4. Ecology and Biodiversity

4.1. Introduction

This chapter of the EIAR has been prepared by WSP Ireland Consulting Ltd (WSP) and presents an assessment of the potential effects on ecological receptors from the Proposed Project.

The Proposed Project is the restoration of a disused quarry by import of clean soil and stone from construction and demolition. The lands on which the Proposed Project occur (the 'Application site' or Site') are located in the townland of Coolsickin or Quinsborough, Co. Kildare.

The Application Site includes a disused quarry void and associated historical working areas. It also includes a private access road that connects the disused quarry to the public road network, and agricultural lands to the east of that road where it is proposed to locate the temporary facilities required to manage the importation of clean soil and stone required for the Proposed Project.

All lands within the Application Site are within the ownership of the Applicant, Bison Quarries Ltd (BQL).

This EIAR is submitted in support of an application under Section 37L of the Planning and Development Act 2000, as amended.

This assessment and report has been prepared by Lisa O'Dowd ACIEEM. It has been reviewed by Steven Tooher ACIEEM and Luis Iemma MCIEEM CEcol. Lisa, Steven and Luis have 5-, 10- and 15-years' professional ecology experience respectively.

This chapter should be read in conjunction with the following technical chapters of the EIAR: Project Description (Chapter 2, including the Invasive Species Management Plan provided as an appendix to that chapter), Lands, Soils and Geology (Chapter 5), Water (Chapter 6), Air Quality (Chapter 7), and Noise and Vibration (Chapter 9).

A proposed Restoration Plan has been prepared for the Proposed Project and is provided as a standalone document within the Section 37 Application.

4.1.1. Technical Scope

This report outlines the baseline ecological conditions (flora, fauna and habitat composition) allowing for an assessment of potential impacts of the proposed works, attributed to land take, disturbance and environmental emissions, to be carried out.

This assessment considers the potential sources of change resulting from Proposed Project activities detailed in the Chapter 2 (Project Description). It also sets out mitigation measures proposed to be undertaken, where relevant.

Desk study data, aerial imagery, information provided by Bison Quarries Ltd., and field surveys have all been used to determine baseline ecological conditions.

The objectives of this EIAR chapter are to:

- Describe the ecological baseline (and trends) prior to the Proposed Project;
- Describe the criteria used to evaluate IEFs potentially impacted by the Proposed Project;
- Describe the criteria used to assess the significance of effects arising from the impacts of the Project;
- Identify IEFs and describe the potential effects, including direct, indirect and cumulative effects on IEFs;
- Describe the mitigation measures proposed to address likely significant effects;
- Assess the residual effects remaining following the implementation of mitigation; and
- Identify opportunity for biodiversity enhancements where suitable.

4.1.2. Geographical and Temporal Scope

The geographical study area for this assessment comprises the area within the EIA boundary, which is illustrated in **Figure 4-1**, and the assessment area has been extended as appropriate to identify the relevant Important Ecological Features (IEFs) surrounding the Application Site.

The EIA Boundary encompasses the Application Site. All proposed works for the Proposed Project will be within the Application Site (see **Figure 4-1**).

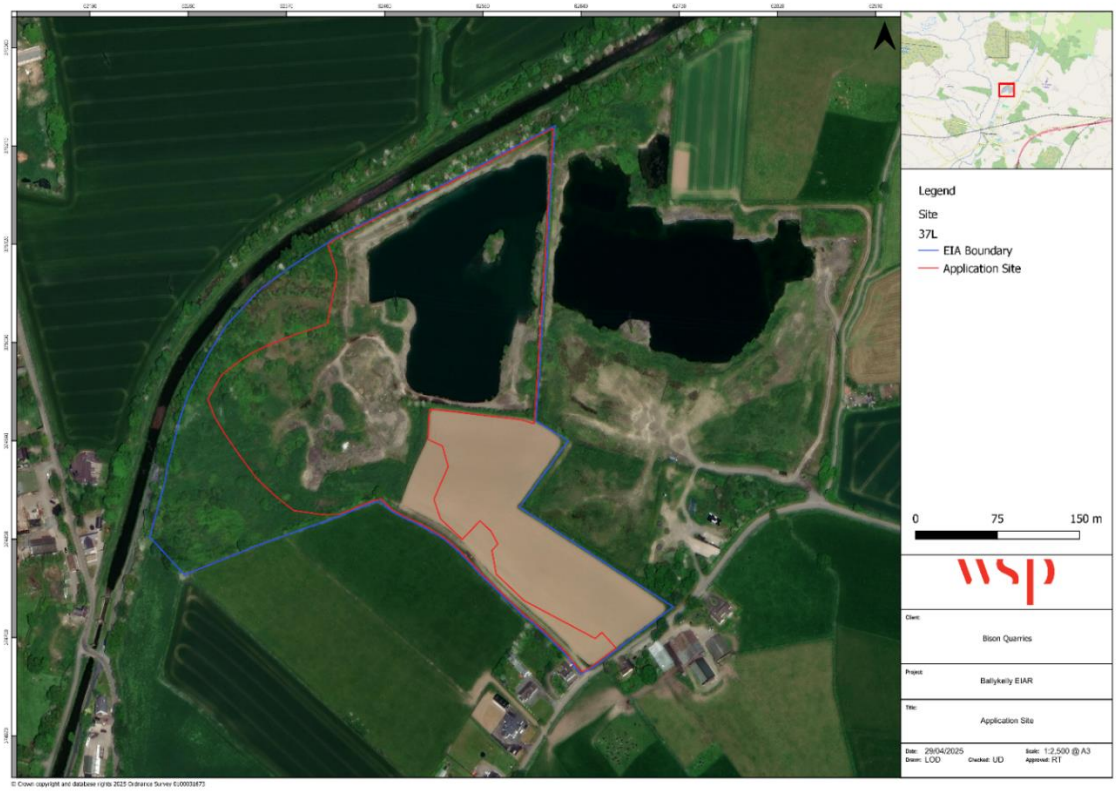

Figure 4-1 - Application Site and EIA Boundary

The temporal scope of this assessment covers the proposed 10-year construction phase (comprising enabling works and infilling activities) and the proposed three-year restoration phase (largely comprising aftercare and maintenance activities). The combined duration of these phases is predicted to 13 years. Detailed description of the Proposed Project phasing is presented in Chapter 2 (Project Description).

4.1.3. Project Description Summary

The Proposed Project consists of the restoration of lands through the import of approximately 720,000 tonnes clean soil and stone as by-product (non-waste) from development sites to infill a disused historical quarry and raise ground levels to tie in with ground levels of surrounding land.

Restoration of the lands will be to agricultural grassland, an artificial waterbody, and a hedgerow habitat with the lands returned to their pre-extraction agricultural use.

The proposed duration of infilling is 10 years depending on market conditions for the anticipated acceptance of clean soil and stone, and a further 3 years for the completion of final restoration activities.

The Application Site is located in the townland of Coolsickin or Quinsborough, Co Kildare. The Application Site is accessed by a privately-owned access road connecting to a local road (L7049).

The following temporary facilities will be installed and maintained during the life of the Proposed Project:

- office and fully serviced welfare facilities;
- weighbridge and associated portacabin;
- closed-system wheel wash;
- 6 no. parking bays;
- 2 no. waste inspection bays and 1 no. bunded waste quarantine area;
- hardstanding area (vehicle movement and storage); and,
- surface water drainage infrastructure from hard standing and discharge to ground, including 2 no. interceptors and 2 no. soakaways.
- security features, including security gates and fencing.
- Power supply. It is intended that approval will be sought for a connection to the ESB Network for the office and fully serviced welfare facilities. Diesel generators will be used to power mobile lighting, if required.

The Proposed Project site entrance and private access road will be upgraded and realigned. These will be retained following to completion of the Proposed Project.

A full project description in provided in Chapter 2 of this EIAR.

4.2. Policy and Legislation Context

The ecological assessment described in this chapter complies with the following legislation and guidance:

4.2.1. Legislation

- EC Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora; hereafter referred to as the Habitats Directive;
- EC Council Directive 2009/147/EC of 30 November 2009 on the conservation of wild birds; hereafter referred to as the Birds Directive;
- EU Environmental Impact Assessment (EIA) Directive (2011/92/EU as amended by 2014/52/EU);
- European Communities (EC) (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) as amended; hereafter referred to as the Birds and Habitats Regulations);
- EC Council Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds; hereafter referred to as the Birds Directive;
- EC Regulations 2011 (S.I. No. 477/2011) as amended; hereafter referred to as the Birds and Habitats Regulations.
- Wildlife Act, 1976 and Wildlife (Amendment) Act (2000) including all amendments. In this document, the legislation is referred to collectively as the Wildlife Acts (referred to in this report as WAs);
- S.I. No. 356/2015 - Flora (Protection) Order, 2022;
- EU Water Framework Directive (WFD) 2000/60/EC; and
- Planning and Development Act, 2000 (as amended);

Species-specific legislation is outlined in **Appendix 4A.**

4.2.2. Relevant Policies and Plans

- National Biodiversity Plan, 2017-2021;
- Ireland's National Strategy for Plant Conservation;
- Kildare County Development Plan 2023-2029, in particular Chapter 12 (Biodiversity and Green Infrastructure);
- Kildare Biodiversity Action Plan 2009-2014;
- All Ireland Pollinator Plan 2021-2025;
- County Kildare Heritage Plan 2019-2025; and,
- Monasterevin Biodiversity Action Plan 2021-25.

The key policies and objectives of the country development plan is listed within the Project description (Chapter 2).

4.2.3. Relevant Guidance

- British Standards Institute (2012). BS5837 – Trees in Relation to Construction - Recommendations, BSI, London, UK;

- Chanin, P. (2003) Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough.
- CIEEM (2024) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.3. Chartered Institute of Ecology and Environmental Management, Winchester;
- Collins, J. (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4thEdition). Bat Conservation Trust, London;
- DAFM (2022). Nitrates Explanatory Handbook. Department of Agriculture, Food and the Marine;
- EPA (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Fossitt, J. (2000) A Guide to Habitats in Ireland. Heritage Council;
- Gurnell, J., Lurz, P., McDonald, R. and Pepper, H. (2009). Practical Techniques for Surveying and Monitoring Squirrels. Forestry Commission;
- Marnell, F., Kelleher, C. & Mullen, E. (2022) Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage;
- Marnell, F., Kelleher, C. & Mullen, E. (2022) Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage;
- National Biodiversity Data Centre (n.d.). Irish Vegetation Classification – Division Synopses;
- National Roads Authority (NRA) (2006) Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes;
- NatureScot standing advice for planning consultations: Red Squirrel;
- NatureScot standing advice for planning consultations: Pine Marten;
- Notice Nature (n.d.) Guidelines for the Protection of Biodiversity within the Extractive Industry Document ‘Wildlife, Habitats &the Extractive Industry’;
- NRA (2006) Guidelines for the treatment of badgers prior to the construction of national road schemes;
- NRA (2008) Guidelines for the treatment of otters prior to the construction of national road schemes;
- NRA (2009a) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes;
- NRA (2009b) Guidelines for Assessment of Ecological Impacts of national Road Schemes;
- NPWS (2019a) The Status of EU Protected Habitats and Species in Ireland. Habitat Conservation Assessments (Volume 2). Version 1.0. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland;
- NPWS (2019b) The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS Report. Edited by Deirdre Lynn and Fionnuala O’Neill;

- NPWS (2024) Conservation Objectives and Site Synopsis of Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and National Heritage Areas (NHAs);
- OPR Practice Note PN01 (2021) Appropriate Assessment Screening for development Management. Office of the Planning Regulator;
- Reason and Wray (2023). UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats. Version 1.1. Chartered Institute of Ecology and Environmental Management, Ampfield;
- Smith, G.F., O'Donoghue, P., O'Hara, K. and Delaney, E. (2011) Best Practice and Guidance for Habitat Surveying and Mapping. Heritage Council; and
- SNH (2016) Assessing Connectivity with SPAs. Version 3 – June 2016.

