/>

¹³ <https://www.catchments.ie/data/>

¹⁴ <https://epawebapp.epa.ie/qvalue/webusers/>

¹⁵ <https://gis.epa.ie/EPAMaps/>



Ecological Survey	Site	Gas pipeline
Bat roost emergence surveys - buildings and structures	10-12 Mar 2026 and 24 th June 2026 Encompassed immediate neighbouring features	10-12 Mar 2026 Inspection of existing bridges including the Cardinal Moran Bridge (IDB2)
Static bat detector	29 May - 11 Jun 2025 12 Aug - 4 Sep 2025 23 Sep - 7 Oct 2025	N/A (emergence surveys were completed at suspected roosts)
Bat Activity Surveys	26 Jun 2025 4 Sep 2025 29 Sep 2025 Completed as night-time bat walkovers (NBW)	23 Sep 2025, 19:08 to 21:23 (sunset at 19:23) Completed as emergence surveys at the Cardinal Moran Bridge (IDB2)
Bird Vantage Point Surveys	Completed by external specialist Cian Cardiff 15 May 2025 10 & 30 Jun 2025 29 Jan 2026 4 Feb 2026 3 Mar 2026	N/A
Breeding Bird Surveys	14 May 2025 2 Jun 2025 27 Jun 2025 Transect surveys at the proposed development and Kilcarrig quarry (completed by external specialist, Cian Cardiff)	Riverine bird assessments were completed as part of the river habitat and aquatic surveys (see below).
Raptor Surveys	14 May 2025 2 Jun 2025 27 Jun 2025 Completed by external specialist Cian Cardiff at potential suitable areas within 2km of the site and the gas pipeline (Clonmelsh quarry, Clogrennane Woods, Clogrennane quarry, Milford Park and a section of the L3045 Powerstown)	
Barn Owl Nesting Suitability	10-12 Mar 2026	N/A
Sand Martin Nesting Site	19 Mar 2026: Preliminary assessment of suspected breeding site Follow-up monitoring in early breeding season on: 13, 23 & 27 Apr, 05, 14, 20 & 26 May 2026	N/A
Wintering Bird Surveys	Completed by external specialist Cian Cardiff within the proposed development and adjacent quarry 16 Jan 2026 13 Feb 2026 7 Feb 2026	See Hinterland Surveys below



Ecological Survey	Site	Gas pipeline
Hinterland Bird Surveys	Completed by external specialist Cian Cardiff. Hinterland surveys along the River Barrow near proposed development and the gas pipeline. These surveys are less restricted by survey timing and followed the intertidal survey methodology (four hour survey period) 16 Jan 2026 29 Jan 2026 4 Feb 2026 13 Feb 2026 7 Mar 2026	
River habitat survey, including Invasive species; Aquatic species (fish and macro-invertebrates); Otters; Kingfishers; and riverine birds	29 May 2025 Powerstown Stream was surveyed as part of overall habitat survey. 10-12 Mar 2026 Follow up survey of the length of the Powerstown Stream 150m up- and down-stream of the R448 road crossing.	23-25 Sep 2025 Encompassed 150m up and downstream of crossings IDB1 to IDB4 to identify suitable fisheries / mammal / bird habitat within the river. 10-12 Mar 2026 Follow up survey of the crossings IDB1 to IDB4.
Herpetofauna	5 Mar 2025: habitat suitability assessment 19 Mar 2026: Reptile survey refugia (corrugated roofing sheets) placed on site Monitoring of refugia completed on: 13, 16, 21, 23 & 27 Apr, 05, 14, 20 and 26 May, 02 June 2026	Habitat suitability for species as part of the overall surveys carried out along the gas pipeline.

During surveys, any ecological features or species encountered were recorded, even if these were not part of the targeted surveys.

During surveys all points of interests, animal sightings, linear features and habitat areas were captured directly into GIS application, ArcGIS Field Maps, with appropriate ecological technical notes and observations. This was directly available on ArcGIS Pro for analysis and assessment.

In general, weather conditions did not hamper or affect ecological surveys, but the frequent storms and severe flooding did influence scheduling of surveys (detailed under the limitations, Section 11.4.7).

11.4.5.1 Habitats and Flora

All habitats were initially delineated based on desktop assessment and detailed drone survey and OSI Aerial photography (Section 11.4.4.2). The habitat survey area was assessed (where access was permissible) (Table 11-2) using methodology based on the Heritage Council's Best Practice Guidance for Habitat Survey and Mapping (Smith, et al., 2011) and the Good Practice Guidance for Habitats and Species (CIEEM, 2021).



The classification of habitats recorded during the field survey is based on the A Guide to Habitats in Ireland (Fossitt, 2000). The guide classifies habitats according to a hierarchical framework with Level 1 habitats representing broad habitat groups, Level 2 representing habitat subgroups and Level 3 representing individual habitat types. The field survey focused on identifying habitats to Level 3 of the 'Guide to Habitats in Ireland'. Any other records of interest (e.g., invasive plant species) were also marked on ArcGIS Field Maps. The DAFOR scale was used to record species abundance within relevés: Dominant, Abundant, Frequent, Occasional and Rare (DAFOR). All species were readily identifiable during the survey. Plant nomenclature for vascular plants follows 'New Flora of the British Isles' (Stace, 2019), while mosses and liverworts nomenclature follow 'Mosses and Liverworts of Britain and Ireland - a field guide' (British Bryological Society, 2010).

Each habitat was assessed for its ecological significance based on the NRA guidelines (TII, 2009, republished 2025) and its suitability to support protected species. A survey was undertaken for FPO and rare and threatened red-listed plant species. Where appropriate, vegetation was sampled by taking botanical quadrats/relevés which were undertaken to analyse potential links with Annex I habitat types. The Interpretation Manual of European Union Habitats (EC, 2013) and NPWS Article 17 report (NPWS, 2025) were used to evaluate whether links with Annex I habitats exist.

During habitat surveys, a search for non-native invasive species was undertaken. The survey focused on the identification of invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (as Amended).

11.4.5.1 Non-Volant Mammals

Mammal surveys included recording sightings, tracks or any other signs of mammals (scat, feeding signs, otter slides, mammal pathways, resting sites, including badger setts, otter holts and otter couches) in mammal surveys areas (Table 11-2) to determine the likely presence of protected mammal species and habitat suitability to support protected mammal species. Badger surveys focussed on the proposed development and gas pipeline and otter surveys focussed on the aquatic survey areas (Section 11.4.5.6) (Figure 11-1).

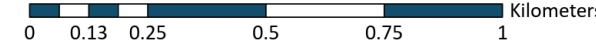
Based on the findings of desktop assessment, the following dedicated surveys were undertaken in addition to general ecological walkover [as per the 'Ecological Surveying Techniques for Protected Flora and Fauna During the Planning of National Road Schemes' (TII, 2008, republished 2025) and the 'Common Standards Monitoring Guidance for Mammals' (JNCC, 2004)]:

- Badger survey in accordance with 'Surveying Badgers' (Harris, et al., 1989)
 - This was supported further with the deployment of a trail camera under licence 008/2025 at a potential sett entrance (Figure 11-2) for two weeks in early summer (Table 11-2)
- Otter survey in accordance with 'Monitoring the Otter *Lutra lutra*' (Chanin, 2003) and the National Otter Survey of Ireland 2010/12 (Reid, et al., 2013)
- Hedgehog survey in accordance 'The New Hedgehog Book' (Morris , 2006)

NBDC data shows historical records for red squirrel around the gas pipeline, and pine martin with 1-3km of the pipeline; none in the vicinity of the proposed development. The proposed development does not provide habitat to support these mammals. Isolated suitable habitat is present along the gas pipeline for these species, but none of these habits, nor the linear ecological features that link these habitats, will be affected by the proposed gas pipeline and no other targeted surveys were required.



TITLE:	Mammal Survey Areas			FIGURE NO:	11.1	
				CLIENT:		
PROJECT:	Powerstown Bioenergy			SCALE:	1:16,000	REVISION: 0
				DATE:	01/07/2026	PAGE SIZE: A3





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11.4.5.2 Bats

Bat surveys encompassed preliminary roost assessments, roost inspections, emergence surveys and activity surveys (transects and static detector deployment). The suite of bat surveys undertaken and the timing of surveys is provided in Table 11-2.

All bat surveys followed guidance from 'Bat Surveys for Professional Ecologists: Good Practice Guidelines' (4th edition) (Collins, 2023).

11.4.5.2.1 Preliminary Roost Assessment Surveys and Ground-Level Tree Assessment

A preliminary assessment was done at the proposed development and immediate neighbouring areas and along the gas pipeline for the potential suitability to support roosting habitats in structures and providing potential flightpaths or foraging habitats. A ground level tree assessment (GLTA) was completed as part of the preliminary survey.

Surveyors utilised the assessment criteria described in Collins (2023) which provides guidelines for assessing potential suitability of the proposed development and the gas pipeline for bats and inform other surveys that may be required based on the initial findings in context of the Project.

The findings of the preliminary survey indicated that there will be no destruction of any features of importance to bats due to the Project (further detailed in Section 0) and further surveys were considered to inform the potential effects of disturbance to bats due to the Project, which included:

- Bat activity surveys which were completed as nighttime bat walkovers and deployment of static bat detectors along the proposed development perimeter.
- Bat activity survey completed as an emergence survey at the Cardinal Moran Bridge (IDB2) along the gas pipeline.
- External and internal roost inspection surveys (where access was permitted) for structures neighbouring the RLB of the proposed development.

11.4.5.2.2 Night-time Bat Walkovers

Bat activity surveys were undertaken by two surveyors using a handheld BATLOGGER M2. Surveyors walked the proposed development boundary where treelines and hedgerows were more likely to support bats as flightpaths.

11.4.5.2.3 Static Bat Detector Surveys

Static bat deployments were completed in accordance with NatureScot (2021) and NIEA (2024) guidance, using full-spectrum Song Meter SM4BAT detectors mounted ~2 m above ground. Detectors were deployed to ensure 5 nights recorded within good weather on three occasions across spring to autumn seasons (Table 11-2), recording from 30 minutes before sunset to 30 minutes after sunrise. Recorded bat passes represent relative activity levels rather than individual bats.



A static bat detector was deployed in the scrub area (Figure 11-2) connected to and adjacent the hedgerow / treeline along the northern boundary of the proposed development. The scrub area was the more significant potential forage area in the development footprint that was fully connected to the treeline / hedgerow / scrub surrounding the perimeter of the proposed development and to the regional landscape. There were no roads adjacent to this northern ecological corridor, which abutted the old landfill to the north and was considered the more likely linear ecological feature to support commuting/foraging bats on and around proposed development.

11.4.5.2.3.1 Static Data Assessment

All static recorders use Real Time recording to record bat echolocation calls which is analysed using designed software (Kaleidoscope and Bat Explorer) to auto-identify the bat calls. These auto-identifications are reviewed, proportionally based on rarity and / or uniqueness of bat call (for example distinct bat calls are more likely to be identified correctly and a smaller proportion of these calls are reviewed).

All static data is then analysed using the Ecobat online tool, which compares nightly bat activity against a national reference dataset to provide percentile scores and classifies activity levels (low, moderate, high).

11.4.5.2.4 Bat Emergence Surveys

Emergence surveys were undertaken along the gas pipeline, at the Cardinal Moran Bridge (IDB2) (Table 11-2). Two surveyors with bat detectors were positioned up- and down-stream of the crossing, beginning their observation of the bridge 15 minutes before sunset and finishing two hours after sunset.

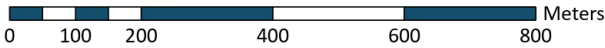
11.4.5.2.5 Roost Inspections

Where access was granted and it was safe to do so, an external and internal roost inspection survey was completed of the structures adjacent to the RLB (Figure 11-2). Where access was not granted to privately-owned lands, external visual survey was completed where visible.

A systematic survey was completed of the exterior of the structure, followed by an internal survey of the structures adjacent to the RLB of the proposed development (Collins, 2023). This included checking for signs of bats and endoscopic exploration of crevices and cracks where accessible (Licence No. 032/2026 to photograph wild animals). An additional emergence survey was undertaken on the old stone buildings (Location B) located 15m south of the proposed development boundary (-6.95538, 52.76213) given the outcome of the initial inspection survey.



TITLE: Bat Ecological Survey Locations	FIGURE NO: 11.2	
	CLIENT: 	
PROJECT: Powerstown Bioenergy	SCALE: 1:11,500	REVISION: 0
	DATE: 01/07/2026	PAGE SIZE: A3



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11.4.5.3 Birds

11.4.5.3.1 Vantage point Surveys

Vantage Point Surveys (VPS) (Table 11-2) used methodologies described in 'Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms' (Scottish Natural Heritage, 2017) to identify bird activity in and immediately around proposed development, monitor flight activity within, through and over the proposed development. Surveys were conducted from no. 1 fixed vantage point (Figure 11-3) with comprehensive coverage of the proposed development and conducted from January 2025, which was when ecological surveys were initiated, to June 2025, the end of the breeding bird survey season (Table 11-2).

11.4.5.3.2 Breeding Birds Surveys

Breeding Bird Surveys (BBS) consolidated methodologies set out in (O'Brien, et al., 1992), (Gilbert, et al., 1998), (Brown, et al., 1993), the Bird Survey Guidelines¹⁶ and Bird Watch Irelands Countryside Bird Survey (CBS) Manual¹⁷. The surveys included daytime walkovers within the proposed development along transects (Figure 11-3), including lowland breeding waders (e.g., snipe, curlew and lapwing) over three consecutive breeding months (Table 11-2).

Although sand martins were recorded as part of the overall seasonal surveys, a known sand martin breeding site east of the proposed development, was inspected for signs of nesting and briefly monitored in the early breeding season of 2026 (Table 11-2) for potential breeding activity in the area.

Given the nature of the activity of the gas pipeline, birds were recorded as part of the overall ecology surveys carried out along the gas pipeline. In addition to this, dedicated survey of riverine birds (kingfisher, dipper and grey wagtail) and habitat suitability for riverine birds was completed at the crossings (Figure 11-3) as part of the aquatic ecology surveys (Section 11.4.5.6).

11.4.5.3.3 Breeding Raptor Surveys

Dedicated breeding raptor were undertaken in accordance with the 'Raptor Monitoring Methods' (Hardey, et al., 2013) over three consecutive breeding months (Table 11-2) in areas of suitable raptor habitat surrounding the proposed development and included Clonmelsh quarry, Clogrennane Woods, Clogrennane quarry, Milford Park and a section of the L3045 Powerstown overlooking the surrounding landscape (Figure 11-3).

'Survey and Mitigation Standards for Barn Owls to inform the Planning, Construction and Operation of National Road Projects' (TII, 2021) informed survey methodology, which included a survey of potential structures (the quarries were assessed as part of the breeding raptor surveys) that could provide nesting opportunities for barn owls within the 500m (Table 11-2 and Figure 11-3) of the proposed development. Where access was possible /granted the structures were also assessed externally and internally for any evidence of use or signs of barn owls.

11.4.5.3.4 Winter Birds Surveys and Hinterland Surveys

Winter Bird Surveys (WBS) comprised transect walkover surveys of the proposed development and the adjacent quarry to the south, which provided alternative habitats for species likely to utilise the site (Table 11-2).

¹⁶ The bird survey methodologies are described in the methods accessed via <https://birdsurveyguidelines.org/>

¹⁷ Accessed via <https://birdwatchireland.ie/publications/cbs-counter-manual/>



Hinterland surveys accompanied the WBS (Table 11-2), with VPS focussing on habitats in the area surrounding the proposed development and the gas pipeline along the River Barrow (Figure 11-3). Given that these habitats support wetland habitats, the surveys adopted methodologies for Wetland Bird Surveys (WeBS) described in the Bird Survey Guidelines¹⁶ and more specifically the Irish Wetland Bird Surveys (I-WeBS)¹⁸.

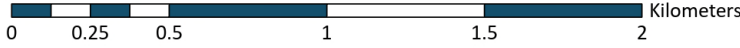
11.4.5.3.5 Riverine Birds

Suitability for and signs kingfisher, wagtail and dipper was specifically surveyed and recorded where observed.

¹⁸ Irish Wetland Bird Surveys information can be access at [Irish Wetland Bird Survey](http://www.fehilytimoney.ie) website



TITLE: Bird Survey Vantage Points and Transects	FIGURE NO: 11.3	
	CLIENT: 	
PROJECT: Powerstown Bioenergy	SCALE: 1:24,000	REVISION: 0
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11.4.5.4 *Herpetofauna*

Surveys focussed on the presence of species by determining the suitability of habitats followed by potential presence of species on site and immediate surrounds (within 250m of the proposed development). A site walkover was completed (Table 11-2), recording suitable habitats for reptiles and breeding and foraging habitat for amphibians (Figure 11-4), including intensified search for any signs of frogs and newt (eggs, spawn, juveniles) in any suitable habitats encountered. Methodology drew on guidelines for herpetofauna surveys from the National Roads Authority's ecological survey guidelines (TII, 2008, republished 2025) and the Herpetofauna Workers' Manual (Gent, et al., 2003), and also informed by the Reptile Habitat Management Handbook (Edgar, et al., 2010).

A water sample was collected for eDNA assessment of amphibians that may be using the ephemeral pools on site (Figure 11-4). The methodology used was taken from the testing facilities (Surescreen Scientifics) website¹⁹ and having regard to 'An evidence review for great crested newt eDNA monitoring protocols' (Rees, et al., 2023) and ISO/AWI 26488 Water quality — Extraction of aquatic environmental DNA (eDNA) from filters (Working Draft)²⁰.

Additional surveys were carried out in habitats considered suitable for herpetofauna:

- Reptile refugia (Figure 11-4) were placed in habitat identified as potentially suitable for reptiles on 19 March 2026 and left to colonise for three to four weeks. Ten follow-up inspections were completed, twice a week (when weather conditions were near to sunny but cool) over April and May 2026 (Table 11-2). This included a binocular survey of potential basking reptiles followed by lifting the sheets to see if they are occupied by lizards. The reptile refugia were removed on the last inspection, 02 June 2026.



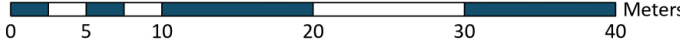
Plate 11-1: Sample of reptile refugia placed on site for reptile trapping and surveying

¹⁹ <https://www.surescreenscientifics.com/forensic-ecology/edna/>

²⁰ <https://www.iso.org/standard/93654.html>



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			CLIENT:			
PROJECT:	Powerstown Bioenergy		SCALE:	1:500	REVISION:	0
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11.4.5.5 *Terrestrial Invertebrates*

Dedicated invertebrate assessment were not completed. However, during surveys, any rarely encountered invertebrates and invertebrates related to specific interest groups (Lepidoptera, Hymenoptera, Odonata, Orthoptera and Coleoptera) were noted.

Species that were identified through the desktop assessment and consultation process were discussed where information on the species are available.

Habitats were assessed for suitability to support rare, threatened or protected invertebrate species.

11.4.5.6 *Aquatic Ecology*

No water courses are present within the proposed development. The Powerstown Stream is located 200m north of the proposed development and confluences with the River Barrow approximately 480m west of the R448. The proposed development is within a topographical depression and does not contribute to this stream through runoff. There is no direct path for construction stage runoff from the proposed development to the local watercourses.

The only circumstances for connectivity to the local watercourses during operation is when storm water will be directed from the proposed development to the Powerstown Stream. This will only occur rarely during the operational phase where a 1 in 30-year storm event coincides with circumstances where the stormwater lagoon and fire and process water tanks are full. This storm water will be collected in a segregated drainage network and will be passed through treatment systems (petrol/oil interceptor and settlement in the lagoon) and released at greenfield runoff rates via controlled discharge arrangements. The discharge will be in accordance with limits set under the Industrial Emissions (IE) Licence which must be obtained from the EPA for the operation of the facility. The Powerstown Stream was surveyed for 150m upstream and down-stream of the R448 road crossing (where the stormwater will discharge to the stream via the existing drain).

The gas pipeline will cross over the River Barrow at the Cardinal Moran Bridge (IDB2) and three tributaries (crossings IDB1, IDB3 and IDB4) of the River Barrow, and two land drains (IDB5 and IDB6) as detailed under Section 11.2. The River Barrow, the three tributary crossings and the two land drains on the proposed gas pipeline route were surveyed 150m upstream and downstream.

Survey methodology included an upstream to downstream walkover of the watercourses, following Check-Clean-Dry biosecurity measures, to characterise the river habitats. Wading with a bathyscope was completed to assist in determining stream characteristics of importance to aquatic ecology. The surveys were in accordance with the following standards and guides:

- River habitat assessment and hydromorphology assessment (RHAT) in accordance with BS EN 14614:2004 & (Murphy, et al., 2014).
- River habitat survey (RHS) in Britain and Ireland published by the Environmental Agency RHS guidelines^{21&22}.

²¹ https://www.ceh.ac.uk/sites/default/files/files/rhs_guidance.pdf

²² <https://www.riverhabitatsurvey.org/manual/>



- Assessment of correlation to Annex I habitat 'Watercourses of plain to montane levels with the *Ranunculion fluitantis* and Callitriche-Batrachion vegetation' was made against The Interpretation Manual of European Union Habitats - EUR28 (EC, 2013).
- Visual assessment for the presence of aquatic invasive alien species listed on the Third Schedule of the European Communities (Birds & Natural Habitats) Regulations 2011 as amended (S.I. No. 477 of 2011).
- Habitat appraisal, specifically focusing on salmonids *Salmo* spp. (Hendry, et al., 2003), lamprey *Lampetra* spp. (Maitland, 2003), white-clawed crayfish *Austropotamobius pallipes* [(Holdich, 2003) and (Peay, 2003)] and freshwater pearl mussel *Margaritifera margaritifera* (Skinner, et al., 2003).

The two land drains (IDB5 and IDB6) were inspected but dry at the time of the inspections in May 2026.

11.4.6 Evaluation of Ecological Resource

The value of the ecological resources/receptors was evaluated using the ecological evaluation guidance given in the TII guidance on assessment of ecological impacts of National Road Schemes (TII, 2009, republished 2025).

This guidance provides ratings for resources based primarily on geographic context and allows for resources to be valued at International, National, County and Local (higher and lower value) levels. Key ecological receptors (for assessment) are those deemed to be above the 'Local Importance (lower value) evaluation.

11.4.6.1 *Assessing Effect Significance*

Once the value of the identified ecological receptors (features and resources) is determined, the next step is to assess the potential effect or impact of the Project on the identified key ecological receptors.

Assessment of effects considers construction, operational and decommissioning effects with reference to the potential for direct, indirect and cumulative effects. The assessment also takes account of any residual effects that may persist following the implementation of any mitigation or best practice design.

The characterisation of effects reflects the ecological structure and function upon which the key ecological receptors depend. Detailed assessment of effects considers the magnitude of effects affecting populations.

This Biodiversity Chapter uses the EPA classification (EPA, 2022) of effects in order to describe the quality, significance, duration and type of effect.

The ecological significance of the effects is determined following the precautionary principle and in accordance with the methodology set out in Section 5 of CIEEM (CIEEM, 2018), whereby an ecologically significant effect is an effect that either supports or undermines biodiversity conservation objectives for important ecological features or for biodiversity in general through impacts on the ecological structure and function. 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).

When determining significance, consideration is given to whether:

- Any processes or key characteristics of key ecological receptors will be removed or changed
- There will be an effect on the nature, extent, structure and function of important ecological features
- There is an effect on the average population size and viability of ecologically important species



- There is an effect on the conservation status of important ecological habitats and species

11.4.6.1.1 Assessment of Cumulative Effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period or concentrated in a location (CIEEM, 2018). Different types of actions can cause cumulative impacts and effects. As such, these types of impacts may be characterised as:

- Additive/incremental – in which multiple activities/projects (each with potentially insignificant effects) add together to contribute to a significant effect due to their proximity in time and space (CIEEM, 2018); and,
- 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.

11.4.7 Survey Limitations

Surveys at the proposed development and along the gas pipeline were undertaken during optimal conditions. Bat activity and emergence surveys in particular were undertaken during periods of calm winds and no rainfall.

Ground level tree assessments (GLTAs) were completed on the 29 May 2026 for the gas pipeline and foliage and ivy may have obscured visibility of potential roost features (PRFs). Considering that no trees will be removed and the pipeline construction works at a specific location will generally be completed within a single day this is not considered a significant limitation.

Several storms and flooding in November to December 2025 and January 2026 caused delays in targeted surveys. The River Barrow and the tributaries were flooded inundating and flooding the survey areas making them unsafe and inaccessible for surveying. This affected bat winter roost surveys. The bat winter roost surveys were delayed to early March 2026. This is considered adequate in terms of the surveys and survey findings and is not considered a limitation to the outcome of this Biodiversity Chapter.

For breeding bird surveys at the proposed development, the surveyor was unable to start at sunrise due to the site being locked at that time of day. Surveys commenced around 8am once access was obtained and surveys were completed on site before 11am which is in accordance with the standard best practice methodology, and as such is not a limitation to the findings of the assessment.

eDNA results should be considered in terms of the following: eDNA can be released into the environment through other organisms, for example through predator scat, direct drop by predator, dislodging from fur / feathers, through bathing/wading in water. The eDNA can also be spread through the environment and transported across several kilometres (or hundreds of kilometres) by various means such as humans (boots, vehicles, boats and equipment), other animals (bloodsucking fauna, predator scat) or stream flow (Deiner, et al., 2014).

Other than the surveys discussed above, all surveys were completed in appropriate seasons and under appropriate weather conditions.



11.5 Baseline Environment

The following sections describe the results of the assessment of available published material that was carried out as part of the desk study coupled with the findings of ecological field surveys which were conducted to establish the current state of the environment (baseline scenario) and the likely evolution thereof through natural changes.

The wider environmental setting of the site is considered rural, with land uses in the 500m ZoI consisting of quarries (including the proposed development and Kilcarrig Quarry south of proposed development), a covered landfill (north and adjacent of proposed development), agricultural lands (south, east and west of the proposed development), the recycling facility east and adjacent of proposed development and the nearby flood zone of the River Barrow across and west of the local R448 road.

The proposed development comprises a historical quarry which is partially filled and levelled (western extent) and vegetation is colonizing this area, with active areas in the eastern and northern extents. An application was granted for the change of use from a quarry to recovery activities over the remaining active quarry areas (northern and eastern extents of the proposed development). The area is surrounded by a mixture of treelines, hedgerows and scrub on embankments which will be retained *in situ*, with grassy and scrubby areas encroaching into limited areas within the site.

Chapter 1 Introduction in Volume 2 of this EIAR provides the planning and development history of the site. With the implementation of the consented conditions the site would have been infilled and profiled to obtain restoration levels (still lower than original topography) and blend with the surrounds, with soil deposited in preparation for seeding for grassland establishment, with the aim of returning the site to agricultural use. The entire site is at a lower topography than the surrounding properties and all water falling onto the is retained on site, with no direct interaction with the surrounding hydrological regime.

The site supports ephemeral wet areas of ponding which are noted not to be connected to other nearby wetland survey sites in Kilcarrig Quarry (POWERSTOWN QUARRY PONDS SOUTH and POWERSTOWN POND), or the wet woodland areas east of site (POWERSTOWN FEN and POWERSTOWN NORTH; the latter >500m from site).

The gas pipeline is within built environment over the entirety of its length, including for HDD under the River Barrow and drains, and HDD under the M9 motorway where the entry and exit pits will be in-road. The adjacent areas include a variety of habitats, but dominated by hedgerows, treelines, agricultural grassland and wooded areas. At the watercourse crossing the habitats also include scrubs, wet wooded areas and amenity grasslands alongside the rivers and reedbeds.