4.3. Assessment Methodology and Significance Criteria

The approach to this impact assessment comprises analysis of data within the **'Study Area'** (desk study data) and within the **'Survey Area'** (ecological field data) as well as environmental emissions monitoring data gathered for the Proposed Project in 2023/24. The Study Areas for each ecological receptor are outlined in **Table 4-1**. The Survey Area includes all lands within the EIA Boundary, as well as long the Grand Canal towpath to a distance of 150 m north and south of the EIA Boundary. These distances were chosen in accordance with the likely Ecological Zone of Influence (EZoI) associated with the Proposed Project. The EZoI can be defined as 'the area over which ecological features may be affected by biophysical changes as a result of the Proposed Project and associated activities' (CIEEM, 2024a).

Conclusions are drawn as to whether (and to what extent) baseline conditions are likely to change as a result of the proposed activities, and whether these changes represent significant ecological impacts.

4.3.1. Desk Study

A desk study was undertaken between May 2024 – May 2025 to review existing ecological baseline information available in the public domain and to obtain relevant information held by third parties. The Study Areas for each ecological receptor are outlined in **Table 4-1**.

Table 4-1 – Overview of Desk Study

Data Type	Ecological Receptor	Source	Study Area (distance from Application Site)
International and European Designated Sites	Ramsar Site	▪ Irish Ramsar Wetlands Committee	10km[1]
	Special Area of Conservation (SAC) and candidate SAC (cSAC)	▪ NPWS Designations Viewer	
	Special Protection Area (SPA) and potential SPA (pSPA)	▪ NPWS Designations Viewer	
Statutory Designated Sites	Natural Heritage Area (NHA)	▪ NPWS Designations Viewer	2 km[1]
	Proposed Natural Heritage Area (pNHA)	▪ NPWS Designations Viewer	
Species	Legally protected and notable[2] species records including: ▪ Terrestrial and aquatic fauna ▪ Rare higher plants	▪ National Biodiversity Data Centre (NBDC) Biodiversity map viewer[4], ▪ Article 17 2019 Data (Habitats Directive)[5], ▪ Article 12 2019 Data (Birds Directive)[6],	5 km

[1] The Study Area is extended where hydrological connectivity may be present and/or where supporting habitat is considered present, such as the case for SPAs based on the upper foraging range of greylag geese (SNH, 2016).

[2] Notable species are species considered rare or important/endemic in Ireland. Specifically, if they are categorised as Vulnerable, Endangered or Critically Endangered, Extinct in the Wild, or Extinct as per the International Union for the Conservation of Nature and Natural Resources (IUCN) Red Lists. Available at: https://www.npws.ie/publications/red-lists.

[4] A custom polygon was drawn on the NBDC online mapping platform to define a 5km buffer from the site. This represents an estimate.

[5] Data illustrates range and distribution on a 10km^2 grid across Ireland. The Application Site lies within the hectad N61. Article 17 data relating to habitats and species is therefore of a low resolution.

[6] Data was published in 2019 however, was collected between 2013 to 2018 from a combination of field survey and other research methods primarily by BirdWatch Ireland and species-specific projects carried out by NPWS and others.

Data Type	Ecological Receptor	Source	Study Area (distance from Application Site)
	■ Notable Bird Species[3] ■ Fish ■ Protected flora	■ Consultation with Inlands Fisheries Ireland ■ Consultation with NPWS on sensitive data ■ NPWS FPO Map Viewer – Bryophytes and Vascular Plants[7]	

Hydrological connectivity with designated and non-designated sites was considered if an open watercourse exists within 50 m of the Application Site.

In addition to the sources noted above, the desk study made use of free online resources to assess the context of the land associated with the Project as well as to assess habitat suitability for species within the Study Area (accessed January 2024 – March 2025):

- Bing maps (https://www.bing.com/maps/);
- Google Earth;
- EPA maps (https://gis.epa.ie/EPAMaps/);
- Flood maps (https://floodinfo.ie);
- NBDC Biodiversity Maps (https://maps.biodiversityireland.ie/Map); and
- Review of any other relevant ecological reports and literature – cited as necessary.

4.3.2. Field Surveys

A range of ecological surveys were carried out within the Application Site between 2023 and 2024, as set out in **Table 4-2** below. These surveys informed the current baseline conditions of the Application Site and results are presented in **Section 4.4**.

Table 4-2 – Overview of Ecological Field Surveys

Survey Type	Date	Surveyor[8]
Ecological Scoping survey	■ 30 May 2023.	■ Steven Tooher ACIEEM (Principal Ecologist) with 9 years of relevant experience.

[3] Notable bird species include those listed in Annex I of the Birds Directive and those listed as either Red or Amber as per Birds of Conservation Concern in Ireland (BoCCI) 4 by Gilbert *et al* (2021).

[7] https://www.npws.ie/maps-and-data

[8] Job title and years of relevant experience are included at first mention of the surveyor only.

Survey Type	Date	Surveyor[8]
Detailed Habitat and Botanical Survey, Invasive Species Survey and Non-Volant Mammal Survey	■ 09 May 2024.	■ Steven Tooher ACIEEM.
Amphibian Survey	■ Visit 1: 23 February 2024. ■ Visit 2: 08 March 2024.	■ Visit 1: Steven Tooher ACIEEM and Lisa O'Dowd ACIEEM (Consultant Ecologist) with 5 years of relevant experience. ■ Visit 2: Lisa O'Dowd ACIEEM and Lisa Cleary (Graduate Environmental Scientist) with 2 years of relevant experience.
Bat Daytime Walkover	■ 9 May 2024.	■ Mark Blacker ACIEEM (Principal Ecologist), with 9 years of relevant experience and Lisa O'Dowd ACIEEM.
Bat Static Deployment[9]	■ Visit 1: 11 July 2024. ■ Visit 2: 25 July 2024. ■ Visit 3: 08 August 2024. ■ Visit 4: 22 August 2024. ■ Visit 5: 30 August 2024.	■ Visit I: Lisa O'Dowd ACIEEM. ■ Visit 2: Zak Bursey (Graduate Environmental Scientist), with 2 years of relevant experience. ■ Visit 3: Zak Bursey. ■ Visit 4: Zak Bursey. ■ Visit 5: Zak Bursey.
Breeding Bird Survey	■ Visit 1: 30 May 2023. ■ Visit 2: 27 June 2023. ■ Visit 3: 17 July 2023. ■ Visit 4: 27 July 2023.	■ Visit 1: Steven Tooher ACIEEM. ■ Visit 2: Iain Gilmore (Senior Ecologist), with 6 years of relevant experience. ■ Visit 3: Lisa O'Dowd ACIEEM. ■ Visit 4: Lisa O'Dowd ACIEEM.
Badger Camera Trapping	■ Visit 1: 11 July 2024. ■ Visit 2: 25 July 2024.	■ Visit 1: Lisa O'Dowd ACIEEM. ■ Visit 2: Zak Bursey. ■ Visit 3: Zak Bursey. ■ Visit 4: Zak Bursey.

[9] The static bat detectors monitored continuously for 50 nights during the survey period. These dates present the dates which batteries were changed for the detectors and their security was reviewed.

Survey Type	Date	Surveyor[8]
	■ Visit 3: 26 August 2024. ■ Visit 4: 9 September 2024.	

For all visits, at least one surveyor present was 'capable'[10], as described within the CIEEM's competency framework (2024b) . Further descriptions of each survey are provided throughout this section. Additionally, all surveys included the entire area within the Application Site and relevant EZoI where specified. This area is hereafter referred to as the Survey Area.

4.3.2.1. Ecological Scoping Survey

An initial ecological scoping survey was carried out within the Survey Area on the 30 May 2023 following guidance from NRA (2009a). The purpose of the survey was to gain an appreciation of the Site, identify the requirement for targeted surveys and ascertain ecological opportunities and limitations.

Following the initial ecological scoping survey, several targeted surveys were undertaken. The requirement for these surveys was based on professional judgement and best practice guidance. Methodologies are described below.

4.3.2.2. Habitats

A habitat survey was carried out on the 09 May 2024 to record habitats and flora within the Survey Area. The survey followed guidance by Smith et al. (2011) and Fossitt (2000), with a focus on collecting a detailed flora inventory, determining suitability for and evidence of protected species as well as the presence of any invasive species[11].

4.3.2.3. Bats

4.3.2.4. Site Suitability

The Application Site and its associated landscape features were assessed for their suitability to support bats for foraging, roosting, and commuting. The assessment was carried out in accordance with the Bat Conservation Trust (BCT) guidelines (Collins, 2023) using the criteria set out in **Appendix 4B**. Based on this methodology, the overall suitability of the Site for bats was categorised as detailed in **Table 0-2** (see **Appendix 4B**).

[10] A capable surveyor is one with the knowledge and experience essential to carry out standard relevant tasks unsupervised consistently well (CIEEM, 2024b).

[11] Unless specified otherwise, the term 'invasive species' in this report, refers to species listed in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations (S./I. 477/2011) and subsequent amendments as well as those listed as High Impact invasive species (O'Flynn, Kelly, & Lysaght, 2014).

4.3.2.5. Daytime Bat Walkover

A Daytime Bat Walkover (DBW) was conducted by an experienced bat ecologist holding a Natural England Bat Survey Class Licence (Level 1) and Associate Membership of CIEEM, with nine years of relevant bat survey experience. The purpose of the survey was to inspect the southern quarry wall – identified during the initial ecological walkover as having potential suitability for roosting bats. The survey was undertaken on 9 May 2024 under optimal weather conditions.

4.3.2.6. Static Detector Survey

Potential roost features could not be closely inspected during the DBW[12] and use of static detectors were considered as a suitable alternative to gather information on bat activity. Two static detectors, Song Meter SM4 (Wildlife Acoustics, Maynard, MA, USA) were deployed along the quarry face 14m south of the quarry void where potential for roosting bats was identified. The detectors were secured approximately 20m apart to give full survey coverage of the potential roosting area. Both detectors were deployed on the 11 July 2024 and surveyed continuously until the 29 August 2024 (50 consecutive survey nights). Locations of the bat detectors are illustrated in **Figure 4-2**. Weather data was obtained from a weather station in Oakpark, Co. Carlow, situated 35 km southeast of the Site.

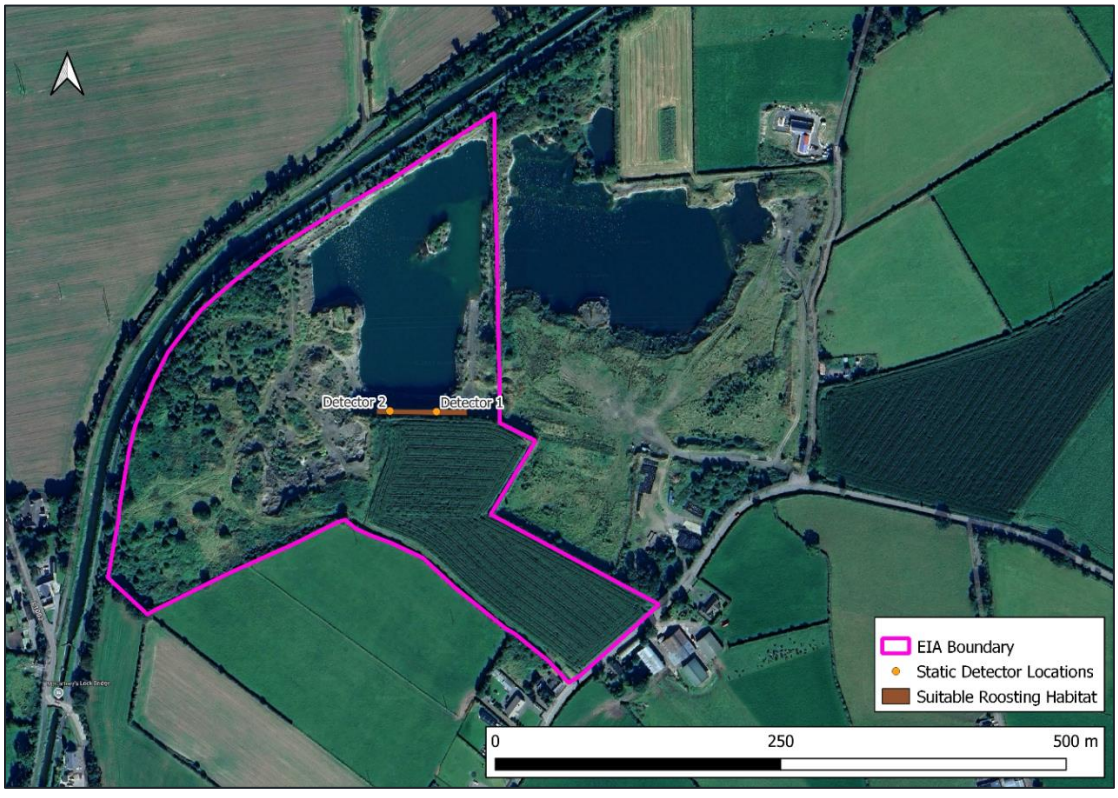

Figure 4-2 - Bat Static Detector Surveys

[12] It was deemed unsafe to inspect he quarry face was potentially unstable and the potential features were located at height (discussed further within Limitations)

The detectors surveyed continuously from a half hour before sunset to a half hour after sunrise. Site location using GPS coordinates were inputted into both detectors. The detectors automatically adjust sunset and sunrise times using the Solar Calculations Method from the GPS location provided. Details of the survey effort and weather conditions are summarised in **Appendix 4B** (**Table 0-3**). Each detector was set up with four D-cell batteries and a 64 gigabyte (GB) Secure Digital (SD) memory card. Batteries were replaced and SD cards changed every two weeks throughout the survey period. Recording settings used are detailed in **Table 4-3**.

Table 4-3 – Static Detector Settings

Recording Range	**30 minutes before sunset to 30 minutes after sunrise**
Tigger frequency range	16kHz to 250kHz
Minimum event	4 milliseconds
Max file length	15 seconds

4.3.2.7. Sound Analysis

Sound files collected during the static detector surveys were analysed using specialist computer software (Wildlife Acoustics Kaleidoscope Pro 5.1.3). Each sound file represented an observation with a bat pass being defined as any call, or series of calls, separated by more than one second from another call or series of calls (Reason, Newson, & Jones, 2016). Bat passes are representative of overall bat activity levels rather than individual bats. The analysis of each of these sound files enables identification/confirmation of species or species group based on call parameters, and the relative activity of different species of bats by counting the minimum number of bats recorded within discrete sound files.

During the auto-identification process, an analysis parameter was applied to filter out files that only contained background noise and did not contain bat calls. The settings used during the filter process are detailed in **Table 4-4**. All files outside these parameters were labelled as noise during the auto-identification process. Ten percent of these were manually checked to ensure no bat activity was missed.

Table 4-4 - Kaleidoscope Pro 5.1.3 Auto Identification Parameters

Signal of Interest	
Kilohertz	8 - 120kHz
Milliseconds	2 – 500ms
Minimum number of pulses	2

All remaining sound files were classified to species level by the auto-identification system. Files were attributed with a species-specific identification or classified as 'NoID' where the call parameters could not be identified by the software.

Following the auto-identification process, all 'NoID' calls were manually checked to assign a species identification. Ten percent of *Pipistrelle sp*. calls were manually checked to verify the auto-identification, and 100% of species calls excluding *Pipistrelle* were manually checked and assigned to the closest match. If the percentage checks returned a greater than 10% error rate all sound files in that session were checked manually.

For manual identification, bat calls were identified to species level. However, species of the genus *Myotis* are grouped together because their call characteristics are similar in structure, and they have overlapping call parameters (Russ, 2012). Individuals were therefore collectively referenced by their genus rather than their species name. *Myotis* species which may be encountered within the geographical region of the Survey Area comprise Daubenton's bat (*Myotis daubentonii*), whiskered bat (*Myotis mystacinus*) and Natterer's bat (*Myotis nattereri*). Additionally, Pipistrellus species often produce similar calls and as such, it was not always possible to identify a call to species level during analysis. These calls were classified to genus level and described as *Pipistrellus* species.

An abbreviation of the genus and species name of each bat was used to create the call Identification References (ID) used during analysis. Details of these call IDs are provided in **Table 4-5**. Individual species included under each genus are only those which have a known distribution in Ireland. Data was sorted following guidance from Collins (2023).

Table 4-5 - Call Identification References

Genus	Common name	Scientific name	Call ID
Pipistrellus	Common pipistrelle	*Pipistrellus pipistrellus*	PIPPIP
	Soprano pipistrelle	*Pipistrellus pygmaeus*	PIPPYG
	Nathusius' pipistrelle	*Pipistrellus nathusii*	PIPNAT
Nyctalus	Leisler's bat	*Nyctalus leisleri*	NYCLEI
Plecotus	Brown long-eared bat	*Plecotus auritus*	PLEAUR
Myotis	Daubenton's bat	*Myotis daubentonii*	MYOTIS
	Whiskered bat	*Myotis mystacinus*	
	Natterer's bat	*Myotis nattereri*	
Rhinolophus	Lesser horseshoe bat	*Rhinolophus hipposideros*	RHIHIP

4.3.2.8. Non-Volant Mammals

In addition to the dedicated bat surveys, a protected mammal walkover survey was undertaken on the 09 May 2024 within the Survey Area. The walkover searched for evidence of protected mammals including:

- Badger *Meles meles*;
- Red squirrel *Sciurus vulgaris*;
- Otter *Lutra lutra*;
- Pine marten *Martes martes*;
- Hedgehog *Erinaceus europaeus*;
- Irish hare *Lepus timidus hibernicus*; and
- Pygmy shrew *Sorex minutus.*

The survey comprised a search for evidence such as potential setts/dens/dreys, scat, mammal paths, prints and live/dead sightings. The survey followed relevant guidelines set out by NRA (2009a) for badgers, Chanin (2003) for otter and Olsen (2013) for all other species.

In the case of all species listed above, the surveyed area comprised the area within the Application Site and along the towpath adjacent to the Grand Canal, in line with the Application Site extents. In the case of otter, the towpath was surveyed an additional 150 m north and south of the lands within the EIA boundary.

Additional incidental evidence of non-volant mammals was recorded during the amphibian survey, bat survey and breeding bird survey as described within **Table 4-2**.

4.3.2.9. Badger Camera Trapping

The mammal walkover survey identified a potential badger sett at Irish Grid Reference N 63448 13016. A trail camera (K&F Concept 48MP UHD) was secured to a wooden post in front of the badger set on 11 July 2024. The camera was deployed for an initial two two-week period, following guidance from Scottish badgers (Scottish Badgers, 2018). The camera was collected at the end of the two-week period to review footage, swap out batteries and replace the memory card. As no badger activity was identified within the footage, the camera was redeployed at the end of August for a further two-week period. The camera was then retrieved in early September with final footage reviewed.

4.3.2.10. Birds

4.3.2.11. Breeding Bird Survey

A breeding bird survey was carried out following an adapted version of the Common Birds Census (CBC) methodology by Gilbert et al. (1998).

Four survey visits were carried out between May and July 2023, as described in further detail within **Appendix 4B**, in line with recommended guidance by Calladine, Garner, Wernham & Thiel (2009).

The surveys were conducted between at least an hour after dawn and 11 o'clock in the morning. Visits were scheduled to take place during good weather conditions (i.e. avoiding persistent rain or fog, excessive cold or heat and wind exceeding Beaufort force 4). Details of the breeding bird survey effort is summarised within the **Appendix 4B**.

During each visit, the surveyor walked through the Survey Area recording all bird species observed. Due to the undulating and scrubby nature of the Site, transect lines were selected within the Site and surveyed sequentially. Birds observed visually or aurally up to 150 m either side of the transects were recorded. Each observation was plotted onto a digital field map (ESRI ArcGIS Field Maps application) using the standard British Trust for Ornithology (BTO) coding and symbology to record species and details of their behaviour, particularly where indicative of breeding, such as singing males or nest building.

4.3.2.12. Breeding Bird Territory Analysis

The objective of the breeding bird surveys was to identify the presence and locations of breeding territories held by species of conservation concern. Such species are referred to as 'target species' and were based on the following legislative or conservation lists:

- Listed on Annex I of the Birds Directive (Annex I);
- Listed as 'Red' or 'Amber' on the BoCCI 4 2020 - 2026 (Gilbert, Stanbury, & Lewis, 2021)

Field observations were entered into desktop ArcMap Geographical Information System (GIS) software. These were then analysed to identify the minimum number of probable or confirmed breeding territories for all bird species. This was done following the CBC methods (Gilbert, Gibbons, & Evans, 1998). This involves the identification of 'clusters' of registrations of birds of the same species displaying breeding characteristics (e.g. singing, alarm calling, nest building, mating) or food provisioning in the same general area over successive survey visits (probable breeding). Additionally, the discovery of an active nest (e.g. containing eggs or chicks) during a single visit (confirmed breeding). Given that the surveys comprised four visits over the breeding season, the minimum requirement for a 'cluster', a probable breeding territory, to be defined was at least two registrations conforming to the above criteria recorded on separate survey visits conducted at least ten days apart.

Non-target species (i.e. Green-listed per BoCCI 4) were identified as being 'present' within the Survey Area and territory analysis was not carried out on these species.

4.3.2.13. Wintering Birds

Considering the topography of the site, in particular the high walls surrounding the lagoon[13], it was determined that the site is unlikely to be an important roosting resource for wintering waterfowl – the high walls impede comfortable take-off and landing. Wintering bird surveys were considered unnecessary and were not carried out.

[13] The collected waters within the quarry void space are referred to as the 'lagoon'.

4.3.2.14. Herpetofauna

4.3.2.15. Amphibians

An amphibian survey was carried out by adapting methodologies presented in Meehan (2013a) and Reid et al. (2013b).

A total of two survey visits were carried out in line with timeframes proposed in Meehan (2013a) and Reid et al. (2013b). Further details of the survey effort are summarised within **Appendix 4B**.

During each visit, two surveyors walked through the Survey Area recording all suitable habitats for breeding common frog *Rana temporaria* and smooth newt *Lissotriton vulgaris* such as small areas of pooled water and ponds as well as the presence of common frog spawn/tadpoles or smooth newt eggs. Suitability for breeding common frogs was based on shallow areas of pooled freshwater whereas suitability for smooth newt was based on the presence of aquatic vegetation in such pooled water bodies as described in Meehan (2013a) and Reid et al. (2013b). The total coverage of spawn in any one water feature was recorded as the maximum estimate recorded between the two visits.

Suitable waterbodies were measured using a digital field map (ESRI ArcGIS Field Maps application). The underside of aquatic leaves was inspected for the presence of smooth newt eggs. Incidental observations of adults were also recorded. Each positive observation was plotted onto a digital field map recording location with a description of the habitat.

4.3.2.16. Reptiles

Suitability was recorded during the ecological walkover and habitat survey. Reptiles were recorded incidentally throughout the programme of ecological surveys. No additional targeted surveys were carried out.

4.3.2.17. Fish

Given that the waterbodies onsite are artificial in origin and hydrologically isolated from the surrounding environment, natural recruitment of important populations of aquatic fauna was considered unlikely. On that basis, targeted field surveys for fish or other aquatic species were deemed unnecessary and were not carried out.

4.3.2.18. Terrestrial Invertebrates

Suitability was recorded during the ecological walkover and habitat survey. Any notable invertebrates were recorded incidentally throughout the programme of ecological surveys. No targeted survey was carried out.

4.3.3. Assessment of Significant Effects

4.3.3.1. Overview

Assessment of the significance of effects on ecological receptors is based on the staged process outlined in the ecological impact assessment guidelines from CIEEM (2024a). The stages in the assessment are as follows:

- Identifying and characterising impacts and their effects;
- Incorporating measures to avoid and mitigate adverse impacts and effects;
- Assessing the significance of any residual effects after mitigation;
- Identifying appropriate compensation measures to offset significant residual effects; and
- Identifying opportunities for ecological enhancement.

4.3.3.2. Baseline Evaluation Criteria of Ecological Features

Evaluation of the ecological features as identified by the baseline studies as IEFs have been guided by the NRA (2009b) and CIEEM (2024a) guidelines. In accordance with these guidelines, the importance of each IEF has been assessed in relation to the conservation status of the feature over a range of geographical scales as listed below in **Table 4-6**.