11.5.1 Designated Sites

11.5.1.1 European Sites

An Appropriate Assessment (AA) Screening Report (AASR) and Natura Impact Statement (NIS) have been completed to appraise the likely significant effects of the Project either alone or in combination with other plans or projects on European sites; these accompany this planning application. Figure 11-5 show the locations of the European sites relative to the location of the proposed development and the gas pipeline.

As indicated in Section 11.4.3, only the River Barrow and River Nore SAC is within the ZoI of the Project.



11.5.1.1.1 Special Areas of Conservation (SACs)

SACs are protected under the European Union (EU) 'Habitats Directive' (92/43/EEC), as implemented in Ireland by S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) and Part XAB of the Planning and Development Act 2000 (as amended).

Only one SAC is within the potential ZOI of the project: the River Barrow and River Nore SAC (002162). The Site Synopsis Report (2024)²³ describes the River Barrow and River Nore SAC as consisting of the freshwater stretches of the Barrow and Nore River as far upstream as the Slieve Bloom Mountains and as far downstream as Creadun Head in Waterford, passing through eight counties, including Carlow.

The Site Synopsis Report states the SAC to be of considerable conservation significance due to the occurrence of good habitat examples and plant and animal populations listed on Annexes I and II of the E.U. Habitats Directive, including the occurrence of several red-listed plant species. It is also of high conservation value for bird populations. QIs for the SAC that have been fully assessed within the NIS include:

- Annex I habitats: Estuaries [1130]; Mudflats and sandflats not covered by seawater at low tide [1140]; Reefs [1170]; Salicornia and other annuals colonising mud and sand [1310]; Atlantic salt meadows (*Glaucopuccinellietalia maritima*) [1330]; Mediterranean salt meadows (*Juncetalia maritimi*) [1410]; Water courses of plain to montane levels with the *Ranunculus fluitantis* and Callitricho-Batrachion vegetation [3260]; European dry heaths [4030]; Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]; Petrifying springs with tufa formation (Cratoneurion) [7220]; Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] and Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0].
- QI flora species: Killarney fern (*Trichomanes speciosum*) [1421].
- QI fauna species: Desmoulin's whorl snail (*Vertigo moulinsiana*) [1016]; freshwater pearl mussel (*Margaritifera margaritifera*) [1029]; white-clawed crayfish (*Austropotamobius pallipes*) [1092]; sea lamprey (*Petromyzon marinus*) [1095]; brook lamprey (*Lampetra planeri*) [1096]; river lamprey (*Lampetra fluviatilis*) [1099]; Twaite shad (*Alosa fallax*) [1103]; Atlantic salmon (*Salmo salar*) [1106]; and otter (*Lutra lutra*) [1355].

The Project is located entirely within the Barrow (14) WFD catchment in the middle reaches of the River Barrow. The SAC boundary is located c. 20m west of the site and the River Barrow is 300m west of the proposed development site boundary. The gas pipeline leaves the proposed development site and remains within the existing R448 road, adjacent to the eastern boundary of the SAC and crossing through the SAC by HDD under the River Barrow at the Cardinal Moran Bridge, with HDD entry and exit points located within the road.

There are no other SACs within the ZOI of the Project.

11.5.1.1.2 Special Protection Areas (SPA's)

SPAs are designated under the EU Birds Directive (2009/147/EC) ('The Birds Directive').

Having regard to SNH, 2016 'Guidance on Assessing Connectivity with Special Protection Areas (SPAs)', an initial study area of 30km was adopted (based on core foraging range protected bird species).

²³ <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY002162.pdf>



The closest SPA to the Project is the River Nore SPA (004233) located 21.5km southwest from the site and 19.1km southwest from the gas pipeline route. The SCI for this SPA is Kingfisher (*Alcedo atthis*). The kingfisher remains within its riverine range, and its conservation objectives (NPWS, 2024a) indicate limited movement within the riverine range (<9km) (NPWS, 2024). There is no connectivity or habitat continuity between the Project and this SPA.

No potential hydrological, ecological or landscape connectivity was determined for any SPA; none of the identified SCI bird species are part of QI populations given the distance of SPAs from site and known forage ranges of birds.

11.5.1.2 National Sites

Sites of National Importance in Ireland are termed NHA and pNHA. One NHA and 23 pNHAs are present within 15 km of the proposed development: Coan Bogs NHA (002382), Archersgrove pNHA (002051), Ardalo Fen pNHA (000821), Ardristan Fen pNHA (000788), Ballylynan pNHA (000857), Ballymoon Esker pNHA (000797), Barrow Valley At Tankardstown Bridge pNHA (000858), Blackstairs Mountains pNHA (000770), Bunclody Slate Quarries pNHA (000750), Cloghrick Wood pNHA (000806), Clohastia pNHA (000830), Corballis Hill (001389), Dunmore Cave pNHA (000401), Dunmore Complex pNHA (001859), Esker Pits pNHA (000832), Grand Canal pNHA (002104), Holdenstown Bog pNHA (001757), John's Hill pNHA (000808), Lough Macask pNHA (001914), Mothel Church, Coolcullen pNHA (000408), Newpark Marsh pNHA (000845), Oakpark pNHA (000810), Red Bog, Dungarvan pNHA (000846), Slaney River Valley pNHA (000781), and Whitehall Quarries pNHA (000855). The locations of these sites relative to the Project is shown on Figure 11-5.

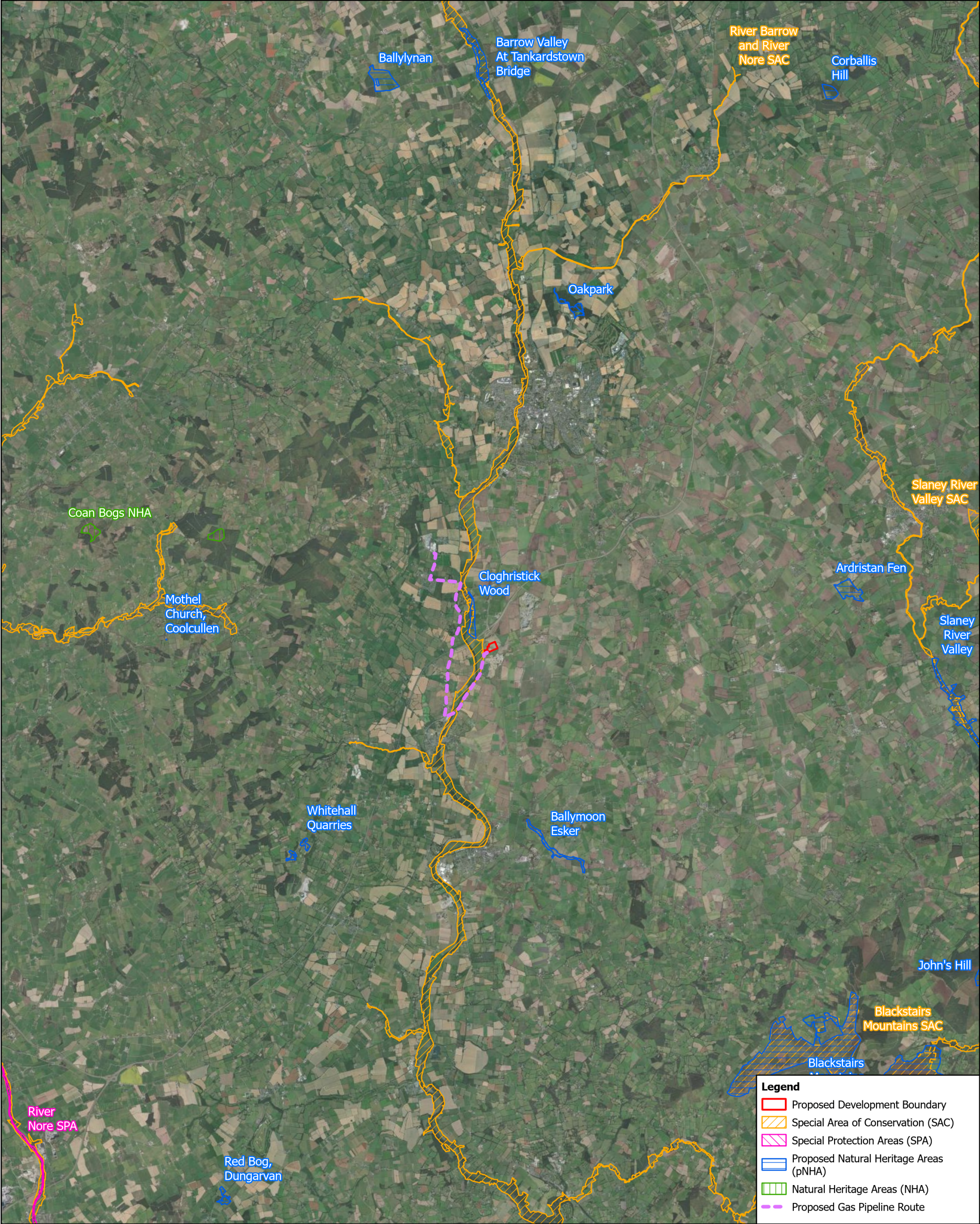
These sites were examined for potential Source-Pathway-Receptor (S-P-R) connectivity with the Project. No potential hydrological, ecological or landscape connectivity was determined for Coan Bogs NHA. No potential connectivity was determined for any of the pNHAs, other than Cloghrick Wood pNHA which is considered further hereunder.

Cloghrick Wood pNHA is located c. 470m northwest of the proposed development. The wide floodplain is occupied by a variety of coniferous and deciduous trees including oak (*Quercus spp.*), beech (*Fagus sylvatica*), hazel (*Corylus avellana*) and willows (*Salix spp.*)²⁴. This site contains Alluvial woodland* - Annex I habitat type code 91E0, mapped in Article 17 reporting. This habitat measures 1.8 ha, while the pNHA measures a total of 21.3 ha. As per the Site Synopsis report²⁴, Cloghrick Wood is of value as it is a typical example of Alluvial woodland and, by standards prevailing in County Carlow, quite large.

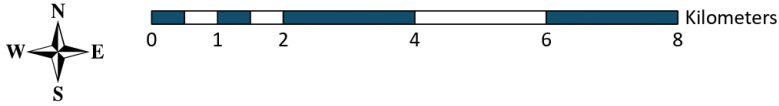
This pNHA is beyond the distance for any direct impacts on habitat loss. The site is outside any ZOI defined for habitat degradation from the Project's construction (and decommissioning) activities. The site is within the potential operational ZOI for effects due to air emissions during operation of the proposed development.

The Cloghrick Wood pNHA is evaluated as National importance.

²⁴ From the Site Synopsis available in the NPWS archive of the Site Synopses for pNHAs accessed via [Natural Heritage Areas \(NHA\) | National Parks & Wildlife Service](#)



TITLE: European Sites and Natural Heritage Sites	FIGURE NO: 11.5	
	CLIENT: Greengate Biogas	
PROJECT: Powerstown Bioenergy	SCALE: 1:115,000	REVISION: 0
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11.5.1.3 Other Protected Sites

There is one Wildfowl Sanctuary, River Barrow (Muine Bheag) (WFS-01) located 6km south of the proposed development and 4.5km south of the proposed gas pipeline route. Wildfowl Sanctuaries are areas that have been excluded from the 'Open Season Order' so that these game birds²⁵ can rest and feed undisturbed. Wildfowl species will generally feed, nest and roost near the water and in adjacent flood lands, with feeding also in the open channel. The wildfowl sanctuary is outside the disturbance ZoI and will not be directly or indirectly effected by the proposed development.

The exact boundaries of this reserve have not been mapped, but the areas along the River Barrow adjacent to the Project would provide similar habitats and flood characteristics and is within the core foraging range for wildfowl species utilizing the sanctuary near Muine Bheag. Given that the areas around the River Barrow west of site will have a similar flood regime to the Muine Bheag Wildfowl Sanctuary, the areas near the site may be used intermittently by the wildfowl species, placing these species within the ZoI for disturbance.

The wildfowl sanctuaries are exclusion zones for hunting and once birds leave this area they are considered as part of the overall bird populations and assessed as part of the avifauna in the Biodiversity chapter. The only wildfowl species which are in the open seasons order (SI No. 421 of 2023) that were recorded during the bird surveys include the lapwing (*Vanellus vanellus*) and mallard (*Anas platyrhynchos*).

The Wildfowl Sanctuary is a nationally designated conservation area and is therefore valued as being of **National Importance**.

There are no Ramsar sites, National Parks or Nature Reserves with any connectivity to the site or gas pipeline.

11.5.2 Aquatic Ecology

The EPA water courses of relevance to the proposed development is the Powerstown Stream (Barrow_180), c. 200m north of site. The Powerstown Stream conflues with River Barrow approximately 480m west of the R448 (Figure 11-6). The site is within a topographical depression and does not contribute to this stream through runoff. The following is relevant regarding water handling on site:

- The storm water runoff within the site will be directed to and contained in a sealed storm water lagoon on site and either reused as construction water supply or tankered off site to an appropriate facility during the construction phase.
- During operation the storm water runoff from paved areas within the site will be directed, via hydrocarbon traps and quality sensors, to the storm water lagoon on site for reuse during operations. Sensors will cause diversion of any contaminated water to an attenuation area to be tankered off site for appropriate treatment.
- During operation the storm water from roof areas will be directed to the storm water lagoon.
- During operation the storm water collected in the tank farm bund will be directed to the storm water lagoon once continuous emissions monitoring sensors confirm it is clean.
- During operation the storm water collected in infiltration areas will be directed to the storm water lagoon.

²⁵ Full list of wildfowl species protected from hunting accessed at <https://www.conserveireland.com/national/wildfowl-sanctuary>



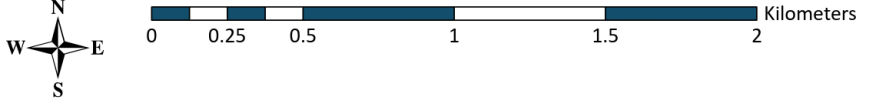
- The storm water lagoon has been designed for a 1 in 30-year storm event. Water from the lagoon is continuously pumped back to the process water tanks for use in the anaerobic digestion process. If the process water tanks are full and the storm water lagoon is full and there is a 1 in 30-year storm event, excess clean water from the lagoon will be pumped to the existing covered road drain west and adjacent to site, which flows via existing pipe to an existing outlet at the Powerstown Stream²⁶. There are water quality controls to prevent contaminated water release. If contaminated, water will be tankered off site for treatment at an appropriately licensed facility. There is further detail in Chapter 3 Description of the Proposed Development and Chapter 13 Surface Water and Hydrology in Volume 2 of this EIAR on the management of storm water on site and the various controls to protect the surface water environment.
- The water contribution from the site during the 1 in 30 year storm water event at this outlet will be 9 % of the available pipe capacity. Together the discharge from the proposed development and the existing discharge from the local network will result in available pipe capacity of 72%
- The gas pipeline crosses the EPA River Barrow (Barrow_180) at the Cardinal Moran Bridge (IDB2) and three of its tributaries and two land drains (non- EPA watercourses). Section 11.2 provides a description of the proposed route which includes the following EPA watercourse crossings:
 - The Ballynaboley Stream (Ballynaboley Stream_010) (EU Code: IE_SE_14B080700) at crossing IDB1 where the pipeline will be within the existing bridge deck / head space of culverts.
 - The River Barrow (Barrow_180) (EU Code: IE_SE_14B012700) at the Cardinal Moran Bridge at IDB2, where horizontal directional drilling (HDD) will be undertaken under the river.
 - The Rathornan Stream (Rathornan_010) (IE_SE_14R430830) at crossing IDB3 where the pipeline will be within the existing bridge deck / head space of culverts.
 - The tributary to the River Barrow (Barrow_180) (EU Code: IE_SE_14B012700) at crossing IDB4 where the pipeline will be within the existing bridge deck / head space of culverts.
 - Two land drains (IDB5 and IDB6), dry during summer may provide aquatic habitats for opportunistic species, for example frog spawning.

The site and the pipeline share the Bagenalstown groundwater body (GWB - IE_SE_G_157).

²⁶ Drawings P24188-FT-DR-EE-0212, P24188-FT-DR-EE-0213, P24188-FT-DR-EE-0214 and P24188-FT-DR-EE-0215 in Volume 4 of this EIAR



TITLE: Watercourses and Drains	FIGURE NO: 11.6		
	CLIENT: 		
PROJECT: Powerstown Bioenergy	SCALE: 1:25,000		REVISION: 0
	DATE: 01/07/2026		PAGE SIZE: A3





11.5.2.1 Desktop ecological findings

Desktop data for the Powerstown Stream is limited, with more extensive historical surveying completed for the River Barrow. The length of the River Barrow upstream of Carlow town, upstream of site and downstream of site was considered in terms of desktop assessments.

The most recent available biological assessment of surface water quality in the Powerstown Stream is from the landfill monitoring from January 2025. The results indicate that the stream has a Q-Value of 3 (Poor WFD Status). The latest reported Q Values for the length of the River Barrow is 3-4 (Table G in Appendix 11.1 in Volume 3 of this EIAR), indicating a 'Moderate' WFD Status and 'Slightly Polluted' condition for the river.

The Inland Fisheries Ireland fish records (Table F in Appendix 11.1 in Volume 3 of this EIAR) showed mostly moderate and poor fish status at monitoring stations along the River Barrow, upstream to downstream of site.

Total fish recorded (at Bestfield_A, Strawhall_A and Strawhall_B monitoring stations over two separate surveys) upstream from Carlow town included nine species (brown trout, dace, European eel, gudgeon, minnow, perch, pike, roach, salmon). Total fish recorded (at Clogrennan Br._A and Mortarstown Lower_A monitoring stations over two separate surveys) downstream from Carlow town and upstream of site included eight species (dace, European eel, gudgeon, minnow, perch, pike, roach, stone loach). Total fish recorded (at Leighlinbridge_A and Dunleckny_A monitoring stations over three separate surveys) downstream of site included eleven species (brown trout, dace, European eel, gudgeon, minnow, perch, pike, roach, salmon, stone loach, three-spined stickleback).

A monitoring station (Coolnakisha East A) upstream of the Rathornan Stream crossing (IDB3) showed records for brown trout, salmon and three-spined stickleback in 2020. No other tributaries within the ZOI have been surveyed as part of the IFI WFD fisheries assessment.

According to NBDC historical records, white-clawed crayfish were regularly recorded from the Ballynaboley Stream (IDB1), with the last record in September 2011. White-clawed crayfish (September 2014) have been recorded at the Cardinal Moran Bridge (IDB2) with scattered records up- and downstream along the River Barrow and its tributaries.

NBDC data (August 2017) also show records of crayfish plague (*Aphanomyces astaci*) within the Barrow catchment, near where the Powerstown Stream enters a culvert beneath the R448. This record was of a dead crayfish, suspected to have crayfish plague but not confirmed by DNA analysis.

11.5.2.2 Site

The Powerstown Stream is a depositing/lowland river (FW2) and a moderately polluted water course (Q-value of 3 in 2025) (Poor WFD Status) as detailed in Chapter 13 Surface Water and Hydrology in Volume 2 of this EIAR.

The river habitat provides overhanging vegetation and shade, but it does not have suitable spawning habitats for salmonids and lamprey species. A single fish was briefly sited during surveys, and the stream is considered to have limited fish populations, with low to moderate suitability for European eel. This further limits species dependent on fish such as otter and kingfisher.

The stream has limited suitability for white-clawed crayfish, limited to stretches upstream of the culvert. There were no records under the NBDC dataset or NPWS sensitive information for white-clawed crayfish in the stream, but a single record of a dead specimen was linked to the stream by way of a record of (unconfirmed) crayfish plague.

The Powerstown Stream is assessed as **local importance higher value**.



11.5.2.3 Gas Pipeline

The gas pipeline crosses the River Barrow (the Cardinal Moran Bridge - IDB2) by HDD and its tributaries (IDB1, IDB2 and IDB4) within the existing bridge deck / head space of culverts.

The Ballynaboley Stream (IDB1) is within a narrow corridor of wet willow-alder-ash woodland (WN6), neighboured by agricultural fields and flows west under the culverted R448 towards the River Barrow (Plate 11-2). The banks are slightly sloped, heavily vegetated with algae-covered rocks. The substrate is considered a mix of silt, pebble and rock.

The stream is considered to have moderate potential for fish and suitability for juvenile lamprey given the presence of suitable soft, fine sediments. Habitat is suitable for white-clawed crayfish as evidenced by historical records. It is noted that upstream, the stream has barriers to fish passage at the two crossing points on the L3046 as identified in the IFI National Barrier Programme.



Plate 11-2: Ballynaboley Stream crossing (IDB1)

The River Barrow around the Cardinal Moran Bridge (IDB2) supports a variety of terrestrial habitats along its banks (Plate 11-3) with improved agricultural grasslands (GA1), reeds (including reed islands) and a pedestrian amenity path with scrub adjacent to road downstream of the bridge. Wooded habitat dominated upstream of the bridge. The river was deep and slow flowing, but where visible, the substrate was composed of silt covering rocks and boulders.

The River Barrow is assessed as having high fishery potential based on historical fish records (Table F in Appendix 11.1 in Volume 3 of this EIAR). Habitat is also suitable for white-clawed crayfish as evidenced by historical records.

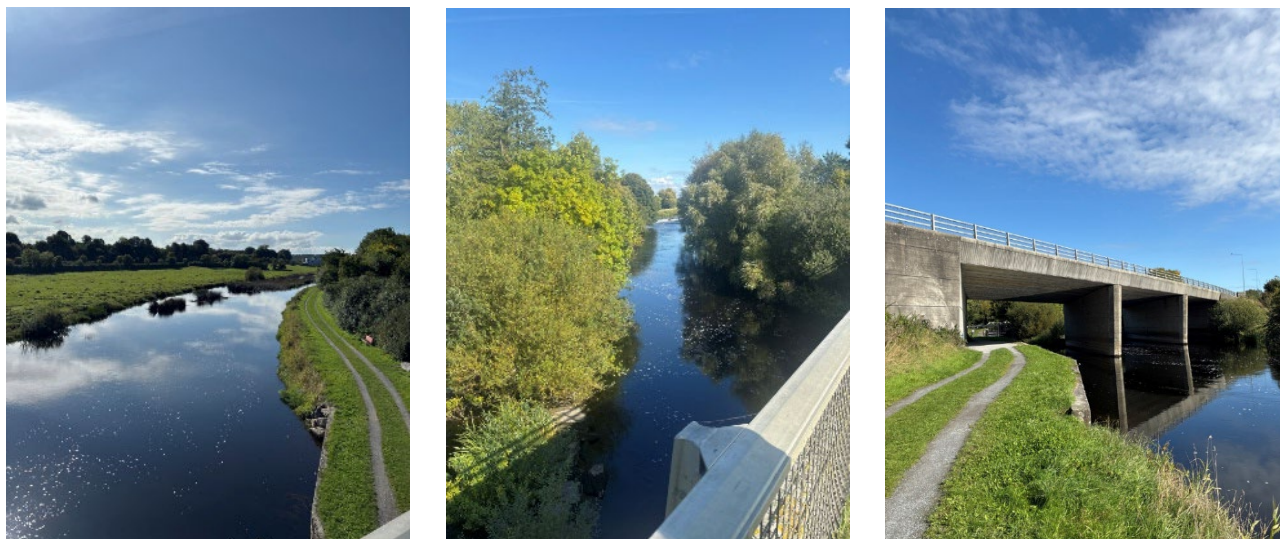


Plate 11-3: River Barrow (IDB2), downstream, upstream and at the Cardinal Moran Bridge respectively

The Rathornan Stream (IDB3) flows under the tree-lined L3038 surrounded by agricultural fields (crops and grazing lands) and flows east towards the River Barrow (Plate 11-4 and Plate 11-5).

The stream is fed by agricultural drainage ditches and downstream has a bridge and concrete bricks damming a drainage ditch on south bank. The stream has a substrate of mixed gravel, pebbles and cobbles and moderate to high flow rates with ripples. The stream is shaded and shows signs of eutrophication.

The stream has moderate fisheries potential. For lamprey there is suitable habitat for juveniles in fine, soft sediment and adults in the gravel/pebble substrates. The stream is blocked / restricted downstream by an agricultural crossing (not surveyed in the IFI National Barrier Programme) and fish movement might be very restricted reducing the fish populations in this stream.

Habitat is considered suitable for white-clawed crayfish, proving suitable substrate.



Plate 11-4: Rathornan Stream (IDB3) upstream (west) of the L3038



Plate 11-5: Rathornan Stream (IDB3) downstream (east) of the L3038

The tree-lined tributary to the River Barrow (IDB4) flows east into the river Barrow, through agricultural fields west of the L3039 and mixed broadleaved/conifer woodland (WD2) east of the local road (Plate 11-6). The stream is shallow with a substrate dominated by cobbles, with gravel substrate also present and no in-stream algae.

The tributary has good fisheries habitat, including for lamprey and salmonid spawning. The stream drains into a canal with sluice gates which may limit mobility of fish into this stream and limit the fish populations (as per the IFI National Barrier Programme).

The habitat is suitable for white-clawed crayfish, providing suitable cobbled substrate.

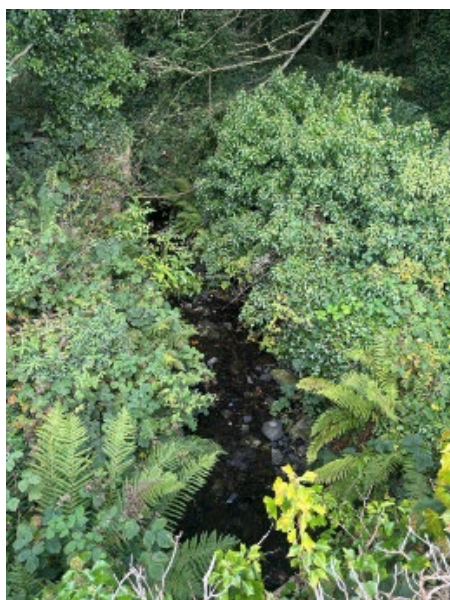


Plate 11-6: Tributary to the River Barrow (IDB4)

The River Barrow is assessed as **international importance**.



The Ballynaboley Stream, Rathornan Stream and the tributary to the River Barrow are rated as **local importance (higher value)**

Both land drains are culverted under the local road and have no fishery potential and do not support any of the qualifying interests of the River Barrow and River Nore SAC.



Plate 11-7: Land Drain IDB5



Plate 11-8: Land Drain IDB6

These drains are rated as **local importance (higher value)**.

11.5.3 Habitats

The desktop study identified the nearest Article 17 habitats as 91E0 Alluvial forests, c.1.1km northwest of the site. The habitat is a QI habitat of River Barrow and River Nore SAC (002162) and at this location overlaps with the SAC. The habitat was identified as a sensitive ecological receptor in terms of potential operational air quality impacts at the site, but no significant effect was identified in terms of nitrogen-based emissions and deposition (Chapter 8 Air Quality in Volume 2 of the EIAR).

The 91E0 Alluvial forests is also downstream of the confluence with the tributary of the River Barrow, which will be crossed by the gas pipeline at IDB4. Given that there will be no impact to the tributary there is no pathway for impact to this 91E0 Alluvial forest from the gas pipeline.

The Alluvial forest is outside the zones of influence as defined in Section 11.4.3. No other Article 17 habitats occur within the zones of influence as defined in Section 11.4.3.

Table 11-3 provides a consolidated list of habitats recorded and mapped:

- Within the proposed development site.
- Within the potential Zol for air quality impacts from the site (50m Zol for dust and up to the River Barrow for emissions on Annex I habitats)
- Within the 500m Zol from the proposed development site for disturbance, to understand the habitats available to birds / mammals



- Within gas pipeline, its immediate area and its watercourse crossings.