Table 4-6 – Approach for Establishing Important Ecological Features (IEFs)

Conservation Value	Criteria
International	■ Statutory sites designated under internation conventions such as World Heritage Sites, Biosphere Reserves, Wetlands of International Importance (Ramsar sites) ■ European Site including SACs, SPAs and Site of Community Importance (SCI) ■ Features essential to maintaining the coherence of the European Network[14]. ■ Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. ■ Resident or regularly occurring populations (assessed to be important at the international level)[15] of the following: ■ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or ■ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. ■ Ramsar Site (Convention on Wetland of International Importance Especially Waterfowl Habitat, 1971). ■ World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). ■ Biosphere Reserve (UNESCO Man & The Biosphere Programme). ■ Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). ■ Biogenetic Reserve under the Council of Europe. ■ Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).[16]
National	■ Site designated or proposed as a Natural Heritage Area (NHA).

[14] See Article 3 and 10 of the Habitats Directive.

[15] It is suggested that, in general, 1% of the international population of such species qualifies as internationally important. However, a smaller population may qualify as internationally important where the population forms a critical part of the wider population, or the species is at a critical phase of its life cycle.

[16] Note that such waters are designated based on these waters' capabilities of supporting salmon, char and whitefish *Coregonus.*

Conservation Value	Criteria
	■ Statutory Nature Reserve. ■ Refuge for Fauna and Flora protected under the WAs. ■ National Park. ■ Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA). ■ Resident or regularly occurring populations (assessed to be important at the national level)[17] of the following: ■ Site containing 'viable areas'[18] of the habitat types listed in Annex I of the Habitats Directive. ■ Species protected under the WAs; and/or ■ Species listed on the relevant Red Data list.
County	■ Area subject to a Tree Preservation Order as defined by the Planning and Development Act 2000. ■ Area of High Amenity[19], or equivalent, designated under the County Development Plan (CDP). ■ Resident or regularly occurring populations (assessed to be important at the County level)[20] of the following: ■ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; ■ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;

[17] It is suggested that, in general, 1% of the national population of such species qualifies as nationally important. However, a smaller population may qualify as internationally important where the population forms a critical part of the wider population or the species is at a critical phase of its life cycle.

[18] A 'viable area' is defined as an area of habitat that, given the particular characteristic of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological process and function) would be maintained in the face of stochastic change (e.g. as a result of climate change)

[19] It should be noted that whilst areas such as Areas of High Amenity and areas subject to a Tree Preservation Order are often designated on the basis of their ecological value, they may also be designated for other reasons such as their amenity or recreational value. Therefore, it should not be automatically assessed that such sites are of county importance from an ecological perspective.

[20] It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County important where the population forms a critical part of the wider population, or the species is at a critical phase of its life cycle.

Conservation Value	Criteria
	■ Species protected under the WAs; and/or ■ Species listed on the relevant Red Data list. ■ Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. ■ County important populations of species, or viable areas of semi-natural habitats or ecological features identified in the National or Local BAP, if this has been prepared. ■ Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. ■ Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (Higher Value)	■ Locally important populations of priority species or habitats or natural heritage features identified in the Local Biodiversity Action Plan (LBAP) if this has been prepared. ■ Resident or regularly occurring populations (assessed to be important at the Local level)[21] of the following: ■ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; ■ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; ■ Species protected under the WA; and/or ■ Species listed on the relevant Red Data list. ■ Sites containing semi-natural habitat types with the high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality. ■ Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining connectivity between features of higher ecological vale.

[21] It is suggested that, in general, 1% of the Local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of the wider population or the species is at a critical phase of its life cycle.

Conservation Value	Criteria
Local Importance (Lower Value)	■ Sites containing small areas of semi-natural habitat that are of local importance for wildlife. ■ Sites or features containing non-native species that are of importance in maintaining habitat links. ■ All other species that are widespread and common and which are not present in regionally or nationally important numbers considered to be of limited conservation value.

In accordance with NRA (2009a) guidelines, ecological sites of below 'Local Importance (higher value)' should not be selected as IEFs for which impact assessment is required during subsequent stages of the process. Impacts on these features would not be considered significant.

The criteria listed above are intended as a guide and are not definitive. Professional judgement is therefore important when attributing a level of value to a species or individual. In these cases, reference has also been made to respective national and county populations and trends.

4.3.3.3. Impact Assessment

The EIA Regulations require consideration of the types of effects in terms of how they arise, whether they are beneficial or adverse along with their duration. The nature of these effects is defined later.

The potential effects are determined through understanding how each IEF is likely to be affected by the Proposed Project and include determining:

- The potential type of effect (as described in **Table 4-7**);
- The scale/magnitude of the predicted effect (as detailed in **Table 4-8**); and
- Cumulative effects that may affect the long-term integrity of the ecosystems at the site.

Guidelines (CIEEM, 2024a) defines a significant effect as one "that either supports or undermines biodiversity conservation objectives for IEFs or for biodiversity in general". Therefore, the assessment process does not require consideration of effects on ecological features deemed to be below a predefined nature conservation importance threshold. As mentioned earlier in this section, IEFs of below 'Local Importance (higher value)' are excluded from further assessment.

Table 4-7 – Types of Effects

Effect	Description
Direct	Effects which may arise immediately as part of the Proposed Project
Indirect	Effects which may not be caused immediately by the Proposed Project but may arise because of it (e.g., habitat change which may not directly affect a top-level predator, but which causes a reduction in the presence of their prey species).
Secondary	Additional effects resulting because of one or more direct effects (e.g. the combined effects of habitat loss and displacement).
Temporary	Effects which cause a change to the baseline for a limited period.
Permanent	Effects which cause an irreversible change to the baseline.

Effect	Description
Cumulative	Effects which may arise from multiple types of effects on a particular receptor. These may overlap spatially or temporally.
Beneficial	Effects which have a beneficial influence on the environment.
Short term	Effects with a duration of 0-5 years
Medium term	Effects with a duration of 5-15 years
Long term	Effects with a duration of more than 15 years
Adverse	Effects which have an adverse influence on the environment.

The level of potential effect on each IEF was determined by considering the type (**Table 4-7**) and magnitude of effect (**Table 4-8**) in relation to the conservation value of the IEF.

Table 4-8 – Criteria for Describing the Scale of Magnitude

Magnitude	Criteria and resultant effect
Large	The change permanently (or over the long-term) affects the conservation status of a habitat/species, reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource/species population, a large area of habitat or large proportion of the wider species population is affected. For designated sites, integrity is compromised. There may be a change in the level of importance of the ecological feature in the context of the Proposed Project.
Medium	The change permanently (or over the long term) affects the conservation status of a habitat/species reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource/species population, a small-medium area of habitat or small-medium proportion of the wider species population is affected. There may be a change in the level of importance of this ecological feature in the context of the Proposed Project.
Small	The quality or extent of designated sites or habitats or the sizes of species' populations, experience some small-scale reduction or increase. These changes are likely to be within the range of natural variability and they are not expected to result in any permanent change in the conservation status of the species/habitat or integrity of the designated site. The change is unlikely to modify the evaluation of the ecological feature in terms of its importance.
Very Small	Although there may be some effects on individuals or parts of a habitat area or designated site, the quality or extent of sites and habitats, or the size of

Magnitude	Criteria and resultant effect
	species populations, means that they would experience little or no change. Any changes are also likely to be within the range of natural variability and there would be no short-term or long-term change to conservation status of habitats/species ecological features or the integrity of designated sites.
Negligible	A change, the level of which is so low, that it is not discernible on designated sites or habitats or the size of species' populations, or changes that balance each other out over the lifespan of a project and result in a neutral position.

The likelihood of the occurrence of an event was estimated based on the scales presented in **Table 4-9**.

Table 4-9 – Scale of Likelihood

Likelihood	Certain	Likely	Unlikely	Extremely unlikely
Probability of occurrence	>95 %	50-95 %	5-50 %	<5 %

4.3.4. Determining Significance

Based on the type of effect, its duration, magnitude, likelihood of occurrence and the conservation value of the IEF, professional judgement is applied as to whether the effect is significant, and at what geographical scale. Justification is provided for all conclusions.

4.3.5. Assumptions and Limitations

Every effort has been made to provide comprehensive descriptions of the baseline conditions however, the following assumptions and limitations apply:

4.3.5.1. Desk Study

4.3.5.1.1 NBDC Data

Data held by the NBDC are often collected on a voluntary basis and therefore, the expertise and experience of the recorder, and the validity of records cannot be confirmed. Records are often accumulated in a piecemeal fashion with systematic surveys for specific species generally undertaken infrequently, if at all. The absence of records does not demonstrate the absence of a species; rather it may indicate a gap in recording coverage.

4.3.5.1.2 Bat Landscape Mapping and Desk Study

The data which informed the habitat suitability assessment by Lundy et al. (2011) was collected between 2000 and 2009. However, this suitability ranking corresponds to the desk-based ranking which was given following review of aerial footage. Therefore, the results of this study may present an outdated conclusion.

4.3.5.2. Field Study

4.3.5.2.1 Bat Survey

If potential roost features are identified during a DBW and if the feature will be impacted by a project, it is recommended that roost inspection surveys, presence/absence surveys or activity surveys are carried out (Collins, 2023). However, health and safety concerns, including unstable rock and the presence of deep water, prevented these surveys from being carried out on one of the walls of the old quarry void. Static detector surveys were therefore carried out to characterise the bat populations which may be using the feature(s). This approach resulted in a large dataset that was sufficient to describe the population of bats within the vicinity of the detectors during the main period of significant bat activity (i.e. the maternity season).

Due to a perceived risk of vandalism on site, the detectors were secured directly to the base of the wall using pre-drilled anchor points. The optimal placement of the microphone is in the middle of the bat flyway (Wildlife Acoustics, 2019) however, the area in front of the wall was relatively uncluttered, and there were no obstacles to deter sound or force bats away from the detectors. Due to the difficulties in calculating the optimum distance between static detectors (Metcalf, et al., 2022), bat activity levels rather than bat population are estimated to avoid considering data replications. It is considered that the activity recorded is an accurate reflection of the bat activity present within this area of the site.

In addition, there is no observational context for the data collected with bat passes possibly representing multiple bats passing or an individual bat passing multiple times. Furthermore, behavioural data has not been collected or analysed.

Due to technical issues, detector **two** did not record for the final two weeks. However, detector **one** functioned adequately for the full duration, such that sufficient survey data was made available for a robust assessment.

Some species such as brown long-eared bat often emit low-amplitude and FM echolocation calls and foraging bats often make no sound, using eyes or ears to hunt by gleaning (Swift & Racey, 2002). Therefore, these individuals can be missed during recording periods. Professional judgement and interpretation of surrounding habitat and suitability for different species groups was used to determine likely species present within the Site.

4.3.5.2.2 Breeding Bird Survey

The breeding bird survey represents an adapted version of the CBC methodology with fewer survey visits undertaken. Four survey visits were considered sufficient to provide an estimate of breeding territories to enable an assessment of effects of the Proposed Project to be carried out. The number and location of breeding territories is an estimate based on the criteria outlined above.

The surveyors were unable to survey the island within the quarry void for breeding birds. Any birds on the island were identified using binoculars. However, surveyors were unable to

hear any calls/song from the island due to the location within the quarry void space. This may have resulted in breeding territories on the island being overlooked and not recorded.

The series of surveys commenced later than guidelines recommend (in May rather than March). It is nonetheless considered that the survey results are sufficiently robust to provide an accurate representation of breeding bird assemblages at the Site. It is also noted that all surveys occurred within the nesting season for birds defined by the WA (March-August inclusive).

4.3.6. Mitigation, Compensation and Enhancement Measures

The approach to mitigation is as set out in the mitigation hierarchy (CIEEM, 2024a) and is explained below in Table 4-10. The principle underlying the mitigation hierarchy is that avoidance is favoured over mitigation, and mitigation is favoured over compensation, which should be viewed as a last resort. Measures for the implementation of Biodiversity Enhancement (BE) should be included regardless of whether avoidance, mitigation or compensation is necessary.

Table 4-10 - Mitigation Hierarchy

Stage	Description
Avoidance	Seek options that avoid harm to ecological features (for example, by locating on an alternative site).
Mitigation	Negative effects should be avoided or minimised through mitigation measures, either through the design of the Proposed Project or subsequent measures that can be guaranteed – for example, through a condition or planning obligation.
Compensation	Where there are significant residual negative ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.
Enhancement	Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

4.3.6.1. BE – Recent Policy

Kildare County Development Plan 2023 - 2029 (Chapter 12) has introduced a new objective (BI O7):

- “pursue insofar as possible and practical, a policy of biodiversity net gain through strategies, plans, developments, mitigation measures, appropriate offsetting and/or investment in Blue - Green Infrastructure”.

A new briefing paper has also recently been produced by CIEEM (2023) on the implementation of BE in Ireland. Two key recommendations include:

- The mitigation hierarchy should always be followed sequentially. The primary emphasis should always be on avoidance; and
- BE should be mandatory for all large-scale developments, e.g. infrastructure projects, renewable energy, or those that require Environmental Impact Assessment.

4.4. Baseline Ecological Conditions

4.4.1. Overview of Application Site and Surrounding Area

The lands contiguous to the Application Site boundary can be largely characterised as rural in nature, with land use in the area being mixed agricultural and single-house residential. Low density, one-off ribbon type roadside housing and farmyards are situated in the vicinity of the Application Site. The Grand Canal and adjacent towpath are situated to the North and West of the Application Site with thick hedgerows, treelines and areas of scrub bordering the Application Site.

4.4.2. Designated and Notable Conservation Sites

Two sites of nature conservation interest were identified within the Study Area. These are presented in **Table 4-11** with their corresponding Qualifying Interests (QIs).

It should be noted that pNHAs do not have lists of QIs in the same sense as European sites. Instead, they have been selected for the presence of a variety of habitats and/or species assemblages, which have been determined to be of ecological significance in a regional and/or national context. Site synopses for pNHAs are provided by the NPWS, and the main/relevant points from these are reproduced in the table overleaf (**Table 4-11**).

An Appropriate Assessment Screening report accompanies this Section 37L application, which addresses impacts to European sites specifically. It has concluded that significant effects to any European sites, by virtue of the Proposed Project in isolation, or in combination with other plans or projects are not expected. The screening process therefore determined that Appropriate Assessment is not required.

Table 4-11 – Designated and Notable Sites Identified within the Study Area

Designated Site Name and Code	Approximate Distance/Direction from the Proposed Project	Qualifying Interests and Conservation Objectives [Habitats/Birds Directive Code] (NHAs/pNHAs) - Site Synopsis Summary
River Barrow and River Nore SAC [002162]	1.6 km southwest (direct) 25.6 km southwest (fluvial – via canal)	Designated for: ■ Estuaries [1130]. ■ Mudflats and sandflats not covered by seawater at low tide [1140]. ■ Reefs [1170]. ■ Salicornia and other annuals colonising mud and sand [1310]. ■ Atlantic salt meadows Glauco-*Puccinellietalia maritimae* [1330]. ■ Mediterranean salt meadows *Juncetalia maritimi* [1410]. ■ Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]. ■ European dry heaths [4030]. ■ Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]. ■ Petrifying springs with tufa formation (*Cratoneurion*) [7220]. ■ Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]. ■ Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae, Salicion albae*) [91E0]. ■ Desmoulin's Whorl Snail [1016]. ■ Freshwater Pearl Mussel [1029][22]. ■ Nore freshwater pearl mussel [1990].

[22] The Nore freshwater pearl mussel is included within the COs of the River Barrow and River Nore SAC however, it is omitted within the Site Synopsis. The species has been included to follow a precautionary approach.

Designated Site Name and Code	Approximate Distance/Direction from the Proposed Project	Qualifying Interests and Conservation Objectives [Habitats/Birds Directive Code] (NHAs/pNHAs) - Site Synopsis Summary
		▪ White-clawed Crayfish [1092]. ▪ Sea Lamprey [1095]. ▪ Brook Lamprey [1096]. ▪ River Lamprey [1099]. ▪ Twaite Shad [1103]. ▪ Salmon[1106]. ▪ Otter [1355]. ▪ Killarney Fern *Trichomanes speciosum* [1421]. ▪ The Conservation Objectives: To restore and maintain the favourable conservation condition of the habitats and species listed above.
Grand Canal pNHA [002103]	Adjacent to the west of the Application Site	▪ Diversity of species and habitats including hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland as well as flora including arrowhead *Sagittaria sagittifolia*, watercress *Nasturitum officinale*, hemlock water-dropwort *Oenanthe crocata*, and opposite-leaved pondweed *Groenlandia densa*. ▪ Otter and smooth newt. ▪ 'The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods.' (NPWS, 1995). *There are no Conservation Objectives (COs) for pNHAs.*

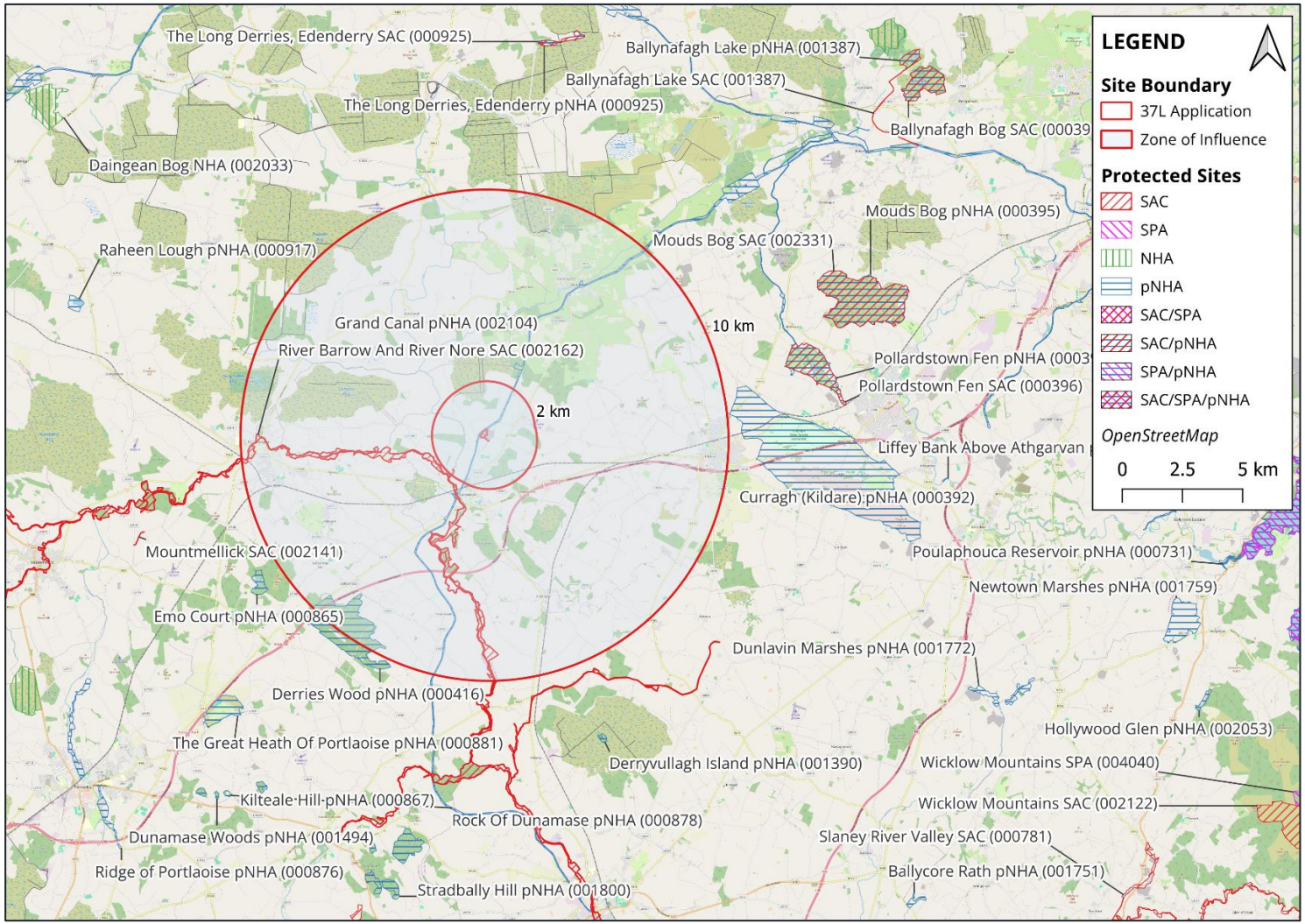

Figure 4-3 - Designated and Notable Conservation Sites

4.4.3. Habitats Baseline

4.4.3.1. Desk Study

4.4.3.2. Annex 1 Habitats

Fourteen areas of Annex 1 habitat were identified within N61 (NPWS, 2019). Details of these habitats are provided in **Table 4-12**.

Table 4-12 - Annex 1 Habitats Within N61 (as Reported in 2019)

Habitat [Habitats Directive Code]	Current Distribution	Current Range[23]	Favourable Reference Range[24]
Cladium fens [7210]	-	✓	✓
Alluvial woodland [91E0]	-	✓	✓
Hard water lakes [3140]	✓	✓	✓
Vegetation of flowing waters [3260]	✓	✓	✓
Molinia meadows [6410]	✓	✓	✓
Petrifying springs [7220]	✓	✓	✓
Alkaline fens [7230]	✓	✓	✓
Wet heaths [4010]	-	✓	✓
Dry heaths [4030]	-	✓	✓
Orchid-rich calcareous grassland [6210]	-	✓	✓
Raised bog (active) [7110]	-	✓	✓
Degraded raised bogs [7120]	-	✓	Not reported

[23] 'The maps presented in this report give the known or best estimate of distribution, illustrated as dark pink squares (either 10 km or 50 km grids). The Range is drawn as an envelope around the distribution using a standardised procedure. Horizontal or vertical gaps in the habitat distribution of 3 or more grid squares or oblique gaps of 2 or more squares are deemed enough to justify a break in the Range. Where ecological conditions for the development of the habitat are deemed unsuitable, gaps of just 1 grid square may also be permitted.' (NPWS, 2019).

[24] 'Favourable Reference Value for Range is the total geographical area within which all significant ecological variations of the habitat or species are included, and which is sufficiently large to allow the long-term survival of the habitat or species.' (NPWS, 2019)

Habitat [Habitats Directive Code]	Current Distribution	Current Range[23]	Favourable Reference Range[24]
Rhynchosporion depressions [7150]	-	✓	✓
Bog woodland [91D0]	-	✓	✓

4.4.3.3. Wetland Habitats

Review of the Map of Irish Wetlands identified the Application Site to be situated within the Coolsickin or Quinsborough [MIW_KE170] wetland. The main wetland feature is an artificial waterbody which corresponds to the collected waters present within the quarry void space that formed following cessation of the historical quarry operations. The wetland description states that no marginal wetland vegetation was recorded and that there is no other wetland feature of interest. The wetland received a D Rating indicating it is of local conservation value (moderate value). No other wetlands were identified within the Study Area.

4.4.3.4. Field Study

The habitat survey identified a dominant artificial waterbody and a mosaic of several distinct habitats including dry calcareous grassland, scrub, wet grassland and hedgerows. In addition, large areas of spoil and bare ground, recolonising bare ground as well as calcareous scree and loose rock were recorded. A full description of the habitats recorded during the habitat survey are provided in **Table 4-13**, with commentary for their potential to correspond to Annex 1 habitats. Their locations on site are illustrated in **Figure 4-4** - Habitat Survey Results (2024).

Table 4-13 - Habitats recorded within the Application Site (2024)

Fossitt Habitat Code and Name	Description and Species	Annex 1 Affinity	Conclusion – Annex 1	Photo
BL1 Arable Crops	Located east of an agricultural access track leading to the southwest corner of the Application Site. Per Fossitt (2000), BC1 is "agricultural land that is cultivated and managed for the production of arable crops". In this case, the field was sown with a monoculture of maize[25].	None	N/A	
BL2 Earth Banks	Located east of the canal towpath, between the canal and the Application Site. A treeline (WL2) sits on top. This habitat was recorded within a habitat mosaic with dry meadows and grassy verges (GS2).	None	N/A	

[25] Identified through Google Streetview (2021).