Table 11-3: Consolidated list of habitats recorded at the site and its surrounds

Fossitt, 2000		Proposed Development Site			Gas pipeline		
Habitat	Code	In the RLB	Air quality ZOI (50m +)	Disturbance ZOI (500m)	Gas pipeline	At crossings	10m buffer
Spoil and bare ground	ED2	✓					
Recolonising bare ground	ED3	✓		✓			
Other artificial lakes and ponds	FL8	✓					
Scrub	WS1	✓					✓
Treelines	WL1	✓	✓				✓
Buildings and artificial surfaces	BL3	✓	✓	✓	✓		✓
Dry meadows and grassy verges (not equated to Annex I)	GS2	✓	✓	✓			✓
Mosaic of Dry calcareous and neutral grassland and Dry meadow and grass verges (not equated to Annex I)	GS1 /GS 2	✓					
Hedgerows	WL2	✓	✓	✓			✓
Arable crops	BC1		✓				
Scattered trees and parkland	WD 5		✓				
Improved agricultural grassland	GA1		✓	✓			✓
Active quarries and mines	ED4			✓			
Reed and large sedge swamps (not equated to Annex I)	FS1					✓	
Depositing/lowland rivers (not equated to Annex I)	FW2			✓		✓	
Dry calcareous and neutral grassland (not equated to Annex I)	GS1			✓			
Wet grassland (not equated to Annex I)	GS4			✓			



Fossitt, 2000		Proposed Development Site			Gas pipeline		
Habitat	Code	In the RLB	Air quality ZOI (50m +)	Disturbance ZOI (500m)	Gas pipeline	At crossings	10m buffer
Mixed broadleaf/conifer woodland	WD 2			✓			
Wet willow-alder-ash woodland	WN 6			✓			✓

11.5.3.1 Site

The habitat types found on site and in the surrounds are listed in Table 11-3 and mapped in Figure 11-7. The site supports recolonising bare ground (ED3) and spoil and bare ground (ED2) alongside small patches of dry meadows and grassy verges (GS2) on heaps and slopes. Within the spoil and bare ground (ED2), there are pools of water classified as other artificial lakes and ponds (FL8) (dry during May 2026 surveys). A linear patch of scrub (WS1) runs along a steep embankment at the northwestern boundary of the site. This grades into a treelines (WL2) and then a hedgerow (WL1) on the boundaries of the site.

Within 50m of site there are additional treelines (WL2) and hedgerows (WL1) bordering arable crops (BC1) to the south of the site. Scattered trees and parkland (WD5) occur adjacent to, and east of, the site. Dry meadows and grassy verges (GS2) and improved agricultural grassland (GA1) occur on the old landfill adjacent to, and north of the site. Buildings and artificial surfaces (BL3) such as a building and roads occur adjacent to the southern and western boundaries.

Other habitats within 500m of the site, include active quarries and mines (ED4) dry calcareous and neutral grassland (GS1) and wet willow-alder-ash woodland (WN6) along R448 and depositing/lowland rivers (FW2) associated with the watercourses.

None of the terrestrial habitats surveyed correspond with any Annex I habitat types.



Legend

Proposed Development Boundary

Fossitt Code

BL3 - Buildings and artificial surfaces

ED2 - Spoil and bare ground

ED3 - Recolonising bare ground

ED4 - Active quarries and mines

FL8 - Other artificial lakes and ponds

GS2 - Dry meadows and grassy verges

Other (Mosaic)

WD5 - Scattered trees and parkland

WL1 - Hedgerows

WS1 - Scrub

WL1 - Hedgerows

WL2 - Treelines

Proposed Gas Pipeline Route

TITLE: Habitat Map (Proposed Development)	FIGURE NO: 11.7	
	CLIENT: Greengate Biogas	
PROJECT: Powerstown Bioenergy	SCALE: 1:2,000	REVISION: 0
	DATE: 01/07/2026	PAGE SIZE: A3

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11.5.3.1.1 Habitats within the Site

11.5.3.1.1.1 Spoil and bare ground ED2

The majority of the site is spoil and bare ground with <50% vegetation cover, given the historical quarrying at site.

This habitat type supported lesser swine-cress (*Lepidium didymium*), common field-speedwell (*Veronica persica*), common bent (*Agrostis capillaris*), toad rush (*Juncus bufonius*), groundsel (*Senecio vulgaris*) and shepherd's-purse (*Capsella bursa-pastoris*).

Given the limited diversity of flora, intensity of disturbance and early stages of colonisation, this habitat is assessed to be **local importance, lower value**.



Plate 11-9: Spoil and bare ground (ED2) within the site

11.5.3.1.1.2 Recolonising bare ground ED3

There are some areas recolonised by plants and bryophytes with >50% vegetation cover within the site.

In drier areas, this habitat type is composed with weld (*Reseda luteola*), creeping thistle (*Cirsium arvense*), creeping buttercup (*Ranunculus repens*), oxeye daisy (*Leucanthemum vulgare*), black medick (*Medicago lupulina*), white clover Canadian fleabane (*Erigeron canadensis*), common bird's-foot-trefoil (*Lotus corniculatus*), greater plantain (*Plantago major*), bush vetch (*Vicia sepium*), common bent and toad rush. Around the seasonal lake, there is recolonising vegetation on wet/moist substrate alongside soft-rush (*Juncus effusus*), daisy (*Bellis perennis*), cowslip (*Primula veris*), cuckooflower (*Cardamine pratensis*), common bent and black medick.

The habitat is also represented outside the site bordering and parallel to the railway line, c. 260m east of the site.

This habitat is assessed to be **local importance, lower value**.



Plate 11-10: Recolonising bare ground (ED3) developing post-quarrying within the site

11.5.3.1.1.3 Other artificial lakes and ponds FL8

Within the site, there are small ephemeral pools of water which form after material has been excavated and the depressions fill with rainwater. On the margin of the pool near the northern boundary, yellow iris (*Iris pseudacorus*), bulrush (*Typha latifolia*), jointed rush (*Juncus articulatus*) and grey willow colonize. The shape of these depression changes regularly as material on site is excavated and shifted, making these pools dynamic features, unsuitable for any long-term use or colonisation by fauna, such as hibernating frogs.

There is a shallow pool of water at the base of the steep embankment which forms the northern boundary of the site and holds water for a longer duration of the year. These pools are considered important to amphibians. These pools dry up in summer.

This habitat is assessed to be **local importance, higher value.**



Plate 11-11: The larger main pool representing other artificial lakes and ponds (FL8) habitat within the site



Plate 11-12: Other artificial lakes and ponds (FL8) habitat within the site during the drier season (May in 2026)

11.5.3.1.1.4 Scrub WS1

The northern boundary of the site runs along a steep bank covered in scrub. In the steeper section bramble (*Rubus fruticosus* agg.) and gorse (*Ulex europaeus*) are dominant, with elder (*Sambucas nigra*) dominant on the flatter ground on top of the bank. Other species present are common nettle (*Urtica dioica*) which was occasional and sycamore (*Acer pseudoplatanus*) which was rare.

Scrub habitats contribute to pollinator forage and nesting habitat and provide refuge/roosting/nesting habitats to fauna.

This habitat is assessed to be **local importance, higher value**.



Plate 11-13: Scrub (WS1) areas within the site



11.5.3.1.1.5 Treelines WL1

Along the southern boundary of the site the hedgerow grades into a mixed-height treeline with moderate connectivity in the canopy. This treeline was composed of ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*) and cow parsley (*Anthriscus sylvestris*) which were frequent, hawthorn (*Crataegus monogyna*), elder (*Sambucus nigra*) and hedge bindweed (*Calystegia sepium*) which were occasional.

A treeline also forms the northeast boundary of the site and contained hawthorn (*Crataegus monogyna*) which was abundant, ivy (*Hedera helix*), blackthorn (*Prunus spinosa*), brambles (*Rubus fruticosus*), hogweed (*Heracleum sphondylium*) and elder (*Sambucus nigra*) which were frequent, ash (*Fraxinus excelsior*), dog-rose (*Rosa canina*), rosebay willowherb (*Chamerion angustifolium*), snowberry (*Symphoricarpos albus*), cleavers (*Galium aparine*), creeping buttercup (*Ranunculus repens*), colt's-foot (*Tussilago farfara*) and germander speedwell (*Veronica chamaedrys*) which were occasional, shining crane's-bill (*Geranium lucidum*) and beaked hawk's-beard (*Crepis vesicaria*) which were rare. This treeline had good connectivity at the base but poor connectivity in the canopy. There was a fence running through it which may impede mammal access and mobility.

Treelines are used as commuting and foraging corridors for various mammals and birds as well as nesting habitat for birds. They also contribute to pollinator forage and nesting habitat and support invertebrate trophic levels important for a range of insectivorous species.

This habitat is assessed as **local importance, higher value**.



Plate 11-14: Treelines (WL1) within and around the site boundary

11.5.3.1.1.6 Buildings and artificial surfaces BL3

Within the site, there are a small concrete shed and paved areas/tracks. This habitat is assessed to be of **negligible value**.



Plate 11-15: An example of structures that make up the buildings and artificial structures (BL3) within the site

Building and artificial surfaces (BL3) persist within the greater area and are not further discussed.

11.5.3.1.1.7 Dry meadows and grassy verges GS2

Within the eastern part of the site, remnant heaps and slopes from quarrying have been covered by grassland species such as oxeye daisy, common poppy, changing forget-me-not, field forget-me-not, herb-robert, ribwort plantain, creeping buttercup, field madder, cornsalad, mugwort, common ragwort, dandelion, black medick, sweet vernal grass, cock's-foot, red clover, bush vetch, beaked hawk's-weed, red clover hairy geranium curled leaved dock broad leaved dock kidney vetch weld and bitter vetch.

The diversity of flowering plants in this habitat makes it beneficial for pollinators. This habitat is assessed to be **local importance, higher value.**



Plate 11-16: Dry meadows and grassy verges (GS2) covering the old landfill north of the site



11.5.3.1.1.8 Mosaic of Dry calcareous and neutral grassland GS1 and Dry meadow and grass verges GS2

Along the southern boundary of the site, there is recolonising grassland consisting of a mosaic of GS1 and GS2 on both sides of the site entrance. Based on the base-rich soils, there are calcareous/neutral grasslands with common bird's-foot-trefoil, common sedge, field wood-rush, common mouse-ear, creeping buttercup and cock's foot, there are some patches dominated by false oat grass, cock's-foot and black medick. Of note, on the west side of the site entrance, bee orchid (*Ophrys apifera*), (Least Concern (LC) in the IRL (NPWS 2016)), was recorded in May 2025 (see Section 11.5.3.3.1).

While it has some calcareous grassland character, given the mosaic nature and the scarcity of high quality and positive indicators, this mosaic habitat does not qualify as Annex I type habitat Semi-natural dry grasslands & scrub facies on calcareous substrates (6210); important orchid sites (*6210).

However, considering the semi-natural nature, this habitat can be assessed to be **local importance, higher value**.



Mosaic of GS1 and GS2



Bee orchid

Plate 11-17: Mosaic of GS1 and GS2 in the east, within the site

11.5.3.1.1.9 Hedgerows WL2

Hedgerows form the eastern boundary and part of the southern boundary of the site. These were dense hedges c. 5m high which had been cut back. Plants present included hawthorn (*Crataegus monogyna*) which was abundant, ivy (*Hedera helix*), blackthorn (*Prunus spinosa*) and brambles (*Rubus fruticosus*) which were frequent, ash (*Fraxinus excelsior*) and dog-rose (*Rosa canina*) which were occasional.

Hedgerows are linear ecological features that provide connectivity across the larger landscape and provide important commuting and foraging corridors and refuge/roosting/nesting habitats for various animals. They also contribute to pollinator forage and nesting habitat.

This habitat is assessed as **local importance, higher value**.



Plate 11-18: Hedgerows (WL2) along the eastern boundary of the site

11.5.3.1.2 Habitats within 50m of the Site

Treelines (WL1) and Hedgerow (WL2) occur in the surrounding areas and are not discussed further. There may be variation in species, but the features provide similar ecosystem function and services (linear ecological features providing forage, habitat and ecological connectivity in and to the broader landscape).

11.5.3.1.2.1 Dry meadows and grassy verges GS2

Although the habitat was recorded on site, given the variation of species the habitat unit is described. It lies adjacent to the northern site boundary and is ungrazed and more species rich than the GA1 field which borders it directly to its west. This area was previously a landfill which was capped and seeded with grassland and also left to be naturally colonised by local flora.

Species recorded in this habitat included Yorkshire-fog (*Holcus lanatus*), red fescue, false oat-grass, bird's-foot-trefoil (*Lotus corniculatus* var. *sativus*) and oxeye daisy which were abundant, red clover (*Trifolium pratense*), black medick, smooth hawk's-beard (*Crepis capillaris*), yarrow (*Achillea millefolium*), cock's-foot, bush vetch (*Vicia sepium*), meadow buttercup (*Ranunculus acris*) and ribwort plantain (*Plantago lanceolata*) which were frequent, germander speedwell (*Veronica chamaedrys*), kidney vetch (*Anthyllis vulneraria*), carrots (*Daucus carota*) which were occasional and cowslip (*Primula veris*).

While the species composition contains key and typical species for calcareous grassland such as kidney vetch, carrots and cowslip, the coverage of agricultural or tussocky grass species such as red fescue, false oat-grass, cock's-foot, Yorkshire-fog is more dominant than the typical calcareous grassland species, therefore, this habitat type is classified as GS2.

The diversity of flowering plants in this habitat makes it beneficial for pollinators. This habitat is assessed to be **local importance, higher value**.



Plate 11-19: Dry meadows and grassy verges (GS2) covering the old landfill north of the site

11.5.3.1.2.2 Arable crops BC1

Approximately 35m south of the site, there are arable fields for rape (*Brassica napus*). This habitat is **local importance, lower value**.



Plate 11-20: Arable crops (BC1) within 50m of the site

11.5.3.1.2.3 Scattered trees and parkland WD5

To the east of the site, within the recycling centre, is an amenity area mostly covered with grass and a few scattered birch trees (*Betula pendula*), sycamore and *Sorbus* sp. The grassland appears to be mowed regularly, and a short sward is maintained. Species composition includes dandelion false oat-grass, common vetch, cock's foot, creeping buttercup. There is little to no connectivity between the trees.

This habitat is assessed to be **local importance, lower value**.



Plate 11-21: Scattered trees and parkland (WD5)

11.5.3.1.2.4 Improved agricultural grassland GA1

The area adjacent to the northwest of the site supports agricultural grassland grazed by sheep. Species recorded include cock's-foot (*Dactylis glomerata*), Yorkshire-fog (*Holcus lanatus*), creeping buttercup (*Ranunculus repens*) and creeping thistle (*Cirsium arvense*) which were abundant and black medick (*Medicago lupulina*) and hard rush (*Juncus inflexus*) which were occasional.

Agricultural fields with monocultures of perennial ryegrass (*Lolium perenne*) occur adjacent to the north-west boundary of the site. The paucity of species and high level of management reduce the overall biodiversity value of the habitat.

This habitat is assessed to be **local importance, lower value.**



Plate 11-22: Improved agricultural grassland (GA1)



11.5.3.1.2.5 Dry calcareous and neutral grassland GS1

Within c.60 to 120m of the site, grassland areas represented by calcareous grassland elements were recorded along the western roadside verges of the R448 and on the slope of the neighbouring agricultural field to the west. The substrate is of imported lime-rich material on sandy soils.

The habitat was assessed to determine the potential correlation with Annex I type habitat Semi-natural dry grasslands & scrub facies on calcareous substrates (6210); important orchid sites (*6210) using:

- The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. Irish Wildlife Manuals - IWM No. 102 (Martin, et al., 2018) (Table 11-4).
- The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments. (NPWS, 2019 and 2025).

Positive indicators associated with calcareous grassland habitat are set out in these publications and summarised in Table 11-4.

Table 11-4: Positive Indicators of 6210/*6210

High Quality Positive Indicator Species	Positive Indicator Species
<i>Antennaria dioica</i>	<i>Arabis hirsuta</i>
<i>Anthyllis vulneraria</i>	<i>Brachypodium pinnatum</i>
<i>Asperula cynanchica</i>	<i>Bromopsis erecta</i>
<i>Blackstonia perfoliata</i>	<i>Carex flacca</i>
<i>Briza media</i>	<i>Ctenidium molluscum</i>
<i>Campanula rotundifolia</i>	<i>Daucus carota</i>
<i>Carex caryophylla</i>	<i>Galium verum</i>
<i>Carlina vulgaris</i>	<i>Helictotrichon pubescens</i>
<i>Centaurea scabiosa</i>	<i>Homalothecium lutescens</i>
<i>Filipendula vulgaris</i>	<i>Leontodon hispidus</i> / <i>L. saxatilis</i> (record both but count as one in assessment)
<i>Gentiana verna</i>	<i>Lotus corniculatus</i>
<i>Gentianella amarella/campestris</i>	<i>Origanum vulgare</i>
<i>Geranium sanguineum</i>	<i>Pilosella officinarum</i>
<i>Knautia arvensis</i>	<i>Ranunculus bulbosus</i>
<i>Koeleria macrantha</i>	<i>Sesleria caerulea</i>
<i>Linum catharticum</i>	<i>Thymus polytrichus</i>
<i>Primula veris</i>	<i>Trisetum flavescens</i>
<i>Sanguisorba minor</i>	
Orchid species (record individual orchid species separately)	

A total of 9 relevés were collected throughout the calcareous grassland areas within a plot. The size for all plots was set as 2m x 2m (4m²) (Appendix 11.3 in Volume 3 of this EIAR). Overall, within each quadrat plus 20m buffer, there are a total of 2 or 3 high quality positive indicators (>2 species required within 4m² plus 20m buffer to pass the criteria), namely, yellow-wort (*Blackstonia perfoliata*), fairy flax (*Linum catharticum*), kidney vetch (*Anthyllis vulneraria*), cowslip (*Primula veris*) and/or 1 or 2 Orchid species and a total of 1 to 3 positive indicators (>7 species required within 4m² plus 20m buffer to pass the criteria), namely, mouse-ear-hawkweed (*Pilosella officinarum*), carrots (*Daucus carota*), lady's bedstraw (*Galium verum*), common bird's foot trefoil (*Lotus corniculatus*) and/or yellow feather-moss (*Homalothecium lutescens*).

On the slope within a pasture located 120m northwest of the site, there are over 50 individual orchids. While they could not be identified due to the lack of inflorescence, it was tentatively assumed as bee orchid and pyramidal orchid (*Anacamptis pyramidalis*), based on their leaf shapes and historical records. Both species are categorised as LC in the IRL (NPWS 2016).



As negative indicators, the encroachment by agricultural grass species such as false oat-grass and cock's-foot and/or scrub of gorse and grey willow and disturbance by cattle trampling and grazing were confirmed.

Given the inadequate numbers of positive indicators, the recent artificial origin of the substrate, the agricultural disturbance and the encroachment of negative indicator species, it does not qualify as the Annex I habitat type 6210 or *6210. However, this habitat area is highly important in supporting local calcicoles and orchid species.

As such, this habitat is assessed as being **local importance, higher value**.



Calcareous grassland in 60m northwest of the site



Calcareous grassland in 120m northwest of the site



Orchid rosettes



Orchid rosettes

Plate 11-23: Dry calcareous and neutral grassland (GS1), 60-120m of the site

11.5.3.1.3 Habitats in the Surrounds (within 500m of the Site)

These habitats will not be affected as they are outside the identified Zol for the site in terms of habitat effects. They are however within the Zol for disturbance to birds and the description aims to provide insight to the habitat available to birds.

The habitats described above are replicated in the greater landscape and contribute to supporting local bird populations. Croplands (BC1) provide seasonally abundant food which will benefit seed-eating birds and raptors that feed on seed-eating mammals / birds, particularly given the overlap with breeding season of birds.

The quarries provide nesting areas for birds that utilise sand banks and also raptors that nest on cliff. The muddy pools provide source of mud for bird nests (for example house martins), and wading areas during summer.



Grasslands (GS2 and mosaics), improved agricultural grasslands (GA1), flooded grasslands and wet grasslands (GS4) around the River Barrow provide supplementary forage areas for wintering birds. The water courses (FW2) and bank habitats support a multitude of aquatic birds and birds reliant on fish prey.

Patches of woodland or denser treelines, particularly following watercourses diversify the landscape. A patch of wet willow-alder-ash woodland (WN6) provides a densely wooded area for woodland birds, and although it was noted as being too dense and cluttered for kingfisher and dipper along the Ballynaboley Stream, where this woodland occurs along the River Barrow, the habitat may be suitable for perching and foraging.

11.5.3.2 Gas pipeline

The gas pipeline is described in Section 11.2, along with the various water course crossings (IDB1 to IDB4). The habitat types found within the road proposed for the gas pipeline and the surrounding areas (10m buffer) are listed in Table 11-3 and mapped in Figure 11-8.

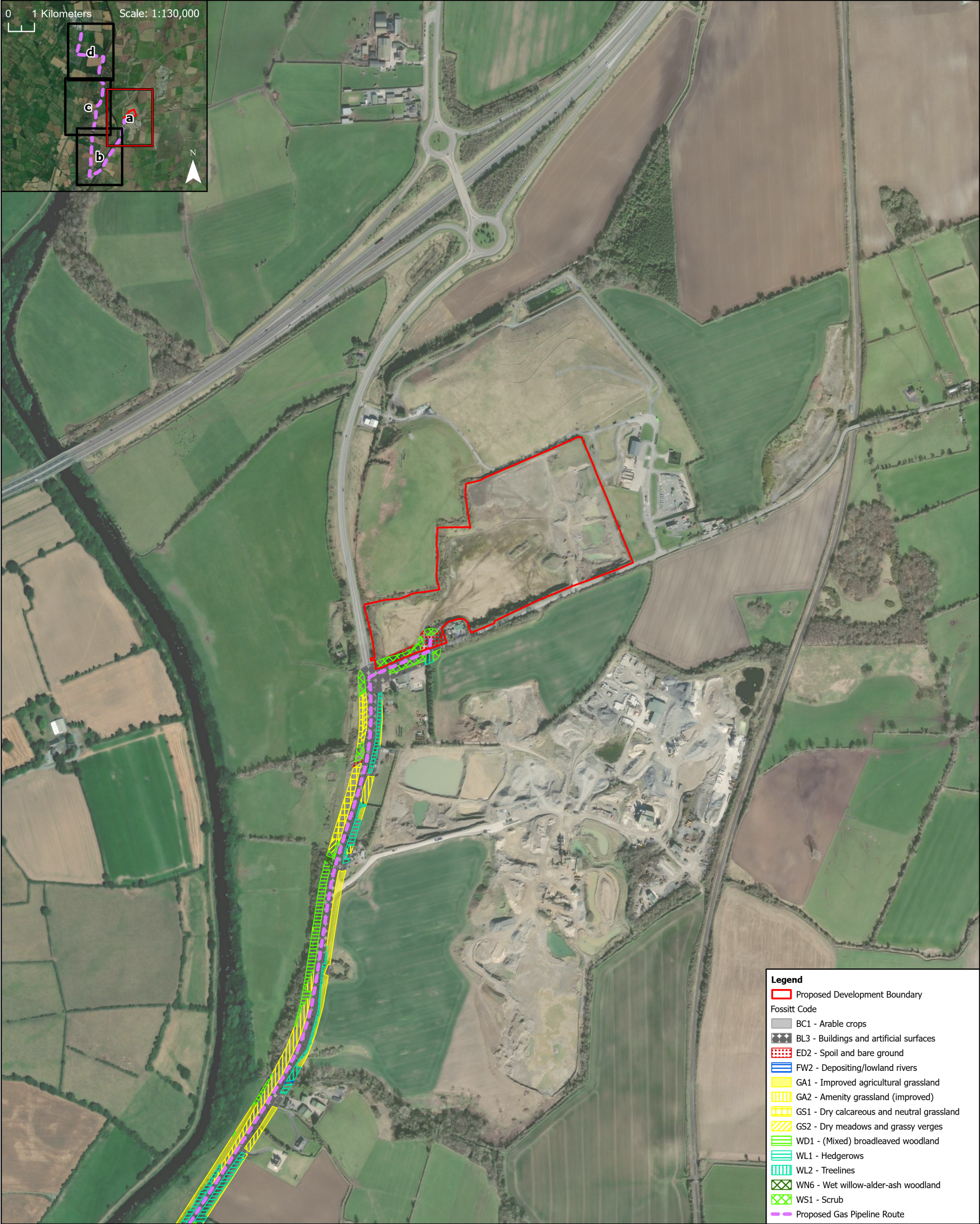
The entire gas pipeline is along areas categorised as buildings and artificial surfaces (BL3) (an artificial and non-vegetated habitat assessed as **negligible value**) and adjacent to hedgerows (WL2), treelines (WL1) and scrub (WS1). Treelines (WL1) and Hedgerow (WL2) are fully assessed for the site, and although there may be some variation in species, the features provide similar ecosystem function and services (linear ecological features providing forage, habitat and ecological connectivity in and to the broader landscape) and retain the same evaluation as **local importance, higher value**.

The gas pipeline crosses the River Barrow (the Cardinal Moran Bridge – ID B2) and its tributaries (ID B1, ID B3 and ID B4). These are fully assessed under the aquatic section (Section 11.5.2.3) and these are not further discussed here but Table 11-3 indicates the terrestrial habitats that occur adjacent to these crossings.

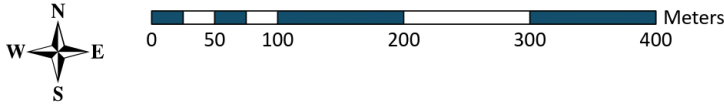
Other habitats within 10m of the gas pipeline include dry meadows and grassy verges (GS2) and scrub (WS1) on roadside verges or earth banks along the roads, hedgerows (WL2) and treelines (WL1) as borders of private properties, improved agricultural grassland (GA1). Mixed broadleaf/conifer woodland (WD2) and wet willow-alder-ash woodland (WN6) along the roads for the gas pipeline overlaps the 10m buffer. Local watercourses, including the River Barrow, traversed by the gas pipeline support reed and large sedge swamps (FS1) and depositing/lowland rivers (FW2).

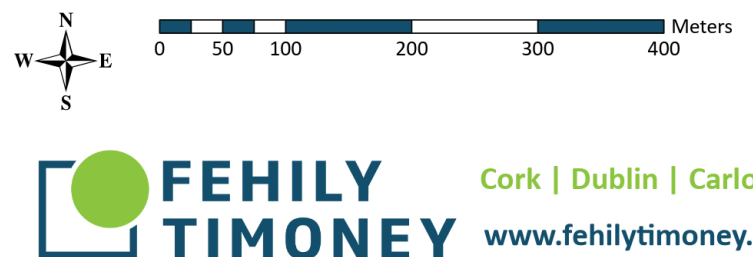
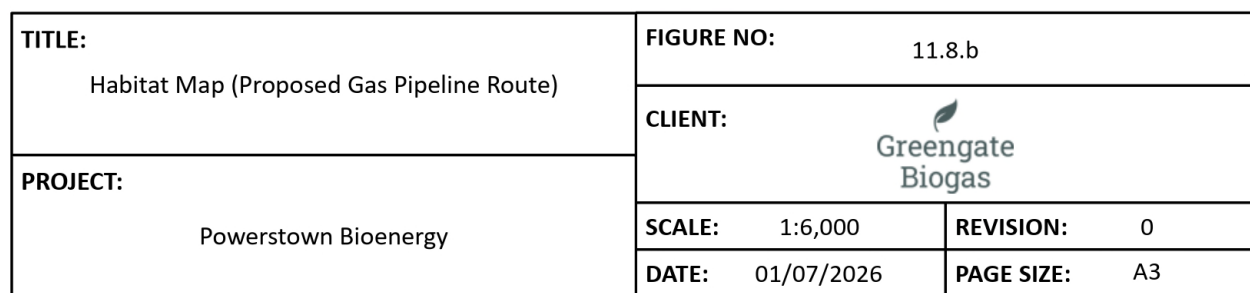
Improved agricultural grassland will be used for contractors' camps and yards, which could encompass grassy verges and hedgerows to gain access to these sites.

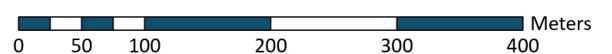
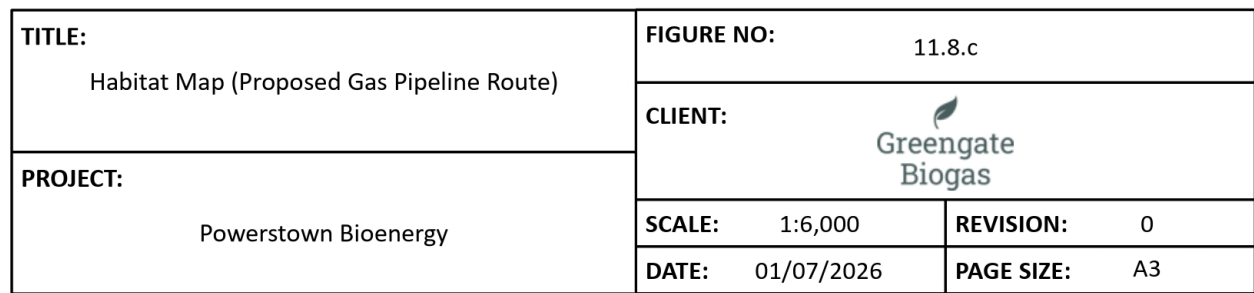
As there is overlap with the site and the gas pipeline, the habitat features are shared and only additional habitats that are not previously discussed are described below.



TITLE: Habitat Map (Proposed Gas Pipeline Route)	FIGURE NO: 11.8.a	
	CLIENT: 	
PROJECT: Powerstown Bioenergy	SCALE: 1:6,000	REVISION: 0
	DATE: 01/07/2026	PAGE SIZE: A3

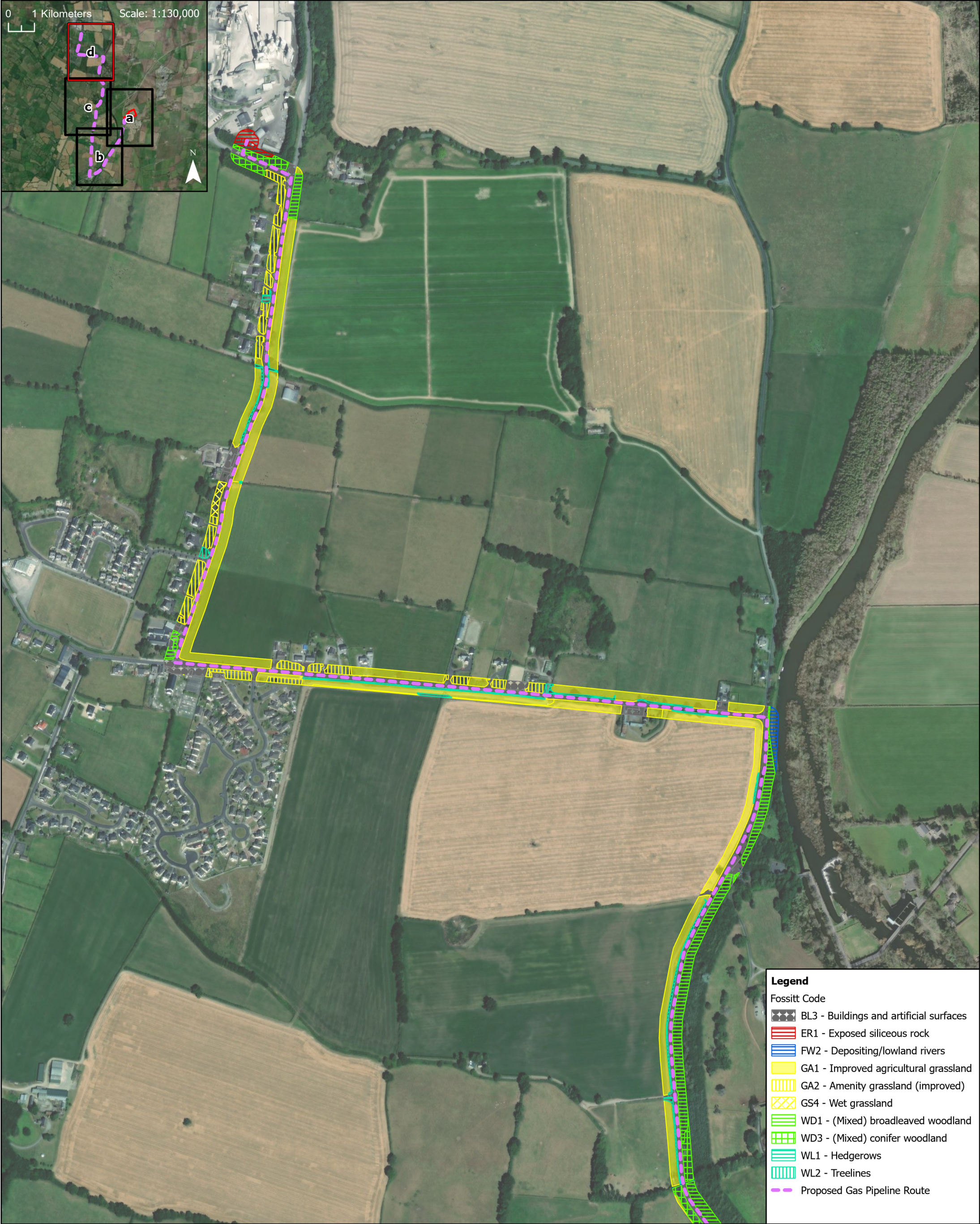






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TITLE: Habitat Map (Proposed Gas Pipeline Route)	FIGURE NO: 11.8.d	
	CLIENT: Greengate Biogas	
PROJECT: Powerstown Bioenergy	SCALE: 1:6,000	REVISION: 0
	DATE: 01/07/2026	PAGE SIZE: A3

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11.5.3.2.1 Reed and large sedge swamps FS1

Reed and large sedge swamps occur along both banks of the River Barrow, including at the Cardinal Moran Bridge, where the habitat also forms islands within the River. Common reed (*Phragmites australis*) dominates the habitat along this section of River Barrow.

Fossitt (2000) indicates that this habitat type has no link with any Annex I type habitats including Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430). In addition, Article 17 report by NPWS (2025) defines 6430 as “*there should be a diversity of tall herb species present, not a monodominant sward of one species with scattered herbs. Reeds and tall grasses and sedges do not form a significant component of the vegetation*”. Therefore, this habitat type, monotonously dominated by common reed, does not qualify as Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430).

Reed and sedge swamps provide significant ecological services in the river environment, trapping sediment, stabilising banks and purifying water. It also provides shelter and cover from predators for waterfowl, particularly juveniles.

This habitat is assessed as **local importance, higher value**.



Plate 11-24: Reed and large sedge swamps (FS1) along the banks of the River Barrow

11.5.3.2.2 Mixed Broadleaf/Conifer Woodland WD2

This is an extent of woodland, c. 3.9ha, bordering approximately 800m of the gas pipeline at crossing IDB4. The habitat consists of Scots pine (*Pinus sylvestris*), Douglas fir (*Pseudotsuga menziesii*) and pedunculate oak (*Quercus robur*).

Woodlands contribute to carbon and water cycling, soil stabilisation and nutrient cycling and provide extensive microhabitat diversity (from the base through to their canopies) to support a range of animals, including as commuting and foraging habitat and provision of resting places, roosting and nesting habitats. They also support invertebrate populations important for a range of insectivorous species. This particular woodland is well connected through its northern extent to the River Barrow and the riverine and contributes to the connectivity and diversity of a nationally important ecological corridor.

This habitat is assessed as **local importance, higher value**.



Plate 11-25: Mixed broadleaved/conifer woodland (WD2) at IDB4 crossing in the northern extent of the pipeline

11.5.3.3 Rare and Protected Flora

The NBDC and BSBI holds records for rare or protected flora species within the 2km grid square for the site (S76E) and the gas pipeline (S76D, S66Y, S66Z and S67V) (Table 11-5).

Table 11-5: NBDC rare and/or protected flora records for the last two decades for the site and the gas pipeline

Species (Latin Name)	Data Source	Latest record & location for the site	Latest record & location for the gas pipeline	Designation
Fragrant Agrimony (<i>Agrimonia procera</i>)	NBDC	01/06/2015 One occasion, 210m east of the site boundary.	N/A	Near threatened (IRL 2016)
Greater Knapweed (<i>Centaurea scabiosa</i>)	NBDC	14/06/2020 Two locations along the verge of the R448 adjacent to the Site but not within the Site.	14/06/2020 One location near the beginning of the gas pipeline (accuracy of 100m) (area of overlap with the site).	Near threatened (IRL 2016)
Basil thyme (<i>Clinopodium acinos</i>)	BSBI	Not specified (2000-2019)	-	Near threatened (IRL 2016)
Dwarf spurge (<i>Euphorbia exigua</i>)	BSBI	Not specified (2000-2019)	-	Near threatened (IRL 2016)



11.5.3.3.1 Site

During the May 2026 survey, 13 individuals of greater knapweed were identified within roadside verges of R448 overlapping the west boundary of the site (Figure 11-9).

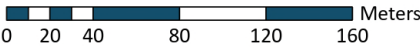
Bee orchid was identified within the site in May 2025. A total of 25 rosettes of orchid species were found near the south and north boundary within the site in May 2026 (Figure 11-9). Lack of inflorescence complicated identification of species, but given the leaf shape, historical data and habitats, they are considered to be bee orchids and pyramidal orchids.



Plate 11-26: Greater knapweed and orchid species found within the site



TITLE: Greater Knapweed and Orchid Species Locations	FIGURE NO: 11.9	
	CLIENT: 	
PROJECT: Powerstown Bioenergy	SCALE: 1:3,500	REVISION: 0
	DATE: 01/07/2026	PAGE SIZE: A3



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11.5.3.3.2 Gas pipeline

During the surveys in May 2026, a total of 5 individuals of greater knapweed were found within 10m buffer of the gas pipeline (Figure 11-9). The habitat was grassy verges dominated by false oat-grass, red fescue and bush vetch on the west facing slope of the earth bank along the public road, R448.



Orchids found in the southern slope within the Site



Southern slope orchids found within the Site

Plate 11-27: Rare plants within 10m buffer of the gas pipeline

11.5.3.4 Invasive/Non-native Flora

Unless specified otherwise, the term “invasive species” in this EIAR refers to Third schedule species to the European Communities (Bird and Natural Habitat) Regulations 2011 (as amended). The Regulations make it an offence to plant, disperse, allow or cause to disperse, spread, or otherwise cause to grow any of the scheduled species. Other non-native species are also considered and discussed.

The invasive/non-native species listed in Table 11-6 have been recorded within the 2km grid square for the site (S76E) and for the gas pipeline ((S76D, S66Y, S66Z and S67V). Five invasive or non-native plant species have been recorded for the site, three of which are Third Schedule species requiring control under Regulations 49 and 50 of the EC (Birds and Natural Habitats) Regulations 2011 (as amended). Five invasive or non-native plant species have been recorded for the gas pipeline grid squares, three of which are Third Schedule species requiring control under Regulations 49 and 50 of the EC (Birds and Natural Habitats) Regulations 2011 (as amended).

Table 11-6: NBDC invasive species /non-native flora records for the last two decades within 2km grid squares associated with the gas pipeline

Species (Latin Name)	Latest record: Site	Latest record: Gas pipeline	Designation
Butterfly-bush (<i>Buddleja davidii</i>)	10/07/2015		Medium Risk Invasive Species (2013 Report)
Cherry Laurel (<i>Prunus laurocerasus</i>)		30/03/2019	High Risk Invasive Species (2013 Report)
Giant Hogweed (<i>Heracleum mantegazzianum</i>)	19/04/2019		EU Invasive Alien Species Regulation No. 1143/2014 & Invasive Species: Regulation S.I. 374/2024
Himalayan Balsam (<i>Impatiens glandulifera</i>)	21/08/2022	18/09/2022	EU Invasive Alien Species Regulation No. 1143/2014 & Invasive Species:



Species (Latin Name)	Latest record: Site	Latest record: Gas pipeline	Designation
			Regulation S.I. 374/2024 - High risk (2013 Report)
Japanese Knotweed (<i>Fallopia japonica</i>)	10/04/2021		EU Invasive Alien Species Regulation No. 1143/2014 & Invasive Species: Regulation S.I. 374/2024 - High risk (2013 Report)
Nuttall's Waterweed (<i>Elodea nuttallii</i>)		31/12/2010	EU Invasive Alien Species Regulation No. 1143/2014 & Invasive Species: Regulation S.I. 374/2024 - High risk (2013 Report)
Sycamore (<i>Acer pseudoplatanus</i>)	21/05/2016	30/03/2019	Medium Risk Invasive Species (2013 Report)
Water Fern (<i>Azolla filiculoides</i>)		31/12/2021	EU Invasive Alien Species Regulation No. 1143/2014 & Invasive Species: Regulation S.I. 374/2024 - Moderate risk (2013 Report)

11.5.3.4.1 Site

One terrestrial Third Schedule invasive species, Himalayan balsam, was observed within the site (Figure 11-10) during habitat surveys in May 2025 (Plate 11-26). This was a single stand, 2m tall by 5m wide, located at the base of a steep embankment.

One non-regulated non-native species, Snowberry, was also recorded within the site boundary. This was a 10m long stand within the treeline that forms the northern site boundary.

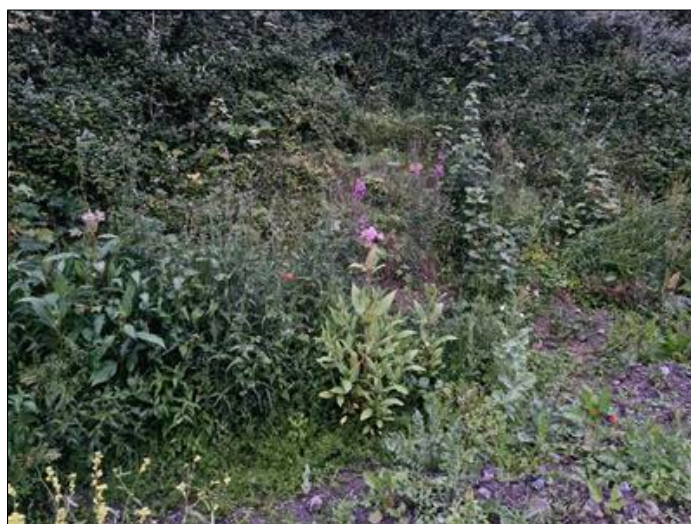
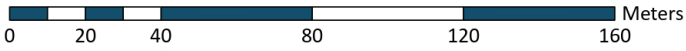


Plate 11-28: Himalayan balsam recorded within site



TITLE: Invasive Species Locations	FIGURE NO: 11.10	
	CLIENT: 	
PROJECT: Powerstown Bioenergy	SCALE: 1:2,000	REVISION: 0
	DATE: 01/07/2026	PAGE SIZE: A3



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11.5.3.4.2 Gas pipeline

During field surveys, the Third Schedule invasive species *Rhododendron ponticum* was recorded in the front garden of a residential property which borders the gas pipeline, at a distance of 18m from the pipeline.

A further Third Schedule invasive species, Himalayan Balsam, was recorded along the banks of the river Barrow, c. 110m from where the gas pipeline crosses the river.

11.5.4 Non-volant Mammals

The mammal species listed in Table 11-7 have been recorded within the 2km grid squares for the site (S76E) and the gas pipeline (S76D, S66Y, S66Z and S67V). Three protected mammal species have been recorded: namely badger (*Meles meles*), hedgehog (*Erinaceus europaeus*) and red squirrel (*Sciurus vulgaris*) and three invasive species.

NBDC historical records show otter records across all the overlapping grids with the latest record near IDB1 in 2015 and at IDB2 in January 2023. From the 'Otter survey of Ireland 2004 & 2005' and the 'Atlas of Mammals in Ireland 2010-2015' datasets, otter signs and at least a sighting of an individual were recorded along the River Barrow and Ballynaboley Stream. Only other records were along the Rathornan Tributary approximately 2.7km upstream from IDB3. None of the historical records indicate presence of holts or couches.

NBDC records (Mammals of Ireland 2016-2025 data set) also indicate pine marten south (1.3km south of IDB2) and several records west (nearest at 1.8km west of the gas pipeline where it intersects the of the gas pipeline and the M9 motorway).

Table 11-7: Historical NBDC mammal records for the last two decades for the site and the gas pipeline

Species (Latin Name)	Latest record: Site	Latest record: Gas pipeline	Designation
Badger (<i>Meles meles</i>)	31/12/2009	18/08/2018	Wildlife Acts
Hedgehog (<i>Erinaceus europaeus</i>)	14/04/2018	11/05/2022	Wildlife Acts
Red Squirrel (<i>Sciurus vulgaris</i>)	No records	21/09/2014	Wildlife Acts
American Mink (<i>Neovison vison</i>)	25/09/2010	No records	Invasive Species: EU Regulation No. 1143/2014 & S.I. 374/2024 - High risk
Bank Vole (<i>Myodes glareolus</i>)	20/04/2018	No records	Invasive Species: Medium Risk
Brown Rat (<i>Rattus norvegicus</i>)	13/03/2012	19/08/2012	Invasive Species: High Risk

11.5.4.1 Site

No signs of red squirrel were recorded during mammal surveys in May 2025. The site is unsuitable for red squirrels with no suitable mixed conifer/broad-leaved woodlands habitats to support the species on site or in the survey area.



The site has limited suitability for hedgehogs, limited to the scrub, hedgerows and edges of the treelines, where there is habitat to support their predominantly insectivorous diet and provide refuge amid logs or in abandoned animal burrows. Despite some suitable habitat, no signs of hedgehog were noted in these habitats during the May 2025 surveys. As they are predominantly nocturnal they are, on a precautionary basis, considered to be present on site and in the surrounds within the appropriate habitats.

Preliminary site assessments indicated the presence of no. 3 burrow/den entrances, two small entrances, one each along the western and northern boundary, and a larger entrance within the treeline along the northern boundary. A trail camera was placed at the latter entrance and confirmed the use of the burrow by rabbits (*Oryctolagus cuniculus*) only, a medium-risk invasive species.

Other than the single suspected burrow entrance (confirmed to be used by rabbits), no signs of badgers were recorded on site. The site has limited suitability as forage habitat for badger and the treelines and hedgerows around site are limited ecological corridors with little connectivity to surrounding natural and semi-natural landscape. Badger activity is likely to be limited to occasional commuting along the boundaries of the site only.

Hedgehogs and badgers and their setts are protected under the Wildlife Acts. They are evaluated as **local importance, higher value**. The remaining mammals, other than otter, are evaluated as **local importance, lower value**.

The Powerstown stream provides good cover for commuting otter, but forage potential is low due to lack of fish and crayfish populations (no historical records and none recorded). No otter signs (tracks, scat and secretions, slides and paths) were noted along the surveyed length of the river (Figure 11-1) and no holts or couches were observed. Upstream of the culvert, a scrubby bank concealed the ground (240m north of the RLB of the site) and the area, at best, is considered to have low suitability to support a holt/couch site. The Powerstown Stream may have some value for commuting otter although no otter signs nor activity (evidence of breeding, feeding, scat, footprints or resting sites) were noted during the assessment of stream.

Otter is a QI species of the River Barrow and River Nore SAC and is evaluated as **international importance**.

11.5.4.2 Gas Pipeline

Given the built nature of the gas pipeline, there are no suitable habitats to support forage areas, resting sites, breeding sites or maternity sites for non-volant mammals within the gas pipeline works.

The varied habitats alongside the gas pipeline could support the desktop species (badger, hedgehog and red squirrel) and other mammals (otter, deer and hare). In addition, the wooded habitats would be suitable for stoat (*Mustela erminea* subsp. *hibernica*), pygmy shrew (*Sorex minutus*) and pine marten (*Martes martes*).

All mammals and their breeding and resting places as protected under the Wildlife Acts are evaluated as **local importance, higher value**.

The Ballynaboley Stream (IDB1) is within a narrow corridor of wet willow-alder-ash woodland (WN6), neighboured by agricultural fields and flows west under the culverted R448 towards the River Barrow. The riverine corridor has good cover for commuting otters. No holts or couches were noted upstream of the crossing nor was any otter signs, suggesting no recent use in the surveyed section of the stream. Otter tracks were observed along the river downstream of the crossing, which is in proximity to the River Barrow at this location. The stream has value for commuting and has potential to support otter foraging, but the quality of upstream water, stagnant and foul smelling from abundant algal growth, may deter otter from using this stream at the time of the survey and would not support prey species.



The River Barrow around the Cardinal Moran Bridge (IDB2) supports a variety of terrestrial habitats along its banks with improved agricultural grasslands (GA1), reeds (including reed islands) and a pedestrian amenity path with scrub adjacent to road downstream of the bridge. Wooded habitat dominated upstream of the bridge. The riverine corridor has good cover for commuting otters, and the river provides good forage for otters. No otter tracks or signs were observed along the surveyed length of the river, and no holts or couches were observed. No signs or evidence of recent activity was observed during the surveys.

The Rathornan Stream (IDB3) flows under the tree-lined L3038 surrounded by agricultural fields (crops and grazing lands) and flows east towards the River Barrow. The riverine corridor has enough cover for commuting otters, but no signs of otter were noted. The stream offers potential for forage, but the paucity of fish due to downstream barriers reduces the forage value for otters.

The tree-lined tributary to the River Barrow (IDB4) flows east into the river Barrow, through agricultural fields west of the L3039 and mixed broadleaved/conifer woodland (WD2) east of the local road. The riverine corridor has enough cover for commuting otters, but no signs of otter were noted. There is some forage potential for otters, but it is suspected that the downstream conditions and sluice gate may limit fish prey species.

The River Barrow and its tributaries are utilised by commuting otters as evidenced by recent tracks observed along the sections of streams surveyed. It is suspected that tributaries offer limited forage potential (poor quality water at time of surveys along with barriers in streams that would limit fish populations), and the River Barrow is the main forage area for otters in the locality. Despite the recent tracks, no other evidence of breeding activity, activity of small family groups or regular feeding or scat signs were noted. Along with the lack of couches and holts observed, breeding otter are not considered to be active in the surveyed areas.

Otter is a QI species of the River Barrow and River Nore SAC and is evaluated as **international importance**.

11.5.5 Bats

The bat species listed in Table 11-8 have been recorded within the 2km grid squares for the gas pipeline (S76D, S66Y, S66Z and S67V). No bats have been recorded for the site (S76E).

Table 11-8: Historical NBDC bat records for the last two decades for the site and the gas pipeline

Species (Latin Name)	Latest record: Site	Latest record: Gas pipeline	Designation
Common Pipistrelle (<i>Pipistrellus pipistrellus sensu stricto</i>)	No records	03/10/2015	EU Habitats Directive: Annex IV Wildlife Acts
Daubenton's Bat (<i>Myotis daubentonii</i>)	No records	03/10/2015	EU Habitats Directive: Annex IV Wildlife Acts
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	No records	03/10/2015	EU Habitats Directive: Annex IV Wildlife Acts

BCI records indicate six known roost locations within 10km of site's 1km² grid (S7068). There is one Daubenton's bat roost within 3km of the site and two Daubenton's bat roosts within 3km of the gas pipeline. BCI bat records and the NBDC records (Table 11-8) show bat records are scattered across the 20km square area, largely associated with the River Barrow and the surrounding streams and wooded areas. All bat records near the site and along the gas pipeline are along the River Barrow.



Based on the NBDC's Bat Landscapes tool the 5x5 km square encompassing the site has moderate/high habitat suitability for all bat species combined. The two 5x5 km squares encompassing the gas pipeline have moderate/high (Grid square 1: majority of gas pipeline) and moderate (Grid square 2: northern section of gas pipeline) habitat suitability (Table 11-9) for all bat species combined.

Table 11-9: Bat Habitat Suitability

Common name	Latin name	Grid square 1 (site & gas pipeline)	Grid square 2 (gas pipeline)
All Bats		39.67	35.78
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	49	45
Brown long-eared bat	<i>Plecotus auritus</i>	57	51
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	57	54
Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>	0	0
Leisler's Bat	<i>Nyctalus leisleri</i>	53	48
Whiskered bat	<i>Myotis mystacinus</i>	39	32
Daubenton's bat	<i>Myotis daubentonii</i>	49	43
Nathusius's pipistrelle	<i>Pipistrellus nathusii</i>	4	4
Natterer's bat	<i>Myotis nattereri</i>	49	45

11.5.5.1 Site

11.5.5.1.1 Suitability of the Site for Bats

The outcome of the preliminary appraisal of the site indicated that the site supported no suitable roosting structures (supported by the BCI and NBDC records). Potential roosting structures were only identified adjacent and outside the RLB (Figure 11-2), all at elevated locations considering the lowered topography of the site.

The development footprint within the site has no suitability for bat roosts or flight paths / foraging potential. On-site scrub habitat may generally contribute to prey species of bats in the area but do not form part of significant forage areas for bats due to the exposed nature of the on-site scrub. The scrub habitat that may contribute to forage area forms part of the ecological linear features around the perimeter of the site, which will be retained.

The boundaries of the site were the only features (trees and hedgerows) suitable for bats, with the remainder of the site very scarce in vegetation cover (open landscapes that have little potential to provide prey). The treelines and hedgerows are considered to provide flightpaths and / or foraging habitat preferentially used by bats (TII, 2005, reissued 2025). The GLTA recorded one tree rated as a PRF-I in the treeline along the northern boundary of the site (Figure 11-2). The linear habitats along the site perimeter (scrub, hedgerows and treelines) have been rated as having moderate to low suitability (Collins, 2023) (rating lower than the NBDC's Bat Landscapes tool assessment), considering that the tree canopy is limited and not continuous and the habitats form very narrow and minor linear features with interrupted connectivity to the River Barrow (the main ecological corridor west of site) and no direct connectivity to any roost features provided by the BCI (nearest two located along the River Barrow). These habitats will be retained on site and the provision of existing ecological services to bats will continue.



11.5.5.1.2 Bat Activity

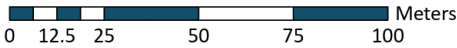
The nighttime bat walkovers show that linear features supported bat activity (Figure 11-11, Figure 11-12 and Figure 11-13) with three species recorded (Table 11-10): common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*) and Leisler's bat (*Nyctalus leisleri*). Common pipistrelle was the most frequently encountered species across all transects, to be expected within the setting and given this common species' widespread and generalist foraging behaviour.