Fossitt Habitat Code and Name	Description and Species	Annex 1 Affinity	Conclusion – Annex 1	Photo
ED2 Spoil and bare ground	Located along internal vehicle tracks, as well as within patchy mosaics with recolonising bare ground (ED3) and scrub (WS1) throughout the Application Site. This habitat is characterised by the absence of flora, likely as a result of ongoing soil disturbance.	None	N/A	
ED3 Recolonising bare ground	ED3 is the first stage in ecological succession after bare ground (ED2) and is characterised by the patchy presence of herbaceous ruderal flora. It is a transitional habitat, whereby the next stage is grassland (in this case GS1 or GS2). 34 species were recorded in ED3, including several grasses and a range of other herbaceous species. The transitional nature of this habitat means that it is	None	N/A	

Fossitt Habitat Code and Name	Description and Species	Annex 1 Affinity	Conclusion – Annex 1	Photo
	inherently inclined to form patchy mosaics with other habitats. It is quite common within the existing quarry footprint, notably along vehicle tracks, along the eastern wall of the main quarry void, and in the central area where works appear to have been most recent. This habitat was recorded alone and within habitat mosaics with scrub (WS1) and soil and bare ground (ED2).			
ER2 Exposed Calcareous Rock	Per Fossitt (2000), ER2 is applied to “all natural and artificial exposures of calcareous bedrock and loose rock, and any other exposures of basic rock, with the exception of unstable scree and areas of rocky coastline”. Examples included exposed bedrock at the southern and	Calcareous rocky slopes with chasmophytic vegetation (8210)	According to the Article 17 Report (Volume 1 - NPWS, 2019), “while there is no strict altitudinal threshold, this habitat is limited to examples of chasmophytic vegetation in a broadly upland landscape context.” **Annex I habitat is not present.**	

Fossitt Habitat Code and Name	Description and Species	Annex 1 Affinity	Conclusion – Annex 1	Photo
	western edges of the quarry void space. A small number of species were recorded in crevices. These comprised *Hart's-tongue fern Asplenium scolopendrium*, dandelion *Taraxacum* sp. and three species of moss – *Amphidium mougeotii, Brachythecium rutabulum and Trichostomum brachydontium.*			
ER4 Calcareous scree and loose rock	Per Fossitt (2000), ER4 is applied to accumulations of loose or broken calcareous rock that are largely unvegetated because they are unstable and subject to ongoing disturbance. In the context of the Application Site, the lack of vegetation is more attributable to the lack of suitable growing substrate on large areas of solid rock.	Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*) (8120)	According to the Article 17 Report (Volume 1 - NPWS, 2019), "calcareous scree habitat consists of accumulations of calcareous rock fragments on slopes below upland cliffs or on exposed / frost-shattered mountain summits or ridges." **Annex I habitat is not present.**	

Fossitt Habitat Code and Name	Description and Species	Annex 1 Affinity	Conclusion – Annex 1	Photo
	Located primarily in the central area where works appear to have been most recent.			
FL4 Mesotrophic lakes	A number of topographical depressions have arisen as a result of extractive works, including redeposition of overburden and soil compaction by the passage of heavy machinery. Many of these have formed small waterbodies and have become vegetated. The term ‘mesotrophic’ refers to a moderate concentration of nutrients, which is considered reasonable given the lack of agricultural activity at the Site. These waterbodies are unlikely to be acidic, given the bedrock type and soil conditions. Thus, these were categorised as FL4	None	N/A	

Fossitt Habitat Code and Name	Description and Species	Annex 1 Affinity	Conclusion – Annex 1	Photo
	after other options were eliminated. Species recorded included common stonewort *Chara vulgaris*, greater water-moss *Fontinalis antipyretica* and floating sweet grass *Glyceria fluitans.*			
FL8 Other artificial lakes and ponds	Located in the east of the Application Site, this habitat is represented by the collected waters within the quarry void space. The steep sides of this waterbody make it inhospitable for aquatic vegetation that would otherwise take root in shallow water.	None	N/A	

Fossitt Habitat Code and Name	Description and Species	Annex 1 Affinity	Conclusion – Annex 1	Photo
FW3 Canals	The Grand Canal (Barrow Line) extends along the north-eastern boundary of the Application Site. It is separated from the Application Site by a treeline, an earthen bank, a footpath and a grassy verge.	None	N/A	
GS1 Dry calcareous and neutral grassland	Per Fossitt (2000), “this category is used for unimproved or semi-improved dry grassland that may be either calcareous or neutral, but not acid. It is associated with low intensity agriculture and typically occurs on free-draining mineral soils of various depths.” Considering the works associated with the Proposed Project, and that the bedrock is limestone, it can be assumed that the works have led to an increased calcareous composition of the soil.	Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometea*) (*important orchid sites) (6210) *Juniperus communis* formations on heaths or calcareous	<u>6210</u> According to IWM 102 (Martin, O'Neill, & Daly, 2018), classification as 6210 requires the presence of seven indicator species, with at least two of these being ‘high-quality’ indicator species. The grassland onsite contained five indicator species – two ‘positive’ and three ‘high-quality’. Whilst the grassland is reasonably high value in an ecological context, **it does not fit the criteria to**	

Fossitt Habitat Code and Name	Description and Species	Annex 1 Affinity	Conclusion – Annex 1	Photo
	Calcareous indicators included yellow-wort *Blackstonia perforata,* cowslip, wild carrot *Daucus carota*, common bird's-foot trefoil *Lotus corniculatus* and common spotted orchid *Dactylorrhiza fuchsii*. A total of 36 species were recorded in this habitat. A total of 13 High-Nature-Value (HNV) species were recorded in this habitat, in accordance with IWM 78 (O'Neill, Martin, Devaney, & Perrin, 2013). This habitat was recorded alone and as a mosaic with Scrub (WS1) and Recolonising bare ground (ED3).	grasslands (5130) Calaminarian grasslands of the *Violetalia calaminariae* (6130)	**be classified as Annex I habitat 6210.** <u>5130</u> Juniper was not observed onsite. **Annex I habitat 5130 is not present.** <u>6130</u> According to the Article 17 Report (Volume 1 - NPWS, 2019), "in Ireland, this habitat is restricted to artificial habitats on spoil heaps in the vicinity of old mine workings." **Annex I habitat 6130 is not present.**	

Fossitt Habitat Code and Name	Description and Species	Annex 1 Affinity	Conclusion – Annex 1	Photo
GS2 Dry Meadows and Grassy Verges	Per Fossitt (2000), 'this type of grassland is now best represented on grassy roadside verges, on the margins of tilled fields, on railway embankments, in churchyards and cemeteries, and in some neglected fields or gardens. These areas are occasionally mown (or treated with herbicides in the case of some railway embankments), and there is little or no grazing or fertiliser application.' In the context of the Application Site, this habitat has been assigned to the grassy verges either side of the canal towpath, both of which are outside the Application Site. It contained several grasses and herbaceous species but lacked the calcareous indicators that were observed within the footprint of the Application Site.	Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*) (6510)	This habitat was recorded outside the site boundary. It is unlikely to conform to Annex I habitat 6510 owing to its position and amenity function alongside the canal towpath. **Annex I habitat 6510 is not present.**	

Fossitt Habitat Code and Name	Description and Species	Annex 1 Affinity	Conclusion – Annex 1	Photo
	This habitat was recorded within a habitat mosaic with earth banks (BL2).			
GS4 Wet grassland	Per Fossitt (2000), this type of grassland "occurs on wet or waterlogged mineral or organic soils that are poorly drained". One area of GS4 was noted near the northern boundary, bound on two sides by scrub (WS1). It was characterised by the abundance of field horsetail *Equisetum arvense* and hard rush *Juncus inflexus.* Other indicator species of wet soils included glaucous sedge *Carex flacca*, cottongrass *Eriophorum angustifolium* and silverweed *Potentilla anserina*. A total of 16 species were recorded in this habitat, 5 of which are considered high-nature-value as per IWM 78.	*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (6410)	*Molinia* was not recorded onsite. **Annex I habitat 6410 is not present.**	

Fossitt Habitat Code and Name	Description and Species	Annex 1 Affinity	Conclusion – Annex 1	Photo
WL1 Hedgerows	Hedgerows were recorded around the boundary of the Application Site, with two examples at height above the main quarry void. They were primarily made up of hawthorn *Crataegus monogyna* and ash *Fraxinus excelsior*. Occasional shrubs included goat willow *Salix caprea*, dog rose *Rosa canina* and bramble *Rubus fruticosus* agg.	None	N/A	
WL2 Treelines	The distinction between hedgerows and treelines is based primarily (per Fossitt (2000)) on the height of the trees. A treeline is 5 m or higher, and anything shorter is a hedgerow. In reality the distinction is somewhat academic, as both habitats often fulfil similar ecological roles.	None	N/A	

Fossitt Habitat Code and Name	Description and Species	Annex 1 Affinity	Conclusion – Annex 1	Photo
	This habitat has been assigned to the tall line of trees lining the canal towpath outside the boundary of the Application Site.			
WS1 Scrub	Dense patches of scrub have become established throughout the Application Site, which are typically an indication of succession, where an area has been left undisturbed for a prolonged period. Goat willow, bramble, hawthorn and ash dominated the habitat with hedge mustard *Sisymbrium officinale* and dog rose occasionally recorded. This habitat was recorded alone and within a habitat mosaic with dry calcareous and neutral grassland (GS1), recolonising bare ground (ED3) and soil and bare ground (ED2)	*Juniperus communis* formations on heaths or calcareous grasslands (5130)	Juniper was not observed onsite. **Annex I habitat 5130 is not present.**	

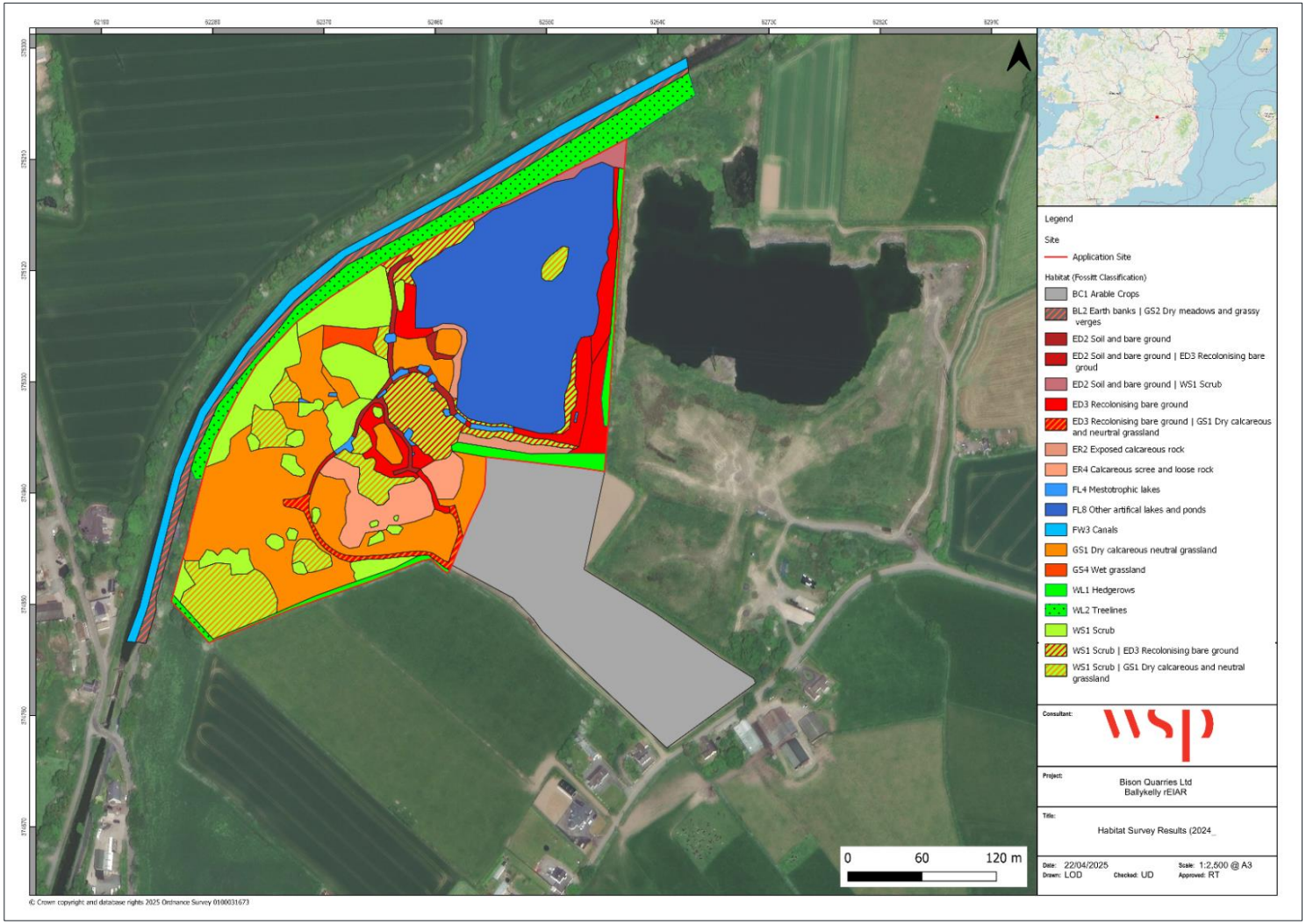

Figure 4-4 - Habitat Survey Results (2024)