Table 11-10: Bat passes recorded during three bat nighttime walkovers

Species	Round 1 - 26/06/25	Round 2 – 04/09/25	Round 3 – 29/09/25	Total
Common pipistrelle	20	22	5	47
Soprano pipistrelle	5	17	0	22
Leisler's bat	0	5	3	8
Total passes	25	44	8	77



TITLE:	Bat Activity Round 1		FIGURE NO: 11.11	
			CLIENT:  Greengate Biogas	
PROJECT:	Powerstown Bioenergy		SCALE: 1:2,000	REVISION: 0
			DATE: 01/07/2026	PAGE SIZE: A3



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TITLE:	Bat Activity Round 2		FIGURE NO: 11.12	
			CLIENT: Greengate Biogas	
PROJECT:	Powerstown Bioenergy		SCALE: 1:2,000	REVISION: 0
			DATE: 01/07/2026	PAGE SIZE: A3

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TITLE:	Bat Activity Round 3		FIGURE NO: 11.13	
			CLIENT: Greengate Biogas	
PROJECT:	Powerstown Bioenergy		SCALE: 1:2,000	REVISION: 0
			DATE: 01/07/2026	PAGE SIZE: A3

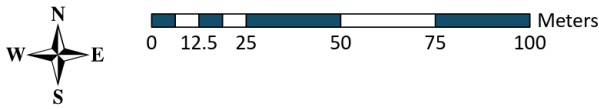




Table 11-11: Total bat passes recorded on static detectors over three sessions

Species	Round 1 28/05/2025 - 10/06/2025	Round 2 12/08/2025 - 03/09/2025	Round 3 23/09/2025 - 06/10/2025	Total
Daubenton's bat	1	23	4	28
Leisler's bat	411	622	110	1143
Common pipistrelle	603	586	113	1302
Soprano pipistrelle	410	695	194	1299
Brown long-eared bat	16	54	10	80
Total passes	1441	1980	431	3852

The results of the static bat detector surveys undertaken at the site are presented in Table 11-11. Static monitoring recorded five bat species. Common pipistrelle (*Pipistrellus pipistrellus*) and soprano pipistrelle (*Pipistrellus pygmaeus*) were the most frequently recorded species. These species typically dominate bat assemblages in a range of habitats across Ireland, and their high levels of activity are consistent with their widespread distribution and generalist foraging behaviour. Leisler's bat (*Nyctalus leisleri*) is often associated with open habitats and edge features, habitat well represented at site and neighbouring areas.

Daubenton's bat (*Myotis daubentonii*) and brown long-eared bat (*Plecotus auritus*) were recorded at comparatively lower levels. These species tend to have more specialised habitat requirements, and their lower activity levels may reflect the lack of availability of suitable foraging resources within the survey area.

Seasonal variation in activity was evident across the three survey rounds, with summer (Round 2 Table 11-11) recording the highest overall levels of bat activity, followed closely by spring (Round 1 in Table 11-11). Activity during autumn (Round 3 in Table 11-11) was comparatively lower.

The bat passes logged across all species indicate a moderate level of bat activity associated with the site's boundary features.

11.5.5.1.3 Bat Roosts

The GLTA recorded one tree rated as a PRF-I (Figure 11-2) in the treeline along the northern boundary of the site. This was a mature ash tree isolated within the treeline with no connectivity in the canopy (Plate 11-27). No further surveys were completed, nor required (Collins, 2023) and the tree will remain in situ.



Plate 11-29: Mature ash with potential roost feature

Table 11-12 provides a summary of findings from the external and internal roost inspection surveys completed of the structures adjacent to the RLB.

Most structures were of negligible to low suitability for roosting bats and two are assessed as moderate (could not be accessed and assessed moderate as a precautionary approach); one showing no use, the other possible scat but occupied by cats and dogs. An emergence survey was undertaken at this structure assessed as moderate, and no bats were recorded emerging from the structure. None are considered to be highly suitable roost structures, supported by the lack of evidence of use by a large number of bats, regular use by bats or use by bats for extensive periods, criteria which differentiate a highly suitable roost (Collins, 2023), and which would leave sufficient evidence for surveyors to uncover. This is further supported by the desktop data showing generally poor bat activity and use of the site and the surrounds despite moderately suitable landscapes and the lack of any nearby roosts or direct connectivity to known roosts as per the BCI data.

Considering the location of the two sites (A and B in Figure 11-2) where only two of eleven structures have been considered moderately suitable on a precautionary basis, the survey effort and findings in terms of the risks that will be discussed for the Project (Section 11.7) are considered proportionate, and no further surveys are considered (survey effort and proportionality are covered in (Collins, 2023) and (Marnell, *et al.*, 2022)). This is motivated for the following reasons:

- Having completed the surveys early March 2026, there was no sufficient evidence that the structures were used as wintering roosts for any significant proportion of populations of the represented species recorded in the area.
- No bats were observed emerging from the surveyed structures in June 2026.
- BCI data showed no records of roosts within the vicinity for which these structures could play a supporting role. The nearest roosts were 3km from the site.
- These structures will remain in place and will not be direct affected. They are on an embankment above the ground level of the quarry (which will become the construction area) and there is a degree of buffering from disturbance, and complete exclusion from potential inadvertent disturbance / damage to the roosts.



Table 11-12: Summary of findings from roost inspections (to be read with Figure 11-2)

		Roost inspection	Roost suitability
Site A: Cluster of buildings north of the L3045 Powerstown Road			
		Main house is occupied with flat rooftop (green roof), no attic and is well-sealed, with no gaps between roof or guttering and walls. No PRFs and no signs of use observed. No internal inspection required.	Low
		Boiler house built of cinder blocks with corrugated roof. No PRFs internally or externally.	Low
		Old stone shed divided in 2, corrugated roof. Walls c. 50cm thick. Open with no doors. Walls have a number of cracks / missing stones which may serve as transitional roots only. No signs of use observed.	Low
		Old stone house with extension. A few cracks high on the gable/under gutters. Potential entrances under corrugated roof on extension. Roof intact, some widows open / broken. No signs of use observed.	Moderate (confirmed not to be a roost through emergence survey in June 2026)



		Roost inspection	Roost suitability
		Left: Converted garden shed / steam room with chimney. Serves as transitional roost only. No signs of use observed. Right: Corrugated metal shed. No PRFs. No signs of use observed.	Negligible
Site B: Cluster of buildings south of site, at the R448 / L3045 Powerstown Road intersection			
		Occupied farmhouse (structure in the background) with slate roof with new slates silicone over gaps. Only one small gap in apex slates at top of roof noted, but unknown if entry point. No other signs of entry noted. No signs of use observed.	Low
		Steel fabricated shed (structure in the foreground in the picture above) with cinder block back wall. May serve as an occasional transitional roost. No signs of use observed.	Low
		Large old stone farm building. Half slate roof; half corrugated. Loft space on slate side. Loose slates in roof, open windows to allow access on both sides. Possible bat scat and staining noted on interior central wall, but unable to gain full access. Considered to have potential to be used by bats.	Moderate (confirmed not to be a roost through emergence survey in June 2026)
			



		Roost inspection	Roost suitability
		Ground floor seems to be occupied with cats and dogs active around the property.	
		Smaller stone garden shed, with some gaps between roof and walls, however mostly covered in spider webs, indicating that it is not in frequent or recent use. No signs of use observed.	Low
		Shed with corrugated roof. Some gaps between roof and walls. May be used as a transitional roost occasionally. Cats sleep in this building.	Low

11.5.5.1.4 Bat Site Summary

The site has no suitability for bat roosts. The perimeter of the site has limited suitability for pathways and forage areas and considered as moderate to low suitability for bats. This is supported by the bat activity records at site.

The structures adjacent to the RLB rated as moderate suitability were confirmed not to be used by bats through emergence survey and winter roost inspections and is supported by lack of evidence of bat use.

The development footprint has negligible suitability for bats, with the habitats present offering neither meaningful foraging opportunities nor features that could support roosting (given its open nature and limited vegetation). In contrast, the perimeter habitats—including treelines, hedgerows and areas of scrub—provide a more favourable network of linear features that could facilitate limited commuting and foraging activity. These boundary features are therefore considered to offer low to moderate suitability for bats. This assessment is consistent with the bat activity data recorded on site, which indicates that bat use is largely confined to the site edges rather than the interior.

Adjacent to the site, several structures previously assessed as having moderate roost suitability are considered capable of supporting occasional or transient use by bats. These structures may provide opportunities for day roosts, night roosts or short-term shelter for individual bats or small groups. However, there is no evidence to suggest that these features function as significant winter hibernation sites or support maternity colonies. Their value is therefore likely to be limited to opportunistic or intermittent use rather than sustained or high-value roosting.



Taken together, the habitat assessment and survey results indicate that while the wider site margins contribute some ecological value for commuting and foraging bats—particularly common and soprano pipistrelle and Leisler's bat—the core development area does not form an important part of the local bat resource.

Bats are assessed as **local importance, higher value**.

11.5.5.2 Gas Pipeline

11.5.5.2.1 Suitability of the Gas Pipeline for Bats

The road which will support the gas pipeline infrastructure will not support any bat roosts, but is bordered by intermittent hedgerows and treelines (of various species and maturity, density along the length of the gas pipeline), treelines along watercourses at crossings IDB2 and IDB3, and also woodlands at crossings IDB1 and IDB4. No suitable habitat is present at IDB5 and IDB6.

East of the River Barrow, along the gas pipeline, there are dense treelines along the road from Kilcarrig Quarry to crossing IDB1 (habitat WN6) and again as the road approaches IDB2 (habitat WL1). West of the River Barrow the gas pipeline continues along public roads under very similar conditions although the linear habitats include more hedgerows and sparser treelines, with wooded areas limited to a broadleaved woodland approximately 800m south of crossing IDB4, a mixed broadleaved/conifer woodland at IDB4 and a planted woodland at the termination of the pipeline.

The adjacent linear habitats and abutting woodlands will contribute to pathways and forage areas for bats and the trees and the crossings could provide for roost features. A single potential roost feature (PRF – I) was identified during the GLTA within the verge of the road.

The outcome of the preliminary appraisal of the gas pipeline indicated that there may be roosting potential at the Cardinal Moran Bridge (IDB2), considered to be occasional and opportunistic roosting due to lack of historical roost records at this bridge (expected to be well documented given its location within the River Barrow, a significant bat corridor part of the River Barrow and River Nore SAC). This bridge crosses over the River Barrow which is a highly suitable flightpath and forage area for bats (rating slightly higher than the NBDC's Bat Landscapes tool assessment).

The remaining crossings showed no suitability for potential roosting but all three crossings (IDB1, IDB3 and IDB4) are within river corridors that are of moderate / high suitability for flightpaths and / or forage areas for bats (supported by the NBDC's Bat Landscapes tool assessment).

11.5.5.2.2 Bat Roosts

During the GLTA, a single potential roost feature (PRF – I) was identified in a mature sessile oak with a thick trunk covered in ivy (Plate 11-28) (Figure 11-2), approximately 374m before crossing IDB3. It formed part of scattered local treeline (considered as minor commuting corridors) connected to and just over 900m west of the River Barrow (the more significant bat commuting and foraging corridor in the area).



Plate 11-30: Mature oak with potential roost feature

Bat emergence surveys at the Cardinal Moran bridge (IDB2) (Plate 11-29) indicated that two bats may have emerged from the upstream bridge face on the west side. The species that were likely emerging could not be distinguished against the background bat activity in the River Barrow corridor (Daubenton's bat, Leisler's bat, brown Long-eared bat, common pipistrelle and soprano pipistrelle), which also affected confidence as to whether emerging bats were in fact roosting in the bridge. It is a busy and noisy road, and it is most likely used as a daytime opportunistic roost. This is supported by the lack of any records of roost at the bridge in the BCI database.

11.5.5.2.3 Bat Gas Pipeline Summary

Highly suitable pathways and forage areas occur along linear habitats directly connected to and along the River Barrow, the main ecological corridor with the vicinity of the gas pipeline (supported by BCI and NBDC bat records). The suitability of this corridor for bat commute/forage is supported by the bat activity records at the Cardinal Moran Bridge (IDB2).

The pipeline follows an existing public road, where the bat pathways and forage habitats are reduced to intermittent boundary hedgerows and tree lines. The existing traffic along the road reduces the suitability and likelihood of bats using these features for roosting, supported by the lack of any roosts identified in the BCI desktop data and the limited roosts identified during the survey.

The Cardinal Moran Bridge (IDB2) is the only bridge identified as a potential roost feature and is most likely used as a daytime opportunistic roost given the lack of emerging bats (only two bats potentially confirmed emerging) and the lack of any evidence uncovered during multiple ecological surveys at the bridge. The bridge is therefore rated as moderate roost suitability, erring on higher suitability.

Bats are assessed as **local value, higher importance**.



Plate 11-31: Cardinal Moran Bridge potentially providing roost features to bats

11.5.6 Birds

The desktop data for birds is presented in each of the baseline descriptions for the proposed development (Table 11-13) and the gas pipeline (Table 11-15).

11.5.6.1 *Site*

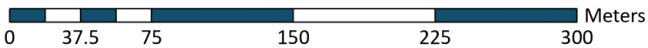
The bird populations recorded on site (Table 11-14) and in neighbouring areas (within 500m of site) are dominated by passerines and corvids, with gulls contributing mostly as fly-over records. The species are typically ubiquitous across a multitude of habitats within the wider landscape due to their general, unspecialised needs and use of habitats, coupled with their tolerance to anthropogenic activity. Figure 11-14 and Figure 11-15 show the bird records for summer and winter respectively, indicating the use of the site by birds.

The birds using the site and surrounds are habituated to existing disturbance from the existing Kilcarrig Quarry to the south (buffered by an area planted to crops), traffic on roads (busy R448 west and adjacent to site and the L3045 Powerstown Road along the southern border of the site), and the active waste recycling facility adjacent and east of the site. The northern and northwestern boundaries are adjacent to the more peaceful rehabilitated landfill site and improved agricultural grassland respectively, but further north lies the busy N8 / R448 interchange. Scattered around site are residential dwellings and agricultural lands which also contribute to anthropogenic effects in the surrounds. West of site lies the River Barrow supporting various habitats, dominated by improved agricultural grassland. There is a patchwork of more natural landscapes (the wet grasslands around the River Barrow and patches of woodlands) to highly disturbed and active landscapes (Kilcarrig Quarry), all utilised by birds.

Surveys along the Powerstown Stream indicate the stream provides perching and resting sites for riverine birds and suitability for limited foraging upstream of the culvert. Downstream of the culvert the foraging potential is reduced by vegetation debris cluttering the stream. The value as foraging habitat is further reduced by the paucity of fish and prey species. There were no suitable sites for breeding/nesting for kingfisher, dipper or the grey wagtail.



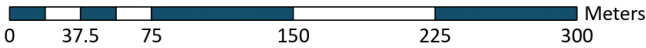
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	CLIENT: 	
PROJECT: Powerstown Bioenergy	SCALE: 1:4,000	REVISION: 0
	DATE: 01/07/2026	PAGE SIZE: A3



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TITLE: Winter Bird Survey Records	FIGURE NO: 11.15	
	CLIENT: 	
PROJECT: Powerstown Bioenergy	SCALE: 1:4,000	REVISION: 0
	DATE: 01/07/2026	PAGE SIZE: A3



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Table 11-13: Desktop survey results of birds recorded at the Site from NBDC and I-WeBS

Species (Latin Name)	Breeding / Wintering	Annex I	Latest NBDC record	I-WeBS*	Other Designations
BoCCI Red List species					
Barn Owl (<i>Tyto alba</i>)	Both	No	25/06/2021		Wildlife Acts.
Golden Plover (<i>Pluvialis apricaria</i>)	Both	Yes	26/12/2020	Yes	Wildlife Acts. EU Birds Directive: Annex I, II, III.
Grey Wagtail (<i>Motacilla cinerea</i>)	Both	No	07/06/2020		Wildlife Acts.
Kestrel (<i>Falco tinnunculus</i>)	Both	No	05/02/2023		Wildlife Acts.
Lapwing (<i>Vanellus vanellus</i>)	Both	Yes	11/01/2025	Yes	Wildlife Acts. EU Birds Directive: Annex II.
Meadow Pipit (<i>Anthus pratensis</i>)	Both	No	13/05/2020		Wildlife Acts.
Redwing (<i>Turdus iliacus</i>)	Wintering	No	09/03/2018		Wildlife Acts.
Snipe (<i>Gallinago gallinago</i>)	Both	No	11/01/2025	Yes	Wildlife Acts. EU Birds Directive: Annex II, III.
Stock Dove (<i>Columba oenas</i>)	Both	No	10/04/2021		Wildlife Acts.
Yellowhammer (<i>Emberiza citrinella</i>)	Both	No	10/03/2022		Wildlife Acts.
BoCCI Amber List species					
Black-headed Gull (<i>Chroicocephalus ridibundus</i>)	Both	Yes	07/11/2020	Yes	Wildlife Acts.
Cormorant (<i>Phalacrocorax carbo</i>)	Both	Yes	11/01/2025	Yes	Wildlife Acts.
Goldcrest (<i>Regulus regulus</i>)	Both	No	09/03/2018		Wildlife Acts.
Greenfinch (<i>Chloris chloris</i>)	Both	No	31/12/2011		Wildlife Acts.
House Martin (<i>Delichon urbicum</i>)	Breeding	No	01/06/2013		Wildlife Acts.
House Sparrow (<i>Passer domesticus</i>)	Both	No	31/12/2011		Wildlife Acts.
Kingfisher (<i>Alcedo atthis</i>)	Both	Yes	07/05/2021	Yes	Wildlife Acts. EU Birds Directive: Annex I.
Lesser Black-backed Gull (<i>Larus fuscus</i>)	Both	Yes	26/10/2022	Yes	Wildlife Acts.



Species (Latin Name)	Breeding / Wintering	Annex I	Latest NBDC record	I-WeBS*	Other Designations
Linnet (<i>Linaria cannabina</i>)	Both	No	10/04/2021		Wildlife Acts.
Mallard (<i>Anas platyrhynchos</i>)	Both	Yes	26/10/2022	Yes	Wildlife Acts. EU Birds Directive: Annex II, III.
Merlin (<i>Falco columbarius</i>)	Both	Yes	17/11/2020		Wildlife Acts. EU Birds Directive: Annex I.
Mute Swan (<i>Cygnus olor</i>)	Both	No	26/08/2012	Yes	Wildlife Acts.
Ruff (<i>Calidris pugnax</i>)	N/A	No	01/11/2022		Wildlife Acts. EU Birds Directive: Annex I.
Sand Martin (<i>Riparia riparia</i>)	Breeding	No	10/04/2021		Wildlife Acts.
Skylark (<i>Alauda arvensis</i>)	Both	No	10/04/2021		Wildlife Acts.
Starling (<i>Sturnus vulgaris</i>)	Both	No	11/01/2025		Wildlife Acts.
Barn swallow (<i>Hirundo rustica</i>)	Breeding	No	01/06/2013		Wildlife Acts.
Tree Sparrow (<i>Passer montanus</i>)	Both	No	31/12/2011		Wildlife Acts.
Willow Warbler (<i>Phylloscopus trochilus</i>)	Breeding	No	13/04/2018		Wildlife Acts.
BoCCI Green List species and other designated birds					
Little Egret (<i>Egretta garzetta</i>)	Both	No	26/10/2022	Yes	Wildlife Acts. EU Birds Directive: Annex I
Little Grebe (<i>Tachybaptus ruficollis</i>)	Both	Yes	05/03/2020	Yes	Wildlife Acts
Mistle Thrush (<i>Turdus viscivorus</i>)	Both	No	13/04/2018		Wildlife Acts
Pheasant (<i>Phasianus colchicus</i>)	Both	No	29/11/2020		Wildlife Acts. EU Birds Directive: Annex II, III
Robin (<i>Erithacus rubecula</i>)	Both	No	11/01/2025		Wildlife Acts
Sparrowhawk (<i>Accipiter nisus</i>)	Both	No	26/10/2022		Wildlife Acts

*Irish Wetland Bird Surveys data - Sub-site 2 - Rathvinden lock to Milford lock

Unconfirmed Annex I species recorded on the desktop surveys for the site (NBDC and I-WeBS Sub-site 2 - Rathvinden lock to Milford lock - within the 500m Zol) include:

- Kingfisher: The site provides no suitability for the species. The Powerstown Stream provides perching and resting sites but foraging potential is limited. The surveyed section of the stream provides no suitable sites for breeding for kingfisher.
- Little egret: The site provides no suitability for the species. The Powerstown Stream provides some wading areas that could serve for foraging, but the downstream in-stream clutter reduces habitat for foraging egrets.
- Ruff: The site nor the Powerstown Stream provide suitable habitat for this scarce migrant which occupies grassy marshes, fields and mudflats. The species could occur in surrounding areas but does not breed in Ireland.

Unconfirmed red-listed species recorded on the desktop surveys for the site (NBDC and I-WeBS Sub-site 2 - Rathvinden lock to Milford lock - within the 500m Zol) include:

- Barn Owl: Barn owl have been sighted flying in the area (personal observation from staff at the landfill site) and the site and surrounds are considered part of the foraging areas for barn owl. No barn owl signs (pellets, whitewash splashes, moulted feathers) were recorded during breeding raptor surveys. No signs of barn owls were observed around structures identified as potential suitable nesting sites, supported by the lack of nesting sites identified by Bird Watch Ireland (BWI) during barn owl surveys completed for Carlow County (Cully, et al., 2023). The site provides no suitable nesting sites for barn owl.
- Snipe: The site nor the Powerstown Stream provide suitable habitat for this species which occupies marshy and reedy wetland habitats and damp habitats.

Other amber-listed species recorded on the desktop surveys (NBDC and I-WeBS Sub-site 2 - Rathvinden lock to Milford lock - within the 500m Zol) are passerines (greenfinch, tree sparrow and willow warbler) that may utilise the perimeter habitat on site, but the remainder of the site has limited suitability to these species, limited to foraging activity in scrub and grassy areas.



Table 11-14: Field survey results of bird species recorded within the Zol of the site

Species	Behaviour/ Location	Supporting habitat within Zol?	Season	Annex I	BOCCI
Golden Plover	Large flocks (260 peak) recorded 4 times over 3 surveys flying towards, and circling over and adjacent to the River Barrow, within the Zol of noise disturbance from site activities.	Fields adjacent to the River Barrow provide foraging and roosting habitat for these species.	Winter	Yes	Red
Lapwing	Large flocks (80 peak) recorded 4 times over 4 surveys flying along River Barrow and feeding in adjacent fields, within the Zol of noise disturbance from site activities.		Winter	No	Red
Whooper Swan	Pair flying north over site in April 2026 on a single occasion.		Spring migration	Yes	Amber
Merlin	Flying through Kilcarrig Quarry on a single occasion.	Kilcarrig quarry provides hunting habitat for Merlin.	Winter	Yes	Amber
Grey Wagtail	One grey wagtail was observed on 2 occasions foraging in a muddy ephemeral pool and heard during another survey. Several more were recorded at pools in Kilcarrig quarry.	Powerstown Stream could provide foraging habitat for grey wagtail but no nesting habitat.	Winter	No	Red
Meadow Pipit	A flock of 9 meadow pipit was recorded on site, foraging in a limited grassy area in the far north-eastern corner of the site in winter. Meadow pipit were also recorded on Site on 2 other occasions as fly-overs.	Agricultural land adjacent to the site could provide foraging habitat for these species.	Winter/ Summer	No	Red
Redwing	A pair of redwing were observed singing in the northern treeline.		Winter	No	Red
Yellowhammer	Yellowhammer was heard singing from the northern treeline and confirmed on 2 other occasions, but only as fly-overs.	Arable fields directly south of the site could provide foraging habitat for these species.	Winter/ Summer	No	Red
Stock Dove	Stock dove was recorded foraging (singly and pair) on 3 occasions around various locations within the site.		Winter/ Summer	No	Red
Kestrel	1 female kestrel showing some hunting behaviour over the entrance to Kilcarrig quarry, and another female kestrel hunting over the quarry.	The site and surrounding areas provide suitable hunting habitat for kestrel.	Winter	No	Red



Species	Behaviour/ Location	Supporting habitat within Zol?	Season	Annex I	BOCCI
Black-headed Gull	Flocks (40 peak) flying over site and 1 flock (52) flying over Kilcarrig quarry, towards River Barrow. One flock (18) feeding in fields adjacent to River Barrow.	The River Barrow and adjacent fields could provide foraging and roosting habitat for these species.	Winter/ Summer	No	Amber
Lesser Black-backed Gull	Recorded in low numbers flying over Site and Kilcarrig Quarry towards River Barrow, one flock of 36 recorded foraging in flooded field adjacent to River Barrow.		Winter/ Summer	No	Amber
Mallard	Group of 7 recorded on pond at Kilcarrig quarry, individuals and pairs recording flying over Site and fields adjacent to River Barrow.	The River Barrow and adjacent fields could provide foraging and roosting habitat for this species.	Winter	No	Amber
Sand Martin	Sand martin was observed in a single summer survey as a flock of 10 birds showing interest in the mud banks next to pool area and a flock of 20 birds foraging in the grassy areas of the backfilled quarry. Sand martin was recorded again in March 2026, foraging over the site. Despite nesting behaviour observed by sand martins recorded in the neighbouring Kilcarrig Quarry (south of site), no such behaviour was noted in the birds observed on site. No nesting holes were noted on site, and the site did not provide suitable nesting sites (banks were not suitably vertical and / or suitably high from access to potential predators).	Areas suitable for nesting within the site and Kilcarrig quarry regularly have material extracted from them, making the areas unusable for nesting sand martins.	Summer	No	Amber
House Martin	A group of 7 house martin was recorded once foraging over Kilcarrig quarry.	There is no residential buildings or other suitable nesting areas for these species within the Zol.	Summer	No	Amber
Swallow	Swallow was recorded during 1 survey in summer as a flock of 5 individuals foraging in scrub on site.		Summer	No	Amber
Goldcrest	Goldcrest was recorded during 1 survey in winter feeding in the scrub on site.	Treelines and hedgerows in the site and surrounding areas could provide foraging and nesting habitat for these passerine species.	Winter	No	Amber
Linnet	Linnet was recorded regularly foraging and flying over the site in flocks of 4 to 21 individuals.		Winter/ Summer	No	Amber
Skylark	Skylark was recorded twice as site flyovers singly and in a group of 16 and recorded once foraging on the stubble field directly south of the site.	Agricultural land adjacent to the site could provide foraging and roosting habitat for skylark.	Winter	No	Amber



Species	Behaviour/ Location	Supporting habitat within ZOI?	Season	Annex I	BOCCI
Mute Swan	A male and female pair were recorded rafting on the section of the river Barrow adjacent to the site.	The River Barrow and adjacent fields could provide foraging and roosting habitat for mute swan.	Winter	No	Amber
Buzzard	Buzzard had eleven recordings, 10 of which were on site, and 1 at Kilcarrig landfill. Most recordings were flyovers or hunting behaviour over the site.	The site and surrounding areas provide suitable hunting habitat for these raptor species.	Winter/ Summer	No	Green
Sparrowhawk	Sparrowhawk was recorded twice, hunting near the old landfill directly north of the site, and hunting over the east of the site and adjacent recycling centre.		Winter/ Summer	No	Green



11.5.6.1.1 Site summary

Wader species, Annexed and red-listed golden plover and red-listed lapwing which were recorded adjacent to the site along the River Barrow in flocks numbering lower than their 1% national populations (910 and 820 respectively) are assessed as **local importance, higher value**.

In terms of raptors, the Annexed merlin, kestrel and buzzard are assessed as **local importance, higher value**.

Waterfowl species, mallard and mute swan, are assessed as **local importance, higher value**.

Gull species, lesser black-backed gull and black headed gull, are assessed as **local importance, higher value**.

Stock dove is assessed as **local importance, higher value**.

Passerines and Hirundines are assessed as **local importance, higher value**.

All other bird species were assessed as **local importance, lower value**.

11.5.6.2 Gas Pipeline

The gas pipeline will support similar species to those recorded at the site and surrounds given the overlap between the site's 500m ZoI for bird investigations and the gas pipeline. Therefore, the findings as detailed for the site are relevant to the gas pipeline, which originates on site and passes the Kilcarrig Quarry; findings for the site are not iterated here. Only additional sightings relevant to the remaining extent of the pipeline are further discussed.

The River Barrow is the most significant ecological feature for the gas pipeline and the bird baseline for the gas pipeline elaborates further on I-WeBS data along the River Barrow and on riverine birds surveyed during the aquatic surveys (Table 11-15).