4.4.4. Species Baseline

4.4.4.1. Fauna & Mammals

4.4.4.1.1 Desk Study

NBDC historical species records were searched within 5 km of the Application Site (the 'Search Area'). Records which have been submitted within the last 10 years were considered. Records of 10 terrestrial mammal species[26] were returned. Six of these species are protected under the WA, while two species are considered invasive and listed on the Regulations S.I. 477 (see **Table 0-3**) (See **Appendix 4C**).

No other species of interest were identified during this study.

Review of Article 17 2019 distribution data showed the favourable reference range for seven Annex IV bats and three other mammalian species in N61. All species identified (**Table 4-14**) have a current range and favourable reference range in N61. Irish hare, otter, pine marten, soprano pipistrelle, Daubenton's bat, brown long-eared bat, Natterer's bat, common pipistrelle and Leisler's bat also have a distribution in N61.

Table 4-14 – Article 17 Data Desk Study: Mammals

Common Name	Scientific Name	Habitats Directive Species Code
Irish hare	*Lepus timidus subsp. Hibernicus*	[1334]
Otter	*Lutra lutra*	[1355]
Pine marten	*Martes martes*	[1357]
Leisler's bat	*Nyctalus leisleri*	[1331]
Daubenton's bat	*Myotis daubentonii*	[1314]
Whiskered bat	*Myotis mystacinus*	[1339]
Natterer's bat	*Myotis nattereri*	[1322]
Common pipistrelle	*Pipistrellus pipistrellus*	[1309]
Soprano pipistrelle	*Pipistrellus pygmaeus*	[5009]
Brown long-eared bat	*Plecotus auritus*	[1326]

[26] All terrestrial mammals excluding bats.

The desk study of NBDC records returned records for three bat species between 2014 and 2024 within 5 km of the Site. A summary of the records is provided in **Table 4-15**. The exact locations of the records were not available.

Table 4-15 – Desk Study - Bats

Species	Protection	No.	Record date	Source and Title of Dataset
Common pipistrelle	WA, Annex IV	3	2015	NBDC: National Bat Database of Ireland
Leisler	WA, Annex IV	2	2015	NBDC: National Bat Database of Ireland
Soprano pipistrelle	WA, Annex IV	7	2015	NBDC: National Bat Database of Ireland

Aerial imagery indicated high connectivity to the wider landscape with high-quality hedgerows, treelines and the adjacent Grand Canal. The nearby River Figile provides foraging and commuting opportunities for bats. Aerial imagery indicates a disused quarry directly adjacent to the east of the site. This quarry includes scrub and grassland habitat as well as a large lagoon which provides a foraging resource for bats. In addition, if exposed bedrock and mature trees are present within this disused quarry, roosting features may also be present there. Furthermore, several old buildings and bridges in the vicinity may provide roosting opportunity for bats. **Figure 4-5** below illustrates connectivity including foraging, commuting and roosting opportunities within 2 km of the site.

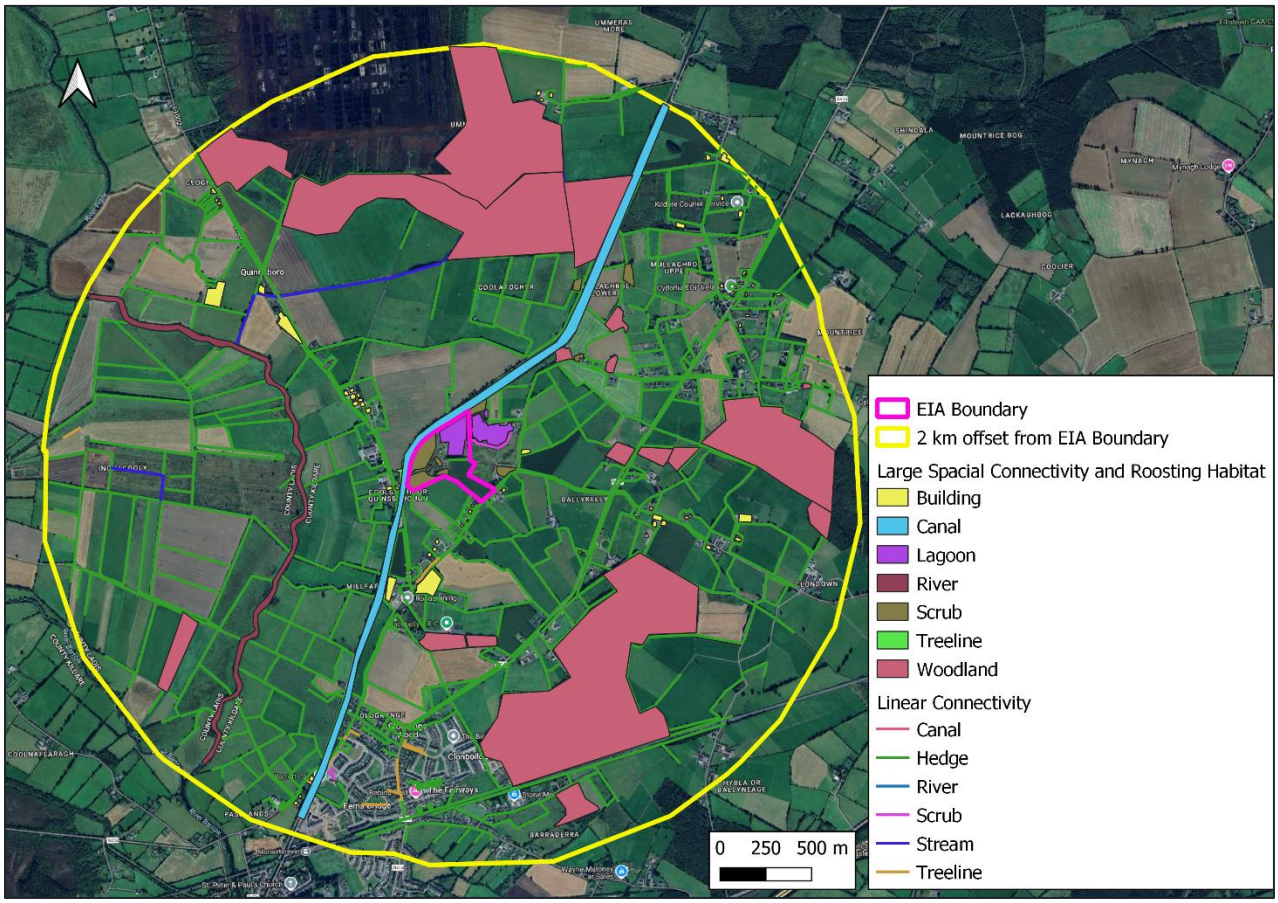

Figure 4-5 - Bat Connectivity to the Wider Landscape

A review of the Bat Landscape Map on NBDC provided a habitat suitability index of 28.1111 to 36.444401, indicative of medium-high habitat suitability for all species bats in Ireland within the 5 km^2 grid in which the site lies.

4.4.4.1.2 Field Survey

Daytime Bat Walkover and Site Suitability

The Site was found to contain habitat connected to the wider landscape that may be used for foraging and commuting bat, badger, hedgehog, Irish hare, pine marten, pygmy shrew and red squirrel such as high-quality hedgerows, scrub, grassland and watercourses.

The exposed southern quarry face was noted to have potential suitability for roosting bats however, close inspection of features from ground level was not possible due to health and safety restrictions as described earlier in Section 4.3. No further roosting resources were observed on site with no Potential Roost Features (PRFs) noted. Outside of the site boundary, old sheds, houses, bridges and trees may provide further roosting opportunities for bats. Following BCT Guidance (Collins, 2023), the Application Site was assessed as having **high suitability for potential flight paths and foraging habitat and moderate suitability for roosting habitats** (specifically features within the exposed bedrock).

These potentially suitable roosting and resting locations are illustrated below in **Figure 4-6**.

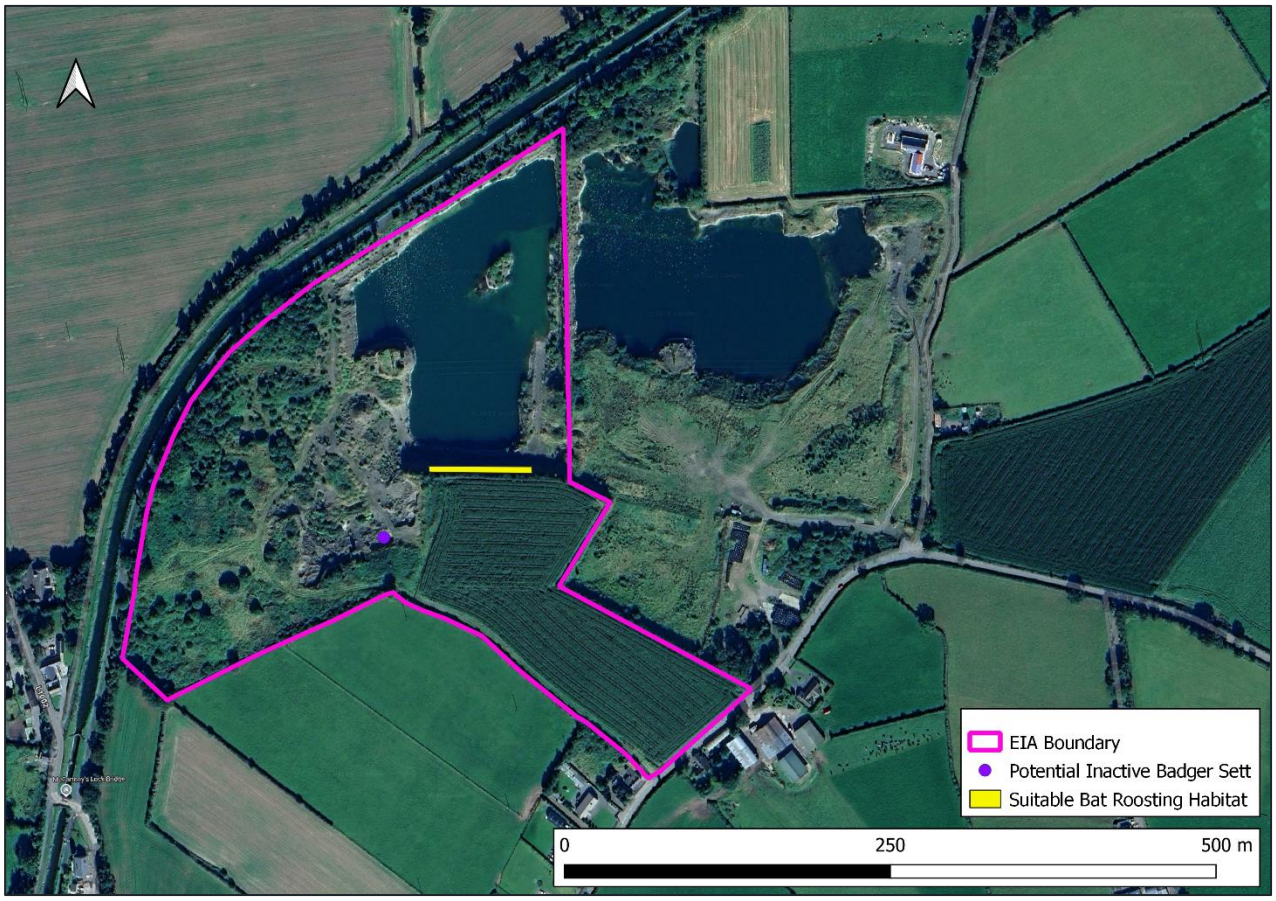

Figure 4-6 - Mammal Field Survey Results

Static Detector Survey

During the survey period, acoustic monitoring recorded activity from at least six bat species: soprano pipistrelle (*Pipistrellus pygmaeus*), common pipistrelle (Pipistrellus pipistrellus), Nathusius' pipistrelle (*Pipistrellus nathusii*), *Myotis* species, Leisler's bat (*Nyctalus leisleri*), and brown long-eared bat (*Plecotus auritus*).