The gas pipeline is within a road servitude for the most part lined with hedgerows and some treelines with adjacent land uses largely agricultural and residential in nature but also includes the existing quarrying at site and the neighbouring Kilcarrig Quarry. Birds using the habitats around the gas pipeline are habituated to existing disturbance from traffic along roads.

The gas pipeline crosses the River Barrow (the Cardinal Moran Bridge - IDB2) and its tributaries (IDB1, IDB3 and IDB4). Surveys indicated no suitability for kingfisher nesting at any of the crossings. IDB2 provided the most suitable nesting habitat for dipper and grey wagtail, with suitable forage for dipper along the tow path at IDB2, although no nesting or adult birds were observed during aquatic surveys or during other ecological surveys. Perching and resting areas were scattered along the water courses and all tributaries had potential to provide forage, although the fish populations may be limited by water quality at the time of surveys and existing barriers in water courses that could impede fish movement through the water courses.



Table 11-15: Desktop survey results of birds recorded along the gas pipeline from the NBDC and I-WeBS data

Species (Latin Name)	Breeding / Wintering	Annex I	Latest NBDC record	I-WeBS*	Other Designations
BoCCI Red List species					
Curlew (<i>Numenius arquata</i>)	Both	Yes	12/12/2021		Wildlife Acts. EU Birds Directive: Annex II.
Golden Plover (<i>Pluvialis apricaria</i>)	Both	Yes	22/10/2025	Yes	Wildlife Acts. EU Birds Directive: Annex I, II, III.
Grey Wagtail (<i>Motacilla cinerea</i>)	Both	No	04/06/2022		Wildlife Acts.
Kestrel (<i>Falco tinnunculus</i>)	Both	No	15/05/2023		Wildlife Acts.
Lapwing (<i>Vanellus vanellus</i>)	Both	Yes	01/01/2025	Yes	Wildlife Acts. EU Birds Directive: Annex II.
Meadow Pipit (<i>Anthus pratensis</i>)	Both	No	13/01/2018		Wildlife Acts.
Redwing (<i>Turdus iliacus</i>)	Wintering	No	11/01/2025		Wildlife Acts.
Snipe (<i>Gallinago gallinago</i>)	Both	No	31/12/2011	Yes	Wildlife Acts. EU Birds Directive: Annex II, III.
Swift (<i>Apus apus</i>)	Breeding	No	07/07/2019		Wildlife Acts.
Woodcock (<i>Scolopax rusticola</i>)	Both	No	05/12/2024		Wildlife Acts. EU Birds Directive: Annex II, III.
Yellowhammer (<i>Emberiza citrinella</i>)	Both	No	23/06/2017		Wildlife Acts.
BoCCI Amber List species					
Black-headed Gull (<i>Chroicocephalus ridibundus</i>)	Both	Yes	03/03/2020	Yes	Wildlife Acts.
Cormorant (<i>Phalacrocorax carbo</i>)	Both	Yes	11/01/2025	Yes	Wildlife Acts.
Goldcrest (<i>Regulus regulus</i>)	Both	No	19/01/2019		Wildlife Acts.
Greenfinch (<i>Chloris chloris</i>)	Both	No	31/12/2011		Wildlife Acts.



Species (Latin Name)	Breeding / Wintering	Annex I	Latest NBDC record	I-WeBS*	Other Designations
House Martin (<i>Delichon urbicum</i>)	Breeding	No	28/04/2018		Wildlife Acts.
House Sparrow (<i>Passer domesticus</i>)	Both	No	21/05/2016		Wildlife Acts.
Kingfisher (<i>Alcedo atthis</i>)	Both	Yes	19/09/2025	Yes	Wildlife Acts. EU Birds Directive: Annex I.
Lesser Black-backed Gull (<i>Larus fuscus</i>)	Both	Yes	10/03/2024	Yes	Wildlife Acts.
Linnet (<i>Linaria cannabina</i>)	Both	No	26/05/2023		Wildlife Acts.
Mallard (<i>Anas platyrhynchos</i>)	Both	Yes	25/01/2025	Yes	Wildlife Acts. EU Birds Directive: Annex II, III.
Merlin (<i>Falco columbarius</i>)	Both	Yes	11/01/2025		Wildlife Acts. EU Birds Directive: Annex I.
Mute Swan (<i>Cygnus olor</i>)	Both	No	26/05/2023	Yes	Wildlife Acts.
Sand Martin (<i>Riparia riparia</i>)	Breeding	No	28/04/2021		Wildlife Acts.
Skylark (<i>Alauda arvensis</i>)	Both	No	11/01/2025		Wildlife Acts.
Spotted Flycatcher (<i>Muscicapa striata</i>)	Breeding	No	04/07/2012		Wildlife Acts.
Starling (<i>Sturnus vulgaris</i>)	Both	No	26/05/2023		Wildlife Acts.
Barn swallow (<i>Hirundo rustica</i>)	Breeding	No	26/05/2023		Wildlife Acts.
Teal (<i>Anas crecca</i>)	Both	Yes	13/01/2018		Wildlife Acts. EU Birds Directive: Annex II, III.
Willow Warbler (<i>Phylloscopus trochilus</i>)	Breeding	No	26/05/2023		Wildlife Acts.
BoCCI Green List species and other designated birds					
Great Spotted Woodpecker (<i>Dendrocopos major</i>)	Both	No	21/05/2023		Wildlife Acts
Little Egret (<i>Egretta garzetta</i>)	Both	No	16/06/2024	Yes	Wildlife Acts. EU Birds Directive: Annex I



Species (Latin Name)	Breeding / Wintering	Annex I	Latest NBDC record	I-WeBS*	Other Designations
Little Grebe (<i>Tachybaptus ruficollis</i>)	Both	Yes	31/12/2011	Yes	Wildlife Acts
Mistle Thrush (<i>Turdus viscivorus</i>)	Both	No	26/05/2023		Wildlife Acts
Peregrine (<i>Falco peregrinus</i>)	Both	Yes	15/04/2015		Wildlife Acts. EU Birds Directive: Annex I
Pheasant (<i>Phasianus colchicus</i>)	Both	No	08/03/2019		Wildlife Acts. EU Birds Directive: Annex II, III
Robin (<i>Erithacus rubecula</i>)	Both	No	11/01/2025		Wildlife Acts
Rock Dove (<i>Columba livia</i>)	Both	No	11/01/2025		Wildlife Acts. EU Birds Directive: Annex II
Sparrowhawk (<i>Accipiter nisus</i>)	Both	No	16/04/2023		Wildlife Acts
Stonechat (<i>Saxicola rubicola</i>)	Both	No	31/12/2011		Wildlife Acts

* Irish Wetland Bird Surveys data - Sub-site 2 - Rathvinden lock to Milford lock



Annex I species whooper swan recorded flying over during spring migration cannot be excluded from occurring in and along the River Barrow, in its tributaries or in the surrounding habitats.

Other red-listed species recorded on the desktop surveys for the gas pipeline (excludes confirmed species at the site) and I-WeBS Sub-site 2 - Rathvinden lock to Milford lock (within the 500m ZoI) include:

- Snipe: The River Barrow and its tributaries may not be directly suitable where the water flows, but the species may use sheltered areas where the waters are slowed or where water creates flooded marshes within the floodplains, and they cannot be excluded from occurring in nearby aquatic environments.
- Swift: the birds breed throughout Ireland and preferentially utilise structures. The crossings were inspected and no swifts were observed using the structures at the crossings, but they cannot be excluded from breeding in the structures surrounding the gas pipeline.
- Woodcock: the species preferentially occupies wet forests and woodlands and may occur in representative habitats surrounding the gas pipeline.
- Curlew: this species may utilise the floodplains along the river Barrow.

Other amber-listed species recorded on the desktop surveys for the gas pipeline (excludes confirmed species at the site) and I-WeBS Sub-site 2 - Rathvinden lock to Milford lock (within the 500m ZoI) include:

- Teal, shelduck and coot: These wildfowl species cannot be excluded from occurring in and along the River Barrow, in its tributaries or in the surrounding habitats due to the variety of habitats/microhabitats supported along the stretch of the River Barrow.
- Greenfinch, spotted flycatcher tree sparrow and willow warbler: These passerines utilise a variety of grassland / field habitats, including in and around farms and villages, and take shelter and nest in hedges, shrubs and /or trees. They are tolerant of anthropogenic activity and are likely to occur in representative habitats around the gas pipeline.
- Greylag goose: The River Barrow provides reedy lengths of habitat and marshy areas that could support these species, and they could occur in appropriate aquatic habitat in the vicinity of the gas pipeline.

The River Barrow is equally likely to support kingfisher, and a focussed survey was completed around the proposed crossings (IDB1, IDB2, IDB3 and IDB4) for the kingfisher and suitability of habitat for the kingfisher. No suitable nesting habitat was recorded along the surveyed section of streams around the crossings, and no kingfisher nesting is expected at the crossings.



Table 11-16: Field survey results of bird species recorded along the gas pipeline in addition to the species recorded for the site and surrounds in Table 11-14

Species	Behaviour/ Location	Season	Annex I	BOCCI
Lapwing	One recording of lapwing flying along the river Barrow and landing in an adjacent field.	Winter	Yes	Red
Little Egret	One recording of a single little egret.	Winter	Yes	Green
Black-headed Gull	A flock of 12 black-headed gulls were recorded in a field c. 50m from Cardinal Moran bridge.	Winter	No	Amber
Mallard	Mallard was recorded on three occasions in flocks of two and three on the River Barrow and a flock of 39 in a field adjacent to the River Barrow.	Winter	No	Amber
Cormorant	There were four recordings of cormorant including one of an individual bird foraging on the river Barrow and three further recordings of small groups of birds roosting next to the river.	Winter	No	Amber
Mute Swan	Mute swan was recorded four times, including separate sightings of a pair, a juvenile and an adult female on the river Barrow and a juvenile in a field next to the river.	Winter	No	Amber
Grey Heron	There were three sightings of grey heron, one in a field adjacent to the Rive Barrow and two of individuals hunting on a weir directly north of Cardinal Moran bridge.	Winter	No	Green



11.5.6.2.1 Gas pipeline summary

Annexed Kingfisher was assessed as **local importance, higher value**.

Wader species Annexed and red-listed lapwing is assessed as **local importance, higher value**.

Little Egret is assessed as **local importance, higher value**.

Gull species black-headed gull is assessed as **local importance, higher value**.

Wildfowl species mallard and mute swan are assessed as **local importance, higher value**.

Cormorant and Grey Heron are assessed as **local importance, higher value**.

11.5.7 Herpetofauna

The NBDC returned no records for reptiles or amphibians within the 2km grid squares for the site (S76E) and the gas pipeline (S76D, S66Y, S66Z and S67V).

11.5.7.1 Site

No Reptiles were recorded during targeted refugia and walkover surveys, and they are not considered to be using the proposed development lands.

Frog spawn was recorded in shallow ephemeral pools that had formed in the centre of the site in February 2025 (Plate 11-30 and Figure 11-4). By May 2025, these pools had dried up.

eDNA in the water sample from the ephemeral ponds (Figure 11-4) tested positive for smooth newt (*Lissotriton vulgaris*). They are considered to be utilising the site, but this must be considered against the limitations of eDNA (Section 11.4.7), where DNA can be transported to sites by predators and humans (tyres and boot treads).

The common lizard, common frog and smooth newt are protected under the Wildlife Acts, they are evaluated as **local importance, higher value**.



Plate 11-32: Pools on site supporting frog spawn



11.5.7.1 Gas pipeline

A single clump of frog spawn was observed near the Rathornan Stream crossing in flooded grassland (IDB3 in Plate 11-31 and Figure 11-6). No smooth newts or common lizards or any other signs of herpetofauna were recorded during surveys of the gas pipeline.

The common frog and smooth newt are protected under the Wildlife Acts, they are evaluated as **local importance, higher value**.



Plate 11-33: Flooded area along Rathornan Stream with frog spawn

11.5.8 Terrestrial Invertebrates

The invertebrate species listed in Table 11-17 have been recorded within the 2km grid squares for the site (S76E) and the gas pipeline (S76D, S66Y, S66Z and S67V). Three pollinator species have been recorded, with one endangered species, Gooden's Nomad Bee (Hymenoptera: Apidae), recorded for the 2km grid square for the site.

Table 11-17: Historical NBDC invertebrate records for the last two decades for the site and the gas pipeline

Species (Latin Name)	Latest record: Site	Latest record: Gas pipeline	Designation
Gooden's Nomad Bee (<i>Nomada goodeniana</i>)	15/04/2023		Endangered
Moss Carder Bee (<i>Bombus muscorum</i>)		08/05/2018	Near threatened
Red-tailed Bumblebee (<i>Bombus lapidarius</i>)	06/04/2019	02/07/2022	Near threatened



Regarding the pollinators, which encompasses the desktop invertebrates historically recorded in the area (Table 11-17), the foraging habitat available on site is very limited and includes the limited hedgerows and treelines (which will be retained *in situ*), and to a very limited extent scrub (partly retained on site). Despite the site providing opportunity for mining bee nesting sites, the limited pollinator forage habitat, will limit the populations of mining bees (and general pollinator populations) and their parasites, such as the cuckoo bees like Gooden's Nomad Bee.

During consultations held with NPWS, Brian O'Connor, the Local Ranger (presentation and meeting of the minutes are attached in Appendix 11.5 in Volume 3 of this EIAR), indicated that the dingy skipper (*Erynnis tages*) (Lepidoptera: Hesperiiidae) may be an uncommon and scarce species to consider during surveys as it is known to frequent quarries, limestone grasslands and boglands²⁷.

The site is outside of the main distribution range mapped for the dingy skipper²⁷, however this is considered in the context that it is an uncommon species in Ireland. The species' only host plant, bird's-foot-trefoil (*Lotus corniculatus* var. *sativus*) is recorded very infrequently around site and on one occasion from site. Given the lack of the host plant on site and the scarcity of its host plant (given that it is its only host plant) locally, the dingy skipper is unlikely to occur on site.

11.5.8.1 Site

Although a dedicated invertebrate assessment was not carried out, invertebrates were recorded when observed during targeted ecological surveys. General insect activity is present on site, evidenced by activity of insectivorous species on site (largely birds and bats).

No butterflies are confirmed on site and their paucity on site is also delimited by adequate forage on site (flowering plants and herbs).

The additional value of these invertebrates to insectivores notwithstanding, the on-site pollinators and butterflies are evaluated as **local importance, lower value**.

11.5.8.2 Gas Pipeline

General invertebrate activity is present in the variety of habitats adjacent to the gas pipeline and within the aquatic and riverine habitats, evidenced by activity of insectivorous species on site (including a diversity birds, bats and likely juvenile and adult fish). The diversity encompasses pollinators, decomposers, soil-dwelling invertebrates and predators (which may predate on pest and vectors species).

The gas pipeline and the construction camps and storage yards are within the built environment of road servitude, existing bridges and culverts, and amenity/agricultural grassland of low value to biodiversity and unlikely to supporting significant invertebrate biodiversity.

Invertebrates as a group are evaluated as **local importance, lower value**.

²⁷ Irish Butterflies provided summary information on the dingy skipper, accessed on the 11 February 2026 at http://www.irishbutterflies.com/dingy_skipper_butterfly_of_ireland.html



11.6 Ecological Resource Evaluation

Table 11-18 lists all identified ecological receptors and assigns them an ecological importance in accordance with the Guidelines for Assessment of Ecological Impacts of National Road Schemes (TII, 2009, republished 2025). This table also provides the rationale for this determination and identifies the habitats and species that are Key Ecological Receptors (KERs). The potential effects of the Project on these ecological receptors are considered in the impact section of this report, and mitigation/ measures will be incorporated into the Project where required, to avoid potential significant effects on these receptors.

11.6.1 Receptor Evaluation

Table 11-18 summarises the evaluations (defined in Section 11.4.6) of the various ecological receptors identified during the baseline assessment of the site, gas pipelines and surrounding areas overlapping the identified Zols. The table also goes on to provide rational as to whether these ecological receptors are considered key ecological receptors (KERs) in terms of the site and gas pipeline.

Table 11-18: Evaluation of ecological receptors for the site and gas pipeline

Feature	Evaluation	Rationale	KER	
			Site	Gas pipeline
River Barrow and River Nore SAC	International importance	Protected under international law and is within the Zol for potential impact from watercourse crossings.	No	Yes
Cloghrick Wood pNHA	National importance	Represents a riverine woodland along the River Barrow. The was specially confirmed to be outside the Zol for atmospheric impact. Is outside the Zol	No	No
Wildfowl Sanctuary	National importance	The wildfowl sanctuary is outside any Zol for direct or indirect effects from the Project	No	No
Terrestrial Habitats within the site boundary / gas pipeline and surrounds (BC1, BL3, ED2, ED3, ED4, GA1, WD5)	Local importance, lower value	Habitat has limited biodiversity value (BL3, ED2, ED3, ED4). Intensively managed habitat (GA1, WD5). Serves negligible (road surfaces and buildings) to relatively low (other habitats) ecological function in terms of connectivity and biodiversity within the greater landscape.	No	No
Terrestrial habitats within the site boundary (GS2, GS1/GS2 mosaic, WS1)	Local importance, higher value	Natural to semi-natural / diverse habitats that contribute to the local biodiversity, provide ecological services that support local ecosystems, fauna and flora, and /or provide habitat that support more unique and diverse species. Habitats are within the Zol for direct impact within the Site.	Yes	No



Feature	Evaluation	Rationale	KER	
			Site	Gas pipeline
Terrestrial habitats around site and gas pipeline (GS2, WD2, WS1)	Local importance, higher value	Natural to semi-natural / diverse habitats that contribute to the local biodiversity, provide ecological services that support local ecosystems, fauna and flora. . Habitats are within the Zol for indirect impacts related to dust.	Yes	Yes
Terrestrial habitats more than 50m from site (BC1, FW2, GS1, GS2, GS4, GA1, WN6)	Local importance, lower value and higher value	Habitats are outside the Zol for all potential impacts.	No	No
Linear terrestrial habitats (WL1, WL2, WS1)	Local importance, higher value	These linear habitats represent poor (site and gas pipeline) to good (gas pipeline) ecological corridors within the local setting, connecting to more regional corridors (River Barrow) in the case of the gas pipeline. The habitats provide valuable habitats for cover, refuge, forage and nesting/roosting. Habitats are within the Zol for indirect impacts related to dust.	Yes	Yes
Aquatic habitats (FL8)	Local importance, higher value	Ephemeral pools within the existing quarry, allowing for opportunistic uses such as frog spawning and mud prospecting by birds and invertebrates. Habitats are within the Zol for direct impact within the Site.	Yes	No
Aquatic habitats (FS1 & FW2)	Local importance, higher value	Riverine habitats providing ecosystem services and ecological connectivity in the local setting. Habitat is within the Zol for potential impact from HDD under the River Barrow.	No	Yes
River Barrow and its aquatic ecosystems	International importance	Supporting river to the River Barrow and River Nore SAC and its QIs.. Habitat is within the Zol for potential impact from watercourse crossings on the proposed gas pipeline route.	No	Yes
Tributaries and their aquatic ecosystems	Local importance higher value	Tributaries support aquatic species and are locally connected to the regional riverine corridor, the River Barrow. The nature of the site being at a lower topographical elevation than its neighbouring areas means that, under natural conditions, there is no direct hydrological pathway from site to any aquatic ecosystem. As per Chapter 13 Surface Water and Hydrology in Volume 2 of this	No	Yes



Feature	Evaluation	Rationale	KER	
			Site	Gas pipeline
		EIAR, there is no impact to any watercourses from the site. Habitat is within the ZOI for potential impact from watercourse crossings on the proposed gas pipeline route.		
Bee orchid/Pyramidal orchid	Local importance, higher value	Individuals of these orchids were observed inside the site boundary where they are within the ZOI for direct disturbance. They were also recorded along the R448 road at the northern extent of the gas pipeline. They are within the ZOI for dust related effects from the site. They are in the ZOI for direct inadvertent damage if used as laydown areas.	Yes	Yes
Greater knapweed	National importance	Individuals were recorded along the site boundary and are within the ZOI for dust related effects. They are in the ZOI for direct inadvertent damage if used as laydown areas.	Yes	Yes
Mammals	Local importance, higher value	Mammals are protected under the Wildlife Acts. Other than one badger track along the gas pipeline, no other signs of these protected mammals were recorded. Commuting species are likely associated with the ecological corridors and wooded areas, more likely along the more significant habitat units around the River Barrow. Breeding species are unlikely given the lack of any signs. However, mammals cannot be excluded from potentially commuting through the Project lands.	Yes	Yes
Otter	International importance	This is a QI species of the River Barrow and River Nore SAC. While no otter resting or breeding sites were recorded, otter signs (fresh footprints) were observed during dedicated otter surveys, and they are commuting through the River Barrow and its tributaries. Otter are potentially within the ZOI for disturbance during watercourse crossing works.	No	Yes
Bats	Local importance, higher value	Bats are likely to utilize the linear habitats which will be retained at site and along the gas pipeline, except for marginal removal/trimming that may be required around existing access to construction camps and storage areas for the gas pipeline. The site and gas pipeline support no roosts. The proposed HDD crossing will avoid direct effects on roost and there is no intention to remove any trees along the gas pipeline.	Yes	Yes



Feature	Evaluation	Rationale	KER	
			Site	Gas pipeline
		There will be lighting used in winter during the construction phase at the site and along the gas pipeline, and during operational phase at the site that could spill into neighbouring areas. Bats are within the Zol for disturbance from light.		
Avifauna	Local importance, higher value	Records represented a range of birds of varying legal status (annexed, BoCII, Wildlife Acts). Species are typically ubiquitous across a multitude of habitats within the wider landscape, with tolerance to human and human-related activities. Habitats utilised by birds are represented across the regional landscape and birds are generally considered within the Zol for loss of habitats on site and within the Zol for disturbance.	Yes	Yes
Reptiles	Local importance, lower value	The site provides marginal habitat (scrub and grassy areas) for common lizards. Despite targeted surveys, no common lizards were confirmed on site and will not be affected by the Project.	No	No
Amphibians	Local importance, lower value	Frog spawn was confirmed on site within the ephemeral pools which is within the Zol for direct loss of habitat and potential mortality. Spawn was also confirmed at one location near IDB3 within a flooded grassland which will not be affected by the proposed gas pipeline and is outside the Zol for potential effects.	Yes	No
Terrestrial invertebrates (excluding the species to follow)	Local importance, higher value	The site and the gas pipeline provide limited value to invertebrate populations, and the more significant natural and semi-natural habitats, likely to support the more significant populations of invertebrates will remain unaffected. They are not considered under threat where they may be within the Zol to an extent that would cause significant declines locally.	No	No
Fish (including salmon and lamprey, QI species)	International importance	The River Barrow and tributaries provide various fishery habitat including for salmonids and lamprey. The watercourse crossings on the gas pipeline route have potential to result in degradation in fishery habitat.	No	Yes
White-clawed crayfish (QI species)	International importance	The River Barrow and all tributaries (except IDB3) supported some habitat suitable for white-clawed crayfish with historical records positive for IDB1, IDB2 and possibly (dead specimen which may have been dropped by predator) the Powerstown Stream.	No	Yes



Feature	Evaluation	Rationale	KER	
			Site	Gas pipeline
		The watercourse crossings on the gas pipeline route have potential to result in degradation in fishery habitat.		
Floating River vegetation (QI of the SAC)	International importance	The River Barrow, near the proposed gas pipeline crossing of Cardinal Moran Bridge, supports floating river vegetation. The watercourse crossings on the gas pipeline route have potential to result in degradation in aquatic habitat in the main Barrow channel through construction stage runoff.	No	Yes

The following KERs are considered for the Proposed Development:

- Terrestrial habitats within the site boundary (FL8, GS2, GS1/GS2 mosaic, WS1) (Local importance, higher value) are within the ZOI for direct loss during construction.
- Terrestrial habitats around site (GS2, WL1, WL2, WS1) (Local importance, higher value) are within the ZOI for indirect impacts related to dust during construction.
- Bee orchid/Pyramidal orchids (Local importance, higher value) are within the ZOI during construction for direct disturbance where they occur on site and within the ZOI for dust related effects where they occur in road verge or adjacent grasslands along the R448.
- Greater knapweed (National importance) are within the ZOI during construction for dust related effects where they occur within the road verge along the R448.
- Mammals may be moving through the perimeter vegetation at site and are within the ZOI for disturbance or injury during construction.
- Bats (Local importance, higher value) are within the ZOI for disturbance from lighting during construction and during operation of the proposed development.
- Avifauna (Local importance, higher value) within the ZOI for loss of habitats on site and within the ZOI for disturbance during construction.

Amphibians (Local importance, lower value) within the ZOI for direct loss of habitat and potential mortality during construction.

The following KERs are considered for the gas pipeline:

- Terrestrial habitats around the gas pipeline (WD2, WL1, WL2, WS1) (Local importance, higher value) are within the ZOI for indirect impacts related to dust during construction.
- Bee orchid/Pyramidal orchid (Local importance, higher value) and Greater knapweed (National importance) are in the ZOI during construction for direct inadvertent damage if used as laydown areas for pipeline materials.



- Mammals including otter may be moving through the area around the gas pipeline and are within the ZOI for disturbance or injury during construction.
- Bats (Local importance, higher value) are within the ZOI for disturbance from lighting during construction.
- Avifauna (Local importance, higher value) are within the ZOI for disturbance during construction.
- River Barrow and River Nore SAC (International importance) and the River Barrow and its associated aquatic ecosystem (International importance) is within the ZOI for potential impact for water quality degradation in the main channel of the River Barrow and its tributaries via construction runoff from watercourse crossing locations on the proposed gas pipeline route. This is applicable to the following KERs that are reliant on the aquatic ecosystem:
 - Aquatic habitats (FS1 & FW2) (Local importance)
 - QI Fish (International importance)
 - White-clawed crayfish (International importance)
 - Floating River vegetation (International importance).

11.7 Assessment of Likely Significant Impacts

11.7.1 'Do Nothing' Impacts

If the Project does not proceed, the site would continue to be managed as it has been operating, i.e. as a quarry approaching end of life. The eventual decommissioning and rehabilitation may see the site change in overall biodiversity.

In the absence of the Project, it is likely that faunal assemblages in the scrub, tree lines and hedgerows will persist within the site. Species using the muddy ponds and quarry faces are unlikely to continue utilising the site as the quarry is back-filled, shaped and rehabilitated to grassland. This scenario does not vary greatly in relation to the Project proceeding on site, where the treelines and hedgerows and limited scrub will be retained *in situ*.

In the absence of any active management of the site to maintain the rehabilitated grasslands, the existing scrub will encroach and expand to cover the site.

11.7.2 Effects on Designated sites

11.7.2.1 European Sites

An Appropriate Assessment Screening Report and Natura Impact Statement (NIS) have been prepared to provide the competent authority with the information necessary to complete an Appropriate Assessment for the Project in compliance with Article 6(3) of the Habitats Directive.

As per the EPA Guidance (2022), "a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European Sites contained in a Natura Impact Statement" but should "incorporate their key findings as available and appropriate".



The Screening for Appropriate Assessment concluded that it cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the European site, that the Project, individually or in combination with other plans and projects, would be likely to have a significant effect on European sites in respect off the River Barrow and River Nore SAC (002162).

A NIS was therefore prepared which examined the potential pathways for adverse effects on the European Site and prescribed mitigation to ensure the pathways by which such effects may occur have been robustly blocked through the use of avoidance, appropriate design and mitigation measures. The measures ensure that the construction, operation and decommissioning of the Project does not adversely affect the integrity of any European sites. Therefore, it can be objectively concluded that the Project, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.

11.7.3 Construction Phase Impacts

The full description of the construction phase is provided in Chapter 3 Description of the Proposed Development in Volume 2 of this EIAR.

11.7.3.1 *Site*

The construction phase impacts considered for the site include:

- Loss of KER habitats and unique floristic species.
- Degradation of KER habitats and near threatened / unique floristic species due to dust dispersal, which has been assessed in Chapter 8 Air Quality in Volume 2 of the EIAR to pose a medium risk on potential sensitive habitats within the Zol.
- Spread and establishment of invasive species.
- Loss of habitats / resting places for small mammals e.g. shrew/mice and hedgehog and potential for mortality.
- Disturbance to mammals and birds due to visual effects and noise, including temporary lighting that may be required during the winter season.
- Loss of amphibian habitat and potential for mortality.

11.7.3.1.1 Loss of Habitat and Flora Species

The proposed development's construction phase will result in the long-term loss of habitats, most rated as local importance (lower value) and not considered as key ecological receptors (KERs) as per TII (2009) Guidelines for Assessment of Ecological Impacts of National Roads Schemes.

Effects are therefore limited to the loss of ephemeral pools (100% loss of temporary habitat) and scrub on site (Table 11-19) (the more important linear scrub will be retained along the perimeter of the site). The impacts are negative and of long-term duration, but local (site specific) scale with only limited removal / alteration of habitats. and imperceptible for scrub, where most of the habitat will be retained and remain interconnected with existing linear ecological features.

Impact Evaluation: Likely, long-term, slight, negative effect.



Bee orchids and pyramidal orchids have been identified on site within three areas along the outskirts of the site that may be affected by site preparation during construction (Figure 11-7). These are a native but scarce species with wide but localised distribution with a preference for prefers dry, calcareous, well-drained soils. As such, loss of suitable habitat with confirmed populations. As such, loss of such habitat from within the proposed development site will reduce the distribution of these species. In the absence of mitigation, these three areas supporting around 26 individual orchids will be lost during the project's construction phase. Bee orchid is rare in County Carlow, with only a small number of verified records on NBDC (5-20 records). As such, loss of these plants is considered significant at a County level.

Impact Evaluation: Likely, long-term, significant, negative effect.

11.7.3.1.2 Degradation of Habitats and Flora by Dust

There is potential, in the absence of mitigation, for the temporary deterioration of neighbouring habitats, near threatened knapweed and the orchids populations adjacent to site due to dust. As per Chapter 8 Air Quality in Volume 2 of the EIAR the more significant impacts to the highly sensitive ecology receptors are evaluated as direct, short-term, negative and of moderate significance.

Given the ecological evaluations of habitats and species (evaluated as local importance, lower / higher) within the defined 50m ZoI, the impact from dust is limited due to reduced receptor sensitivity to dust, tolerance of the habitat to dust (adjacent to existing quarry) and the prevailing climatic conditions (wind and rain) which will reduce the retention time of the dust.

Impact Evaluation: Unlikely, short-term, imperceptible, negative effect.

11.7.3.1.3 Spread of Invasive Species

One terrestrial Third Schedule invasive species, Himalayan balsam, and one non-native species, a 10m long stand of Snowberry, were recorded within the site boundary. Regulated invasive species are proven threats to biodiversity, outcompeting local native species, creating homogenous areas of uniform vegetation and clearing the way for other, potentially more rigorous, invasive species. Non-native, non-scheduled invasive species may be equally damaging to biodiversity under conditions appropriate to the species. There are treatments in place for invasive species, and ultimately infestations can be reversed.

The effect is negative, and the establishment of the invasive species has potential to be a long-term effect, with potential to be spread beyond the site boundary.

Impact Evaluation: Unlikely, long-term, significant, negative effect.

11.7.3.1.4 Disturbance to Non- volant Mammals

Daytime noise and anthropogenic activity during the construction phase will have no significant effect on mammals breeding or resting places given their general absence from the proposed development lands (Section 11.4.3).

The site has limited suitability for smaller mammals and includes the limited areas of scrub, hedgerows, edges of the treelines where these are not to be retained (i.e. against the quarry face). Although there is a negative impact associated with loss of habitat (and potentially food provision associated with that habitats), the impact is of short-term duration and site level (local scale impact only), and unlikely to cause population-level effects and is considered imperceptible.



The removal of the scrub may harm and increase the risk of mortality to any small mammals present. Similarly they may be impacted through injury or mortality by on-site conditions (excavations, unsecured equipment, steeply stockpiled materials). However, given the unlikely potential interaction with small mammals (no signs on site), the effects of the proposed development on the local populations during the construction phase are considered imperceptible with local populations highly likely to recover. Construction activities will be during the daytime and lighting will only be required for brief periods during the winter seasons or during poor visibility due to weather. The sunken nature of the site coupled with the existing treeline, hedgerows and scrub on the earth banks surrounding the site means that light spill during construction will be contained at the site and to its perimeter. This coupled with the lower activity of mammals during winter, and their habituation to anthropogenic activity means that there will be no significant effect on mammals due to temporary lighting that may be required during construction.

Impact Evaluation: Unlikely, temporary, imperceptible, negative effect.

11.7.3.1.5 Disturbance to Bats

Bats and their roosts are protected under the Wildlife Acts and the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

There are no bat roosts with the ZOI of the proposed development.

Construction activities will be during the daytime and lighting will only be required for brief periods during the winter seasons or during poor visibility due to weather. The low topography of the proposed development site relative to adjacent lands coupled with the existing treeline, hedgerows and scrub on the earth banks surrounding the site means that light spill during construction will be contained at the site and to its perimeter, which has moderate to low suitability for flight-paths and foraging habitats and is less likely to be used during winter when bat activity is reduced to warmer nights and calmer weather. The limited use of lighting during construction in winter will effect foraging behaviour of any bats that may be active during such periods, but the effect on bat populations is considered imperceptible at the local scale.

Impact Evaluation: Unlikely, temporary, imperceptible, negative effect.

11.7.3.1.6 Impacts on Birds

As detailed in Section 11.5.6.1 none of the habitats on-site that will be lost are considered significant resources (in terms of size and quality for nesting and foraging) for the birds and contribute marginally to resources (food and water) and refuge. The loss of resources to birds is negative and will be long-term but is unlikely to affect the local population and is imperceptible, especially considering that the important resources that support the bird populations on site, the treelines and hedgerows, will be retained.

Impact Evaluation: Unlikely, long-term, imperceptible, negative effect.

Disturbance to neighbouring areas that may be used by birds is considered in light of the existing local setting (active quarry and busy roads).

The site will be largely screened given its location in a depression, and the only visual disturbance during construction will be related to the movement of vehicles in and around the site and limited lighting that will be required during the winter months. This is not dissimilar to the current existing disturbances, to which birds recorded in the surrounding habitats are habituated to. Disturbance may cause initial flight response in birds using neighbouring habitats, but no long-term effects are expected to bird populations.



Impact Evaluation: Unlikely, short-term, imperceptible, negative effect.

11.7.3.1.7 Impacts on Herpetofauna

Protected amphibian species considered to utilise the site include the common frog (spawn confirmed in the temporary pools) and smooth newt (eDNA from temporary pool water sample).

The ephemeral pools are dynamic (depending on the changing surface topography at the quarry), drying up in May (noted to be dry in surveys undertaken in May 2025 and 2026). They are temporary habitats used by amphibians (common frog spawn confirmed) and likely also smooth newt (as per eDNA results). The loss of habitats on site will cause long-term loss of breeding habitat but the effect is considered significant only at the local scale (site specific), and no population level effects are expected at the regional scale; adult Herpetofauna are known to disperse into terrestrial areas and opportunistically use various suitable pools encountered across the landscape (TII, 2008, republished 2025).

Impact Evaluation: Likely, long-term, significant, negative effect.

Should construction phase coincide with spawning (late February) and the presence of aquatic tadpoles (up to 15 weeks after spawning), there could be direct loss through mortality. Mortality of any amphibian is negative, long-term, likely and of moderate significance at the local scale only (population-level effects are not considered significant).

For newt, the pools do not provide suitable habitat for breeding (and no evidence of same to date through survey). It is likely that eDNA results are from other source e.g. bird dropping. No impacts are likely.

Impact Evaluation: Likely at appropriate season, long-term, moderate, negative effect.

11.7.3.2 Gas Pipeline

The gas pipeline will remain within the road reserve and six existing water crossings (River Barrow, three tributaries and two land drainage channels), as described in Section 11.2. Typically, a pipe installation crew will lay approximately 100 m of pipe a day. Materials required to complete that day's work will be brought to the active construction site daily. Materials will be temporarily laid in the adjacent servitude areas of the roads (R448, L3038, L3039 and L3041). Construction camps, storage yards and any laydown areas will be in agricultural grasslands and / or in the road servitudes and no KER habitats (Section 11.6.1) will be utilised for such activities.

Therefore, potential impacts are within a limited section of the gas pipeline each day and for a brief to period on that specific day. The construction phase impacts considered for the gas pipeline include:

- Damage to or removal of Greater knapweed and Orchids
- Degradation of habitats due to dust dispersal, which has been assessed in Chapter 8 Air Quality in Volume 2 of the EIAR to pose a medium risk on potential sensitive habitats within the Zol.
- The layout and construction of the gas pipeline has avoided in-stream works within the streams and rivers, however the following is assessed:
 - Potential risk of escape of HDD drilling fluid to riverbeds to the Barrow River during the construction phase.
 - Contribution of silt and contaminated runoff from works areas at the watercourse crossing locations.



- Disturbance to fauna due to visual effects and noise, including temporary lighting that may be required during the winter season.

11.7.3.2.1 Damage to or removal of Greater knapweed and Orchids

No protected or threatened red-listed plants were recorded along the proposed gas pipeline route.

Greater knapweed (Near Threatened species) was recorded within the road verge along the R448 road. Greater knapweed is locally rare with a scattered distribution in Ireland.

Bee orchid and pyramidal orchid, were recorded within agricultural lands west of the R448.

In the absence of mitigation, it is likely that greater knapweed could be destroyed during gas pipeline construction works. The orchids are not within the road curtilage and as such cannot be directly impacted.

The potential impact to Greater knapweed plants, is considered likely, negative, long term and significant at the local scale.

Impact Evaluation: Likely, long-term, significant, negative effect.

11.7.3.2.2 Degradation of Habitats due to Dust

There is potential for the brief effects on neighbouring habitats due to dust, also considered in terms of River Barrow and River Nore SAC. Given the status of local habitats (evaluated as local importance, lower / higher), the habitat sensitivity to dust is considered low. Coupled with the limited duration of potential dust generation (approximately 100m of pipeline will be laid in one day) and with high recovery from the impact (through wind and rain), the impact associated with dust on surrounding habitats from construction of the gas pipeline is negative, local in extent, brief and imperceptible.

Impact Evaluation: Unlikely, brief, imperceptible, negative effect.

11.7.3.2.3 Disturbance to Non- volant Mammals

Given the built nature of the gas pipeline, there are no suitable habitats to support forage areas, resting sites, breeding sites or maternity sites for mammals and there will be no direct impact on any mammals or their resting places as per the current status.

Where works are proposed along the road verge there is potential for the presence of smaller mammals e.g. shrew / hedgehog, however these road verges are noted as being managed and maintained by the roads authorities through cutting and strimming and as such are disturbed on a regular basis.

Impact Evaluation: No effect

Construction activities and associated noise and visual disturbance will be predominantly during the daytime, with only brief periods during the winter seasons. Lighting will only be required for brief periods during the winter seasons or during poor visibility due to weather. The brief effect of disturbance to fauna is considered imperceptible against the backdrop of the road, where existing traffic will also produce disturbance.

Impact Evaluation: Unlikely, brief, imperceptible, negative effect.



It is unlikely that mammals will move through the gas pipeline work areas during construction given it is within the existing road network and is already heavily disturbed. Mammals will have a general avoidance of people and there will be limited overlap between daytime construction and nocturnal fauna only during winter when mammal activity is lower. There is unlikely potential for impact to mammals through human-wildlife interaction, and mammals are more likely to be threatened by exposure to hazards at construction sites. Excavations will be shallow and pose imperceptible risks for injury.

Impact Evaluation: Unlikely, brief, imperceptible, negative effect.

Impacts on Otter

No evidence was found of otter holts or couches at any of the crossings nor any accumulation of scat, feeding signs, slides or excessive tracks; otter signs were limited to sporadic tracks only. No population effects will occur as no breeding or resting places will be impacted.

Impact Evaluation: No effect

Their nocturnal and shy nature will reduce the risk of human-wildlife interaction with the construction crew, but during winter when, there may be some interaction, any human presence along watercourses will be brief and the effect on otters imperceptible as the crew moves along the gas pipeline.

Impact Evaluation: Unlikely, brief, imperceptible, negative effect.

Potential effects from frac-out at the HDD crossing under the River Barrow could impair the prey population for otters. The effect would be brief and reversible, but of slight significance at the local scale only, given the lack of holts / couches (breeding and family units will not be affected).

Impact Evaluation: Unlikely brief, slight, negative effect.

11.7.3.2.4 Impacts on Bats

Bats and their roosts are protected under the Wildlife Acts and the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

No trees will be required to be felled for the construction of the proposed gas pipeline given its location within the existing road network, and the crossings of the Cardinal Moran Bridge will be by HDD, thereby avoiding the bridge (which was recorded as hosting small members of opportunistic roosting bats) in its entirety.

The construction activities will take place during daylight hours with some overlap into the nighttime during winter when bat foraging activity is lower (limited to warmer evenings with calmer weather) and prey species less abundant. The use of lighting for these brief periods during the winter months is considered imperceptible against the backdrop of the existing road, where traffic will utilise lights.

Impact Evaluation: Unlikely, brief, imperceptible, negative effect.

Minimal removal of hedgerows to widen existing access to areas that serve as construction camps or temporary storage yards will not additionally fragment foraging habitat and/or reduce prey species for bats; no treelines will be removed. In terms of commuting and foraging bats, the construction of the gas pipeline will have an imperceptible effect, reversible over the short-term.

Impact Evaluation: Unlikely, short-term, imperceptible, negative effect.



11.7.3.2.5 Impacts on Birds

As detailed in Section 11.5.6.2, the gas pipeline is within a road servitude offering negligible habitat for any significant bird populations. The construction camps will be established in areas supporting agricultural grasslands (local importance, lower value), which may provide seasonal habitats for birds, all of which would be habituated to traffic noise along the existing noise and tolerant of existing anthropogenic activity. Habitats that support the bird populations, such as the treelines, hedgerows and woodlands will be retained.

Minimal removal of hedgerows to widen access to areas that will serve as construction camps or temporary storage yards will not contribute to fragmentation of habitat or significant loss of nesting resources for birds; no treelines will be removed.

Impact Evaluation: Unlikely, temporary, imperceptible, negative effect.

Construction activities can create disturbance (activity, noise and dust) that can disrupt bird breeding behaviour (calls between mates and between adults and their fledglings, reduce visual communication by species or spotting predators to sound appropriate alarm calls). Disturbance can cause stress and lead to the birds abandoning their nests / unfledged young that can lead to morbidity / mortality.

Visual disturbance and noise impacts are negative but brief and are not significant when considered against the backdrop of the existing, active road that will be used for the construction of the gas pipeline. Birds that retreat from gas pipeline works will return once the construction crew has moved along and any effects will be brief. Effects on bird populations will be imperceptible, as will any change in use of the areas around the gas pipeline by birds for the brief period that construction occurs in a specific area.

Impact Evaluation: Likely, brief, imperceptible, negative effect.

The minimal removal of hedgerows to widen access to areas that will serve as construction camps or temporary storage yards could disturb breeding birds and cause loss of eggs and mortality of young if undertaken during the bird breeding season (1 March to 31 August inclusive). This is negative over the short term as species will recover from such losses in a relatively short time-frame, however the impact is considered moderate as the species are protected during the breeding season.

Impact Evaluation: Unlikely, short-term, moderate, negative effect.

Any impacts to the aquatic ecosystem will affect birds reliant on those systems for habitat, nesting sites or food. These impacts have been assessed as part of the impacts to aquatic ecosystems (Section 11.7.3.2.6).

11.7.3.2.6 Impacts on Aquatic Ecosystems

The potential effects on water quality during the construction phase of the gas pipeline are described in Chapter 13 Surface Water and Hydrology in Volume 2 of this EIAR. This section assesses the potential for likely significant effects on biodiversity specifically.



The proposed gas pipeline route will cross the River Barrow via an HDD crossing at the Cardinal Moran Bridge (crossing IDB2). The proposed gas pipeline route will also cross three tributaries of the River Barrow by trenching in road within the existing bridge/culvert crossings at the Ballynaboley Stream (IDB1) the Rathornan Stream (IDB3), and the an unnamed tributary to the River Barrow (IDB4). Additionally, the gas pipeline route crosses over two culverted land drains (IDB5 and IDB6) on the L3043 road. These two crossings will be constructed in road by trenching or by HDD. There will be no requirement for in-stream works for any of the proposed waterbody crossings along the gas pipeline route. While all drain/waterbody crossings will be within the curtilage of the road, it is assumed on a that there is potential for runoff of from the works areas or frac-out from HDD works into the drains/waterbody, which are either part of or flow into the River Barrow and River Nore SAC.

The River Barrow has high fishery value, and habitat is suitable for aquatic species of international importance (QI species for the River Barrow and River Nore SAC) such as salmonids, lampreys and white-clawed crayfish, which also provide prey species to otters (also a QI species), with floating river vegetation also present (assessed in Section 11.7.3.2.3). In the event of accidental release of construction runoff / drilling fluid to the river, the aquatic habitat will be affected, including the QI species reliant on this environment. The effect is negative over the short-term, but significant given the potential to impact aquatic receptors, including the QI species of the SAC, at the local scale.

Impact Evaluation: Likely, short-term, significant, negative effect.

11.7.4 Operational Phase Impacts

The full description of the operational phase is provided in Chapter 3 Description of the Proposed Development in Volume 2 of this EIAR.

11.7.4.1 *Site*

The operational phase impacts considered for the site include:

- Disturbance to fauna due to changes in characteristic of noise at night and lighting
- Operational phase stormwater discharge to the Powerstown Stream

11.7.4.1.1 Disturbance to Non- volant Mammals

There will be no further direct impacts on habitat, and there will be no potential loss to mammal resources (resting places and forage areas).

There will be no potential for disturbance from increased noise levels (Chapter 10 Noise and Vibration in Volume 2 of this EIAR), as ambient noise levels are not exceeded.

Increased operational traffic along the Powerstown Road (L3045) will contribute marginally (+4.3dB) to elevated noise levels along the section of road from the site entrance to the intersection with the R448. Any mammals utilising the area around this section of the road, will retreat or habituate, given the slight increase against a baseline level of 40dB to 51dB. This area had no identified mammal signs, and it is expected to have imperceptible effect on any mammal populations.

Impact Evaluation: Unlikely, temporary, imperceptible, negative effect.



Chapter 10 Noise and Vibration in Volume 2 of this EIAR does consider a significant change in the noise characteristic of the site (no increase in noise level) at night (noise is drowned out at night due to existing traffic on roads). Given the variety of activities within the surrounding landscape that the local mammals are exposed to (including the urban setting of Carlow town and intermittent noise of traffic), the animals will habituate to this change in noise, especially given that it will be low level noise (within baseline ambient nighttime noise levels).

Light spill to the neighbouring areas will also provide disturbance to fauna during the night. The low level lighting and in-building illumination will be largely contained to site given the location of the site in a depression. Furthermore, the existing hedgerows and trees on the banks of adjacent property surrounding the site will also screen the outdoor lighting, which will be limited given the limited nighttime operational activities (continued operation of the digestors and other automated systems). There remains some impact on the linear hedgerows and tree lines surrounding the site, but given the limited value to commuting fauna (mostly rabbits) and the tolerance of fauna to light (hedgehogs are known to occur in residential areas), the impact is negative and long term, but imperceptible at the local scale.

Impact Evaluation: Unlikely, long-term, imperceptible, negative effect.

Increased operational traffic along the Powerstown Road (L3045) can lead to increase mortality along the section of road from the site entrance to the intersection with the R448. The habitats along this section of the road provide limited resource value to mammals with active crop fields and quarries, and residences / offices. The marginal increase in traffic is expected to have imperceptible effect on any mammal populations. Given the short section of road and the limited resource value of habitats to mammals, no change is expected in mammal road kills along this section of road.

Impact Evaluation: Unlikely, medium term, imperceptible, negative effect.

11.7.4.1.2 Disturbance to Bats

There will be no further loss of habitats and no loss of commuting or foraging areas, or potential roosts. The operational noise levels will be similar to ambient noise levels and changes in noise characteristics will not affect the local populations of bats.

The low level lighting and in-building illumination will be largely contained to site given the location of the site in a depression. Furthermore, the existing hedgerows and trees on the banks of adjacent property surrounding the site will also screen the outdoor lighting, which will be limited given the limited nighttime operational activities (continued operation of the digestors and other automated systems). There remains some impact on the linear hedgerows and tree lines surrounding the site. There is existing but limited lighting in the surroundings, and any light spill from the site will have a negative impact on bat behaviour in the long-term. The impact is likely but only of slight significance at the local scale given the species that have been recorded on site (also occur in urban landscapes) coupled with the limited use of the ecological features by bats.

Impact Evaluation: Likely, long-term, slight, negative effect.

11.7.4.1.3 Disturbance to Birds

There will be no further direct impacts on habitat and potential forage and nesting areas for birds.

There will be no potential for disturbance from increased noise levels (Chapter 10 Noise and Vibration in Volume 2 of this EIAR), as ambient noise levels are not exceeded.



Increased operational traffic along the Powerstown Road (L3045) will contribute marginally (+4.3dB) to elevated noise levels along the section of road from the site entrance to the intersection with the R448 (baseline levels of 40dB to 51dB). Although a toolkit for waterbirds, low noise level response is <72dB for waterbirds in disturbed areas such as adjacent to roads (Cutts, et.al., 2013). The birds utilising the area around this section of the road, will habituate with limited response, given the slight increase.

Impact Evaluation: Unlikely, brief, imperceptible, neutral effect.

The only nocturnal bird of significance that has been historically recorded (desktop species, unconfirmed during current surveys) is the barn owl. Given the extensive home ranges (5km radius from roosts (TII, 2021)) for forage, they would be exposed to a variety of anthropogenic activities and associated disturbances and the change in nighttime noise characteristics (Chapter 10 Noise and Vibration in Volume 2 of this EIAR) and illumination at the specific site will have no effect on their foraging behaviour.

Impact Evaluation: No effect.

11.7.4.1.4 Aquatic Ecosystems – Stormwater Discharge to the Powerstown Stream

The only circumstances for connectivity to the local watercourses during operation is when storm water will be directed from the proposed development to the Powerstown Stream. This will only occur rarely during the operational phase where a 1 in 30-year storm event and coincides with circumstances where the stormwater lagoon and fire and process water tanks are full. This storm water will be collected in a segregated drainage network and will be passed through treatment systems (petrol/oil interceptor and settlement in the lagoon) and released at greenfield runoff rates via controlled discharge arrangements. The discharge will be in accordance with limits set under the Industrial Emissions (IE) Licence which must be obtained from the EPA for the operation of the facility. The water contribution from the proposed development during the storm water event at this outlet will be 9 % of the available pipe capacity. During a 1 in 30-year storm event, the discharge from the proposed development plus the discharge from the road network will use just 28% of the total pipe capacity. Given the rarity, water quality and volume of the operational stage storm water discharge from the proposed development, there will be no potential for such a discharge to alter the hydromorphological, ecological or chemical status of the Powerstown Stream, or downstream River Barrow. As such the operation of the proposed development will have no effect on the WFD status of these waterbodies.

Impact Evaluation: Unlikely, brief, imperceptible, negative effect.

11.7.4.1 Gas Pipeline

During the operational phase the only activities that will take place will be those associated with maintenance and no further negative impacts are expected under standard operating conditions along the proposed gas pipeline.

11.7.5 Decommissioning Phase Impacts

11.7.5.1 Site

The decommissioning phase activities are detailed in Chapter 3 Description of the Proposed Development in Volume 2 of this EIAR. The decommissioning phase impacts will be similar to the construction phase impacts in extent and duration. Magnitude is likely to reduce for some potential impacts as areas of foundation are to remain *in-situ* and be covered with overburden material to allow for re-vegetation of the development site. Such an approach will reduce dust generation, sediment mobilisation generation and mobilisation.



11.7.5.1 Gas pipeline

No further negative impacts are expected should the gas pipeline be decommissioned as the pipeline will be retained *in situ*.

11.7.1 Cumulative Impact Assessment

As per the CIEEM guidelines (CIEEM, 2018), individually insignificant impacts can collectively cause significant effects over the spatial or temporal scale. Impacts that have been identified as insignificant / slight / not significant could cause existing baseline status to worsen beyond a critical threshold that could cause a significant effect on KERs. Similarly, the EPA guidelines (EPA, 2022) defines cumulative effects as the ‘addition of many minor or insignificant effects, including effects of other Projects, to create larger, more significant effects.’

Assessment of cumulative impacts also considers multiple activities/Projects within proximity in time and space. Existing developments, proposed projects and principal plans that have the potential to have a cumulative impact in-combination with the Project have been listed in Chapter 1 Introduction in Volume 2 of this EIAR. Plans related to biodiversity-relevant policies as detailed in Chapter 2 Need for the Proposed Development and Planning and Policy in Volume 2 were also considered.

The focus is on insignificant effects that have been identified through the impact assessment. Impacts assessed as having ‘no effect’ on biodiversity are not considered further as there is no potential for these to contribute cumulatively to impacts. Impacts assessed as significant are not considered further as these have already been evaluated and identified as requiring mitigation. The concluding chapter will consider the final assessment of any potential cumulative impacts post mitigation (where relevant to impacts being reduced rather than prevented).

Effects on biodiversity potentially arising from the Project that have been identified and assessed as cumulative impacts include:

- Degradation of habitats due to dust generation during the construction phase of the Project. As per Chapter 8 Air Quality in Volume 2 of the EIAR:
 - No significant cumulative impacts are expected in terms of dust generation.
- Increased noise from construction and site operation. As per Chapter 10 Noise and Vibration in Volume 2 of this EIAR:
 - Given the nature of existing uses and the Project there is no cumulative noise impact expected during the construction phase and the operational phase. The effects of noise on biodiversity are localised and limited to the short-duration of the construction phase.
 - The limited operational traffic impacts have been identified for a very limited extent of the local Powerstown Road (L3045) which has considered existing traffic and traffic under projected growth and cumulative impacts are largely considered with no further or additional significant impact on fauna KERs.
- Runoff or drilling fluid frac out during watercourse crossings along the proposed gas pipeline route. :



11.7.1.1 Cumulative Impacts - Conclusion

Given the land use of the immediate surrounds, the protected status of the River Barrow and River Nore SAC, the regulatory requirements of developments (design features, mitigation and monitoring), the limited Zol for identified impacts to biodiversity and the limited potential for significant development in proximity to the site / within the Zol, there is no potential for the Project to contribute to significant cumulative impacts on biodiversity with other plans and projects.

11.7.2 Summary of Potential Impacts

Activity/Source of Impact	Potential Impact	Description of Effects
Construction Phase		
Site		
Vegetation clearance and site preparation	Direct loss of ephemeral pool habitat	Likely, long-term, moderate significance, negative effect.
Vegetation clearance and site preparation	Reduction of scrub habitat	Likely, long-term, imperceptible, negative effect.
Vegetation clearance and site preparation	Loss of orchids	Likely, long-term, significant, negative effect.
Dust – general works	Degradation of habitats and flora due to dust dispersal	Unlikely, short-term, imperceptible, negative effect.
Construction fleet, machinery and staff	Spread and establishment of invasive species Himalayan balsam	Unlikely, long-term, significant, negative effect.
Vegetation clearance and site preparation	Loss of fauna habitats / resting places / forage / roost / nesting / commuting	Hedgehog: Unlikely, short-term, imperceptible, negative effect. Birds: Unlikely, long-term, imperceptible, negative effect. Common frog & Smooth newt: Likely, long-term, slight, negative effect.
Noise and lighting – general works	Disturbance to fauna due to elevated noise levels and lighting during the winter months	Mammals: Impact Evaluation: Unlikely, temporary, imperceptible, negative effect. Bats: Unlikely, temporary, imperceptible, negative effect. Birds: Unlikely, short-term, imperceptible, negative effect.
Construction fleet, machinery and staff and site safety	Potential mortality to fauna	Hedgehog: Unlikely, short-term, imperceptible, negative effect. Common frog & smooth newt: Likely at appropriate season, long-term, moderate, negative effect.



Activity/Source of Impact	Potential Impact	Description of Effects
Gas pipeline		
Vegetation clearance and site preparation	Loss of flora species greater knapweed	Likely, long-term, significant, negative effect.
Vegetation clearance and site preparation	Degradation of neighbouring habitats due to dust	Unlikely, brief, imperceptible, negative effect.
Vegetation clearance and site preparation	Loss of fauna habitats / resting places / forage / roost / nesting / commuting	Bat habitat (forage / fly-path): Unlikely, short-term, imperceptible, negative effect. Breeding birds: Unlikely, temporary, imperceptible, negative effect.
Noise – general works	Disturbance to fauna due to elevated noise levels and lighting during the winter months	Badger, hedgehog, red squirrel, hare and stoat: Unlikely, brief, imperceptible, negative effect. Bats: Unlikely, brief, imperceptible, negative effect. Birds: Likely, brief, imperceptible, negative effect.
Construction fleet, machinery and staff and site safety	Potential mortality to fauna	Badger, hedgehog, red squirrel, hare and stoat: Unlikely, brief, imperceptible, negative effect. Otter: Unlikely, brief, imperceptible, negative effect. Birds: Unlikely, short-term, moderate, negative effect.
Watercourse crossings	Risk due to drilling fluid frac out into the River Barrow or sedimentation and contamination of the River Barrow from works areas at the watercourse crossings	Likely, short-term, significant, negative effect.
HDD under the River Barrow	Loss of otter prey species	Unlikely brief, slight, negative effect
Operational Phase		
Site		
Noise – general operations	Disturbance to fauna due to noise	Hedgehog: Unlikely, temporary, imperceptible, negative effect. Birds: Unlikely, brief, imperceptible, neutral effect.
Lighting at the biogas plant	Disturbance to fauna due to light	Hedgehog: Unlikely, long-term, imperceptible, negative effect. Bats: Likely, long-term, slight, negative effect.
1 in 30-year storm discharge to the Powerstown stream	Impacts on water quality	Unlikely, brief, imperceptible, negative effect



Activity/Source of Impact	Potential Impact	Description of Effects
Operational fleet	Potential mortality to fauna	Hedgehog: Unlikely, medium term, imperceptible, negative effect.
Gas pipeline		
No operational impacts anticipated along the gas pipeline		

11.8 Mitigation Measures

Mitigation is prescribed in accordance with the EPA guideline (EPA, 2022). This requires mitigation by avoidance as a first approach. Where avoidance is not fully feasible mitigation will consider prevention and then the reduction of the effects. If significant effects persist then compensation through offset must be considered and in terms of biodiversity there should be like-for-like with no net loss of biodiversity.

The mitigation measures to avoid, prevent and reduce the significant effects to KERs consider the source activities contributing to the impacts as mitigation measures will firstly target the source of the impact. Where KERs (receptors) may require additional mitigation, these are evaluated separately.

Abiotic aspects of the environment (soil, surface water, groundwater, air quality and noise) that may impact on biodiversity are discussed, evaluated and mitigated under their respective chapters in Volume 2 of this EIAR and each of the Chapters address mitigation measures to avoid, prevent and reduce the impacts / effects, which are not iterated here. Only additional measures related to biodiversity are incorporated in this section.

During construction phase, the following effects have been identified as being significant and for which mitigation is required:

- Loss of bee orchids at the site.
- Spread and establishment of invasive species, Himalayan balsam, within and beyond the proposed development site.
- Impact to aquatic habitats within the River Barrow through watercourse crossings along the gas pipeline and associated potential loss of prey for otter.

During operation phase, no significant effect has been identified.

The Construction Environmental Management Plan (CEMP) (Appendix 3.1 in Volume 3 of this EIAR) will be adhered to in terms of managing construction vehicles, machinery, equipment and staff on site. An Ecological Clerk of Works (ECoW) will be employed for the duration of the construction phase and will be awarded a level of authority and to allowed cessation of construction activity if there is potential for significant environmental effects other than those predicted and mitigated in the EIAR. The ECoW will ensure:

- All biodiversity-relevant mitigation measures set out in the EIAR, NIS and any conditions of consent are implemented.
- Timely advise on environmental effects and communication with the Project owner and contractor to ensure the required actions to implement the mitigation prescribed in this EIAR are carried out in a timely manner.



11.8.1 General Best Practice Measures

Standard best practice measures will be carried out during the construction of the project as set out hereunder.

11.8.1.1 General Construction Best Practice

- Control of water pollution from construction sites - Guidance for consultants and contractors (C532). Construction Industry Research and Information Association, London (CIRIA, 2001).
- Control of Pollution from Linear Construction Project; Technical Guidance (C648). Construction Industry Research and Information Association, London (CIRIA, 2006).
- Environmental Good Practice on Site (4th edition) (C741). Construction Industry Research and Information Association, London (CIRIA, 2015b).
- Guidelines on protection of fisheries during construction works in and adjacent to waters (IFI, 2016).
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note).
- PPG5 – Works or Maintenance in or Near Watercourses (UK Guidance Note).
- Guidelines for the treatment of bats during the construction of national road schemes (TII, 2005, reissued 2025).
- Bat mitigation guidelines for Ireland - V2. (Marnell, et al., 2022).
- UK Bat mitigation guidelines (Reason, et al., 2025)
- Guidelines For the Treatment of Otters Prior to the Construction of National Road Schemes (TII, 2006, reissued 2025)
- Guidelines For the Treatment of Badgers Prior to The Construction of National Road Schemes (TII, 2006, reissued 2025)
- The management of invasive alien plant species on national roads – technical guidance (TII, 2020).

11.8.1.2 Best Practice for Protected Species

Badger

Given that badgers can reinhabit setts, and a burrow occupied by rabbits was confirmed on site that may have been a historical sett entrance, a pre-construction survey must include assessment of this burrow.

Given that the burrow is on the bank (approximate 1.5m above the working level of the site, there is no possibility of inadvertent damage to the burrow. The following will be considered should surveys uncover badger activity:

- As per NRA Guidance, during the breeding season (December to June inclusive) no works will be undertaken within 50m of an active sett or pile driving within 150m of active setts.
- All supervision and surveys will be undertaken or supervised by an appropriately qualified ecologist in advance of construction.

The Consenting Authority will be contacted immediately should any of the following events occur:

- A new sett is recorded during any works.



- There is evidence of badger persecution during surveys.

Pre-mitigation monitoring and ecological supervision will ensure correct implementation of badger mitigation measures at construction stage.

Bats

During construction, avoid any excessive light-spill on the linear ecological features surrounding the works areas by using appropriately directed lighting.

The existing lighting plan for the operational biogas facility has considered the light spill to surrounding areas and will include the following measures for bats:

- LED luminaires within the warm light range (2700-3000 Kelvin) should be used for any lights contributing to light spill into the surrounding linear ecological features.
- Use lights with reduced UV, white and blue wave lengths or apply filters to achieve the same. This will also reduce insects swarming the lights.
- Luminaires will be mounted horizontally, with no light output above 90° and/or upward.
- Baffles, hoods or louvres will be considered in addition to the above to achieve zero light-spill on surrounding habitats.
- Reduce reflective surface around lighting.

Birds

Article 19 of the Wildlife Act 1976 (as amended) provides for the protection of wild birds, their nests and eggs. It is an offence to wilfully take or remove the eggs or nest of a protected wild bird; to wilfully destroy, injure or mutilate the eggs or nest of a protected wild bird; and to wilfully disturb a protected wild bird on or near a nest containing eggs or unflown young. The nesting season for breeding birds in Ireland is between the 1st of March and 31st of August (inclusive).

However, under Article 22 of the Wildlife Act, 1976 (as amended) it is not an offence to unintentionally to kill or to injure a protected wild bird or to destroy, injure or mutilate the eggs or nest of a protected wild bird while carrying out building/construction works. As such, a pre-site clearance survey will be carried out immediately prior to any vegetation clearing during the bird nesting season to identify any active nests within the site or along the gas pipeline where vegetation clearance is required and avoid any contraventions of the Wildlife Act. On-site mitigation for the protection of birds and their nests would be prescribed in the event of the occurrence of nesting birds in site clearance areas.

Survey methodology will comprise ground-level walked transects through the areas to be cleared, searching for nests and nesting activity. Survey will be conducted in the morning as there is generally an increase in bird activity (e.g., territorial singing and foraging) during morning hours. While the composition and diversity of all bird species present on site will be recorded, the aim of the survey will be to identify any active nests. Nesting behaviour will be looked for which includes adults bringing food, adults carrying faecal sacs, sounds of young begging for food, adults giving alarm calls or exhibiting agitated behaviour.

Any nests encountered will be documented as follows:

- The nest location (ITM co-ordinate)
- Habitat in which it occurs
- Bird species
- Number of eggs / young



- Nest status – active or inactive (i.e. birds have fledged)
- Adult behaviour at the nest e.g. incubating, building, distraction displays, alarm calls etc.

In the event that a nest or suspected nest is observed, a nest buffer where no site clearance is permitted will be established. A minimum 30m buffer will be established using posts and tape. However, there may be cause to increase the size and shape of the buffer depending on type and amount of surrounding vegetation cover, species' sensitivity to disturbance, rareness of the species in the local/regional area, site topography, and the type and extent of clearing activities that will be occurring next to the buffer.

No clearing activities within the established buffer areas will occur until after the Ornithologist has determined that nesting and fledging are complete, or if the status of the nest has been changed from active to inactive.

Herpetofauna

In the event that construction is required to proceed during the breeding season of common frog (approximately January to midsummer) or smooth newt (approximately February to June), a pre-construction survey will be completed of the pools on site. If these species are present and it is not feasible to delay works until froglets and efts have matured and dispersed from breeding sites, translocation under licence will be completed by a qualified ecologist.

11.8.2 Project-Specific Mitigation

Mitigation measures are described below which will avoid, prevent, reduce and, where needed, offset likely significant effects arising in relation to biodiversity from the construction (and decommissioning) and operation of the site and gas pipeline. These mitigation measures shall be implemented in full.

Only those impacts that have been identified as significant require mitigation and are addressed below.

11.8.2.1 Measures to Protect Orchids and Greater Knapweed

Orchids

Protection of orchid and greater knapweed plants will require that the mitigation measures detailed below are implemented before vegetation clearance commences under the supervision and direction of an ECoW. In carrying out these activities the following is also undertaken:

- Communicating the importance of the activities that need to be undertaken to the contractor and prevent inadvertent damage to the habitats being retained, compensated or that are part of the orchid donor / receptor sites.

Orchids will be translocated out of the construction footprint of the proposed development. Pending the onset of construction activities, the receptor sites (edges of hedgerows / treelines where orchids will not be over-shadowed) for the local bee orchid populations will be prepared before the first flowering season to ensure that the bee orchids can be relocated directly to receptor sites and reduce handling of the orchids. This will include mimicking the local substrate conditions where the bee orchid was recorded within the receptor site, ensuring well-drained, sandy or loamy substrate enriched with a phosphorus / potassium fertiliser as per recommendations. Areas with drizzled sunlight will be most suitable, so target grassland blocks adjacent to hedgerows, treelines and scrub. prepare the receptor sites as follows:



- Dig a hole twice the size of the root ball and to a depth that will allow the root ball to sit at or just below surface.
- Dig the holes so that plants are spaced 30cm apart.
- Have mulch (bark chips / shredded leaves) available to place over the transplanted bee orchids.
- Have water available for adequate watering

If the receptor sites cannot be prepared in time, then intermediate planting will be required into pots with similarly prepared substrate, which can be left on site but will need to be checked daily to ensure the substrate is adequately moist.

Areas where the orchids were recorded and could be disturbed by construction activities will be cordoned off as a no-go areas before construction commences, to safe guard these areas (Figure 11-16). The orchids from these areas will be translocated to the prepared receptor sites (Figure 11-16) by an ecologist with experience in habitat translocation, in accordance with proven best practice methods²⁸ which must involve the translocation of orchid turf to sufficient depth to retain the mycorrhiza and dormant plants to the pre-pared receptor site. Typically, this is 100–300 mm depth in order to maintain associated soil biota. Translocation will be in late summer / early autumn or in spring (pre-flowering) so as to avoid periods of flowering and full dormancy. The following translocation, the receptor site will be monitored and managed by the Ecologist for the duration of operation of the proposed development.

On the gas pipeline route, there will be no temporary storage of materials or equipment for the gas pipeline in any areas along the gas pipeline designated as GS1 or GS2 habitats to protect the orchids associated with these habitats and the habitat characteristics associated with the soil substrate in these habitats.

Greater Knapweed

Individual Greater Knapweed plants were recorded outside of the western boundary of the proposed development site. No works are proposed to take place at this located. However, in order to avoid accidental damage of these plants, the area will be cordoned off as a no-go area before construction commences.

There will be no temporary storage for materials for the gas pipeline along the R448 road near the western boundary of the proposed development site to safeguard the existing greater knapweed plants.

²⁸ Including regard to Phillips, R.D., Reiter, N., & Peakall, R. (2020). *Orchid conservation: from theory to practice*. Annals of Botany, 126(3), 345–362. <https://doi.org/10.1093/aob/mcaa093>



TITLE: Flora Donor and Receptor Area	FIGURE NO: 11.16	
	CLIENT: 	
PROJECT: Powerstown Bioenergy	SCALE: 1:2,000	REVISION: 0
	DATE: 01/07/2026	PAGE SIZE: A3



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11.8.2.2 *Spread and Establishment of Invasive Species*

The Third Schedule Himalayan balsam and the non-native snowberry were found on the boundary of the proposed development site on the earth banks.

The Himalayan balsam must be controlled on site and the specific measures that follow must be incorporated into the invasive species management plan (ISMP) in the CEMP (Appendix 3.1 in Volume 3 of this EIAR). A single area of growth was observed along the northern boundary of the site.

All works will be undertaken in accordance with the Transport Infrastructure Ireland guide (TII, 2020) and under the supervision of a suitably qualified ECoW with specialist knowledge in alien invasive plant species management. The mitigation measures focus on the manual and mechanised treatment only. The treatment aims at the prevention of flowering.

Given the location of the plant, mowing is not considered and manual pulling of plants (referred to as 'balsam bashing') is the recommended treatment for site. Himalayan balsam has shallow roots and has no barbs or thorns that make handling dangerous. The following will be undertaken:

- A marker will be placed at the existing area of growth, to make the location known and visible. This will reduce the need to search for the non-flowering plant and improve biosecurity measures (reduce risk of spreading seeds across the area when searching for the plant).
- Balsam bashing (pulling of plants out by the roots) will be completed in late April or early May (when plants are around 1m high for ease of pulling) before flowering.
- Pulled plants will be broken to discourage flowering (plants that have been removed from the ground can still flower if not broken).
- Before leaving the infested area, the soles and edges of shoes will be scrubbed clean of any clinging soil and clothing will be rubbed clean of any cling soil/vegetation.
- The existing seed bank could germinate and balsam bashing needs to be repeated later in the season before the seedlings flower. August is considered a suitable time, but growth of plants in the area should be monitored and balsam bashing timed accordingly before flower buds present themselves.
- Monitoring of the infected site and localised hand pulling should be conducted for at least two years but continue as long as monitoring indicates the need.
- Monitoring of the site for invasive species should be ongoing for the life of the biogas facility. A suitably qualified ECoW with specialist knowledge in alien invasive plant species should be consulted if new infestations or species are noted.
- Broken plant material can be placed in piles to decompose naturally. It can also be disposed of by composting if this can be left undisturbed for at least two years. Plant material can be disposed to a licensed landfill or incineration facility or by shallow or deep burial.

In addition to the above, good biosecurity measures will be established on site. This will include:

- Self-contained wheel washing / equipment washing facilities will be provided at the construction site and washing will be undertaken of all wheels, undercarriages and equipment coming from off-site locations and leaving the site.
- A final visual inspection will be made of all cleaned vehicles / equipment for stubborn debris which will be manually removed.



- The debris will not enter the water drainage features and will be contained on site and treated as invasive plant material to be disposed of at licensed landfill or incineration facility or by shallow or deep burial.

11.8.2.3 Protection of Aquatic Ecosystems

The main potential for significant effects during the construction phase on the aquatic environment is via water pollution. Construction phase mitigation for water quality will follow that outlined in Chapter 13 Surface Water and Hydrology in Volume 2 of this EIAR, and the mitigation measures outlined will be adhered to in conjunction with those outlined in this chapter, relating to the protection of specific aquatic species, noting that all measures for the protection of water quality, as detailed in Chapter 13, will also protect the aquatic ecology and fisheries value of downstream watercourses, particularly the habitats supporting sensitive aquatic species and with connectivity to the River Barrow and River Nore SAC.

Works adjacent to drains and watercourses including as part of HDD crossings will adhere best practice guidelines for the control of water pollution as listed in Section 11.8.1.1. The following are additional mitigation measures to protect aquatic ecology:

1. Timing of the Works:

Works within 60m of the drain and watercourse crossings will be carried out outside of the salmonid and lamprey spawning seasons (i.e. works will be confined to between 1st July to 30th September to avoid Atlantic salmon and lamprey species spawning seasons).

2. Measures to prevent Surface water runoff from works areas at/near watercourse crossings:

A double row of silt fences will be established along the perimeter of source areas of contaminated runoff at the following works locations:

- Surrounding the works area at the HDD launch and exit pits for all the drain /waterbody crossings
- For all in-road open cut crossings of drains and watercourses

Silt fencing will be installed by the construction contractor in advance of the works. Silt fencing will consist of a UV-stabilized geotextile membrane (e.g., Hy-Tex Terrastop Premium or similar) attached to wooden posts. The fabric will be buried at least 100-250mm below ground level and anchored, with clean drainage stone, to prevent undercutting.

The silt fencing will be left in place until the works are completed (which includes removal of any temporary ground treatment). Silt fences will not be removed during heavy rainfall.

The integrity of the silt fencing will be checked daily and after poor weather conditions (rain or wind) and any failures rectified immediately. Any build-up of sediment along the fence will be removed in accordance with manufacturers requirements.

A record of when it was installed, inspected and removed will be maintained.

3. Measures to prevent frac-out from HDD

Specialist drilling contractors will be employed with experience in working in gravel aquifers for all HDD works.



The Contractor will report daily to the Developer's Engineer and the Engineer will also be present on site to supervise all HDD works.

The HDD works will be informed by detailed geotechnical investigations prior to drilling. Drilling tools and mud programme will be selected to match soil/rock conditions.

The approach to HDD will focus on the three pillars of environmental protection: mechanical stabilisation of borehole integrity, fluid non-toxicity, and physical containment:

- Mechanical Stabilisation - Mechanical Stabilisation in the gravelly, non-cohesive aquifer, will be managed by installing steel conductor casing through the shallow gravels to bypass the cover zone (i.e. the material above the bore depth) where fluid would be most likely to breach the surface. This casing acts as a physical barrier, protecting the riverbed from pressure spikes and ensuring returns are directed back to the entry pit rather than into the sensitive substrate.
- Fluid non-toxicity - The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used). Biocompatible Drilling Fluids (European Standards) utilize NSF/ANSI Standard 60 or CE-marked additives which are high-performance, biodegradable viscosifiers and will be used to provide the necessary "gel strength" to suspend heavy gravel cuttings. Fluid loss will be controlled using biodegradable sealants, which create a thin, flexible filter cake on the borehole wall to prevent fluid migration into the aquifer. These products break down naturally, ensuring no permanent alteration to the hydraulic conductivity of the aquifer. These products break down naturally, ensuring no permanent alteration to the hydraulic conductivity of the aquifer or the delicate micro-habitats of QIs.
- Physical containment - Real-time annular pressure monitoring will be mandatory. By keeping pressures below the Delft Equation limits, operators can detect lost circulation before it becomes a surface fracture blow-out (frac-out release of drilling fluid through cracks/fissures/weaknesses in the substrate).

These mitigation measures will safeguard the upstream and downstream river characteristics and associated ecosystems and the species supported within these ecosystems.

11.8.3 Major Accidents and Natural Disasters

Should a major accident or natural disaster occur, the potential sources of pollution during the construction and operational phases of the Project are limited. The primary sources with the potential to cause significant environmental pollution and associated negative impacts on biodiversity include the bulk storage of hazardous and friable materials (hydrocarbons, chemicals, cementitious material, digestate and wastes). The possible accidents and disasters that could negatively impact upon habitats and species include:

- Flooding and pumping of water contaminated by the hazardous and friable materials to the surrounding drainage lines / Powerstown Stream, which eventually flow to the River Barrow.
- Onsite fire affecting neighbouring areas and releasing noxious gases.

Accidental release of sediment and pollutants are addressed in Chapter 13 Surface Water and Hydrology in Volume 2 of this EIAR and Chapter 12 Soils, Geology and Hydrogeology in Volume 2 of this EIAR through control measures for release of sediments and hydrocarbons and the management of on-site water.



In addition, the CEMP (Appendix 3.1 in Volume 3 of this EIAR) has detailed emergency response plans detailing steps to take during an accident to prevent environmental pollution including procedures and resources for spill clean-up (for example ensuring spill kits are available at key accessible locations) and fire-fighting (ensuring correct fire-fighting material is available for different fires). A fire water risk assessment report (Appendix 3.2 in Volume 3 of this EIAR) provide details on fire water retention system.

The risk of flooding is addressed in Chapter 13 Surface Water and Hydrology in Volume 2 of this EIAR, which concludes that the site is not mapped within any fluvial, pluvial or groundwater flood zones. The site is at a lower topography than the surrounds and containment can be achieved, and the system is designed for a 1 in 30-year storm event with increased capacity to accommodate for modelled climate changes.

During operations, the proposed development will require an Environmental Management System (EMS) as a licence condition. This will include an Emergency Management Plan (EMP). Accident prevention and emergency response procedures developed in accordance with the conditions of the EMS, will be strictly implemented during the operational phase of the proposed development and spillage kits will be available on-site including in vehicles operating on-site. All staff will be familiar with emergency procedures in the event of accidental fuel spillages.

11.9 Residual Impacts

All impacts can be appropriately mitigated and adequately prevented or reduced below acceptable thresholds that will prevent any significant impacts on biodiversity.

The impacts that are reduced will also not act cumulatively with any projects as no projects are proposed within their limited Zols.

11.9.1 Summary of Residual Impacts

Activity/Source of Impact	Potential Impact	Description of Effects (Post Mitigation)	Residual Effect
Construction Phase			
Site			
Vegetation clearance and site preparation	Direct loss of ephemeral pool habitat	Likely, long-term, slight, negative effect.	Impact is reduced though alternative habitat provided.
Vegetation clearance and site preparation	Reduction of scrub habitat	Likely, long-term, imperceptible, negative effect.	Impact is imperceptible and no mitigation required
Vegetation clearance and site preparation	Loss of orchids	Likely, long-term, slight, negative effect.	Impact is prevented due to rescue and relocation.
Dust – general works	Degradation of habitats and flora due to dust dispersal	Unlikely, short-term, imperceptible, negative effect.	Impact is imperceptible and no mitigation required
Construction fleet, machinery and staff	Spread and establishment of invasive species Himalayan balsam	Unlikely, long-term, slight, negative effect.	No impact through control



Activity/Source of Impact	Potential Impact	Description of Effects (Post Mitigation)	Residual Effect
Vegetation clearance and site preparation	Loss of fauna habitats / resting places / forage / roost / nesting / commuting	Hedgehog: Unlikely, short-term, imperceptible, negative effect. Birds: Unlikely, long-term, imperceptible, negative effect. Common frog & Smooth newt: Likely, long-term, slight, negative effect.	Impact is reduced through alternative habitat provided.
Noise and lighting – general works	Disturbance to fauna due to elevated noise levels and lighting during the winter months	Mammals: Impact Evaluation: Unlikely, temporary, imperceptible, negative effect. Bats: Unlikely, temporary, imperceptible, negative effect. Birds: Unlikely, short-term, imperceptible, negative effect.	Impact is imperceptible and no mitigation required
Construction fleet, machinery and staff and site safety	Potential mortality to fauna	Hedgehog: Unlikely, short-term, imperceptible, negative effect. Common frog & smooth newt: Likely at appropriate season, long-term, moderate, negative effect.	Impact is prevented due to rescue and relocation.
Gas pipeline			
Vegetation clearance and site preparation	Loss of protected and/or threatened flora species or orchid species	Likely at appropriate season (spring to summer), long-term, moderate, negative effect.	Impact is prevented through avoidance.
Vegetation clearance and site preparation	Degradation of neighbouring habitats due to dust	Unlikely, brief, imperceptible, negative effect.	Impact is imperceptible and no mitigation required
Vegetation clearance and site preparation	Loss of fauna habitats / resting places / forage / roost / nesting / commuting	Bat habitat (forage / fly-path): Unlikely, short-term, imperceptible, negative effect. Breeding birds: Unlikely, temporary,	Impact is imperceptible and no mitigation required



Activity/Source of Impact	Potential Impact	Description of Effects (Post Mitigation)	Residual Effect
		imperceptible, negative effect.	
Noise – general works	Disturbance to fauna due to elevated noise levels and lighting during the winter months	Badger, hedgehog, red squirrel, hare and stoat: Unlikely, brief, imperceptible, negative effect. Bats: Unlikely, brief, imperceptible, negative effect. Birds: Likely, brief, imperceptible, negative effect.	Impact is imperceptible and no mitigation required
Construction fleet, machinery and staff and site safety	Potential mortality to fauna	Badger, hedgehog, red squirrel, hare and stoat: Unlikely, brief, imperceptible, negative effect. Otter: Unlikely, brief, imperceptible, negative effect. Birds: Unlikely, short-term, moderate, negative effect.	Impact is prevented through avoidance.
HDD under the River Barrow	Risk due to drilling fluid accidentally entering from cracks or gaps of the riverbed substrate	Likely, short-term, moderate, negative effect.	Impact is prevented through avoidance / control.
HDD under the River Barrow	Loss of otter prey species	Unlikely brief, slight, negative effect	Impact is prevented through avoidance / control.
Operational Phase			
Site			
Noise – general operations	Disturbance to fauna due to noise	Hedgehog: Unlikely, temporary, imperceptible, negative effect. Birds: Unlikely, brief, imperceptible, neutral effect.	Impact is imperceptible and no mitigation required
Lighting at the biogas plant	Disturbance to fauna due to light	Hedgehog: Unlikely, long-term, imperceptible, negative effect.	Impact is prevented through avoidance / control.



Activity/Source of Impact	Potential Impact	Description of Effects (Post Mitigation)	Residual Effect
		Bats: Likely, long-term, slight, negative effect.	
Operational fleet	Potential mortality to fauna	Hedgehog: Unlikely, medium term, imperceptible, negative effect.	Impact is imperceptible and no mitigation required
Gas pipeline			
No operational impacts anticipated along the gas pipeline			No mitigation required

11.10 Biodiversity Compensation

No compensation for biodiversity required as all impacts are adequately mitigated to prevent any significant residual impacts on identified KERs. Furthermore, there are no cumulative impacts that will cause significant impacts to KERs post mitigation.



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