Across the full duration of the survey and both automated detectors, a total of 20,190 bat passes were recorded, as summarised in **Table 4-18**. Soprano pipistrelle accounted for the highest level of activity on site, whereas Nathusius' pipistrelle was detected at the lowest frequency.

Table 4-16 – Total Bat Passes Per Species

Species	Passes (No.)	Percentage of total (%)
Soprano pipistrelle	12,806	63.43
Common pipistrelle	6,377	31.58
Myotis sp.	417	2.07

Species	Passes (No.)	Percentage of total (%)
Leisler's bat	292	1.45
Pipistrelle sp.	242	1.20
Brown long-eared bat	40	0.20
Nathusius' pipistrelle	16	0.08
Total	**20,190**	**100**

The most widely recorded species was soprano pipistrelle (63.38% of all bat passes), followed by common pipistrelle (31.62% of all bat passes). Nathusius' pipistrelle was the least recorded (0.08% of all bat passes), followed by brown long-eared bat (0.2% of all bat passes). Additionally, 11.3% of the total passes recorded at both Detectors were not considered to be or identified as bats. Due to the relatively low number of calls which needed to be checked (four in total) these records were excluded from further analysis as were records of noise and those which could not be identified.

Badger Camera Trapping

When camera footage was reviewed after two weeks, no images or videos of badgers were identified. Therefore, the camera trap was deployed for an additional two weeks however, when reviewed, there was no footage of badgers or any other fauna utilising the potential sett. Moreover, no field evidence of badgers was recorded during site visits to change the batteries or ultimately collect the camera.

Other Terrestrial (Non-volant) Mammals

No evidence of any other mammals was recorded during the field surveys. This included potential breeding/resting places, scat, prints, hair or any other evidence for red squirrel, pine marten, otter, hare, hedgehog and pygmy shrew.

It was noted that areas of scrub and semi-natural grassland represent suitable areas for sheltering mammals, as well as potential resting places for small mammals – hare, hedgehog and pygmy shrew.

The potential for the potential badger sett to be utilised as an otter holt was considered. The camera footage confirmed that this feature was not in use by any fauna.

4.4.4.2. Birds

4.4.4.2.1 Desk Study

Records which have been submitted within the last 10 years (2014-2024 inclusive) were considered. The desk study returned 52 species of birds. Of these, 22 are afforded protection under the Birds Directive and/or are listed as Red or Amber on the BoCCI by Gilbert et al. (2021). Kingfisher *Alcedo atthis* and whooper swan *Cygnus cygnus* were the only two birds identified during the desk study which are also listed on Annex 1 of the Birds Directive. All wild wilds in Ireland are protected under the WA. Full details of all birds identified within the desk study can be found within **Appendix 4B** (**Table 0-1**).

Distribution data from the 2019 review of Article 12 returned 55 species of avifauna within the Study Area.

Two I-WeBS subsites of the River Barrow (Monasterevin - Portarlington 05301) were identified within the relevant Study Area, namely Quinsborough (05310) situated 290 m west and Derrylea North of Monasterevin (05399) situated 790 m southwest of the Application Site. Recent records from these subsites have been included in **Table 4-17** below.

Table 4-17 - I-WeBS records

Common name	Scientific name	BoCCI1 Conservation Status	Count	Subsite Code	Date
Golden plover	*Pluvialis apricaria*	Amber	6,600	05399	2021
Golden plover	*Pluvialis apricaria*	Amber	4,000	05399	2022
Greylag goose	*Anser anser*	Amber	4	05310	2019
Lapwing	*Vanellus vanellus*	Red	1,101	05399	2021
Lapwing	*Vanellus vanellus*	Red	327	05399	2022
Whooper swan	*Cygnus cygnus*	Amber	11	05395	2015

4.4.4.2.2 Field Study

Habitat Suitability for Breeding Birds

Habitats within the Survey Area are considered suitable for a variety of breeding bird species; particularly associated with quarries and farmland, including some of those included on the BoCCI Red and Amber lists. Scrub, hedgerows and treelines are routinely

considered suitable for nesting birds, and it is also acknowledged that lowland areas of grassland and disturbed ground may be used by ground-nesting species.

Breeding Bird Survey

A total of 39 bird species were recorded during the breeding bird surveys. 14 species present were listed on the BoCCI Red or Amber list.

Of these, seven species were considered to be holding breeding territories (see **Figure 4-7**) with 18 separate breeding territories identified. The most abundant species were sand martins; an extensive colony is established within the sandy layer of the wall east of the lagoon. Willow warblers were also common on the site, holding six territories. Linnet held three territories and yellowhammer two territories. Finally, kestrel, spotted flycatcher and a grey wagtail held a single territory each (**Table 4-18** and **Figure 4-7**).

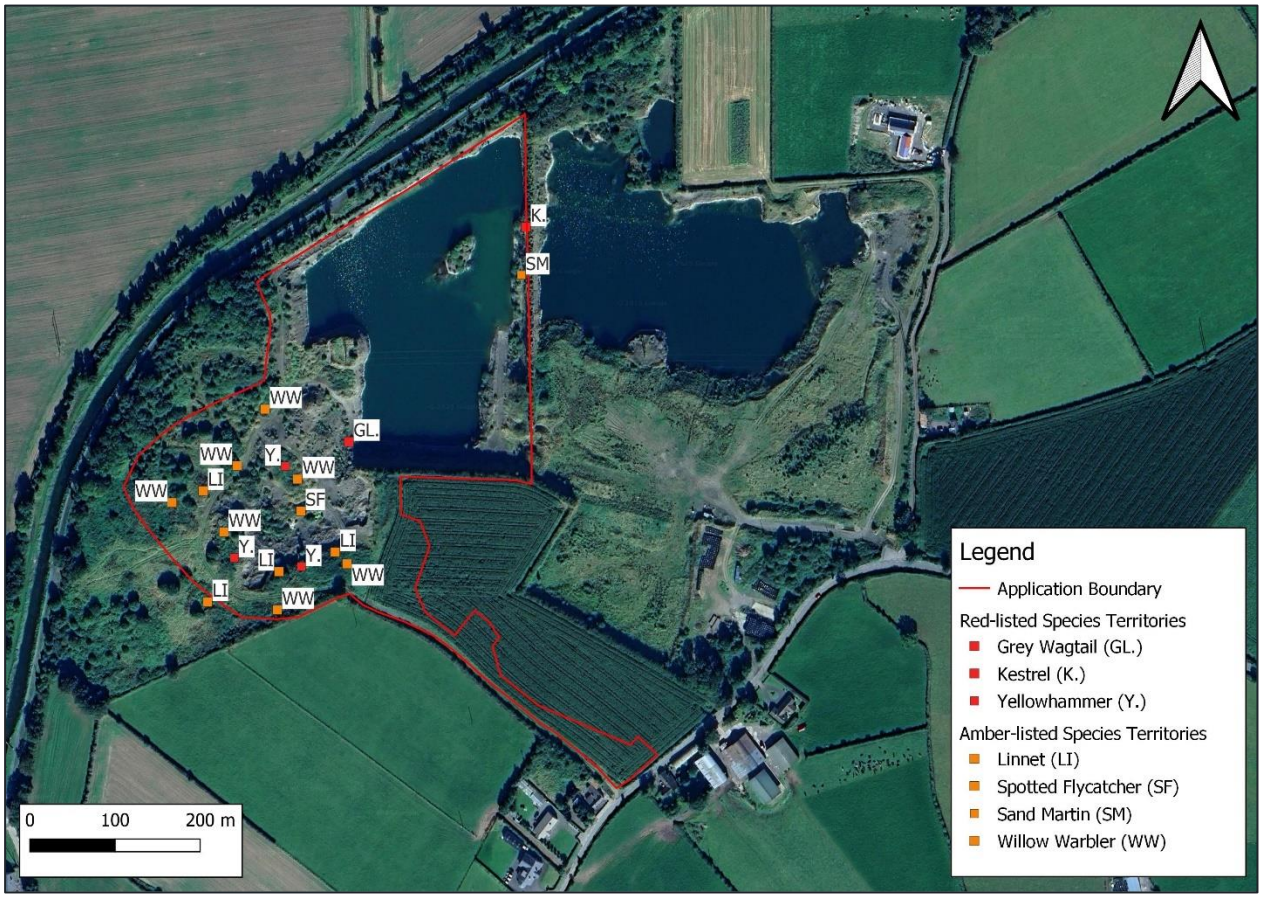

Figure 4-7 - Territory Analysis Results

Table 4-18 – Breeding Bird Survey Results 2023

Species	Number of Territories[27]	Legal Protection/ Conservation Status[28]
Grey wagtail	1 territory	Red
Kestrel	1 territory	Red
Yellowhammer	3 territories	Red
Goldcrest	Present only	Amber
Greenfinch	Present only	Amber
House martin	Present only	Amber
Linnet	3 territories	Amber
Sand Martin	Large colony with c. 150 nests	Amber
Spotted flycatcher	1 territory	Amber
Starling	Present only	Amber
Swallow	Present only	Amber
Willow warbler	6 territories	Amber

The spatial distribution of breeding territories associated with the Survey Area from 2023 is illustrated in **Figure 4-7**. The majority of breeding territories were recorded within the scrub habitat associated with the west of the Site and Site perimeter. The large sand martin colony was recorded to the north-east of the lagoon with the kestrel territory also recorded nearby. No territories were recorded within the lagoon or within the bare ground and discarded rock piles. A full list of species recorded during the breeding bird surveys and their scientific names are provided in within **Appendix 4C**.

[27] Number of territories and presence recorded for both BoCCI Red and Amber listed species only.

[28] Listed on Annex 1 of the Birds Directive (A1) and/or listed on the BoCCI as either Red or Amber.

4.4.5. Herpetofauna

4.4.5.1.1 Desk study

A single record of an amphibian species was returned during the desk study of NBDC records. An observation of common frog, a protected species on the WA, was recorded in 2019. Article 17 2019 distribution data showed N61 to be within the current range and favourable reference range of common frog *Rana temporaria* [1213] (NPWS, 2019).

4.4.5.1.2 Field Study

Habitat Suitability - Amphibians

The habitats on site were noted to be suitable for breeding common frog and smooth newt, especially shallow vegetated ponds, but also seasonal unvegetated ‘puddles’ of rainwater.

During the first visit, 16 different pond/puddle habitats were recorded within the Site. When combined, these areas totalled 798.39 m^2. Full details of these areas are provided in **Appendix 4B** (see **Table 0-4**) and illustrated within **Figure 4-8**.

Habitat Suitability – Common Lizard

Common lizard was not observed. However, this species utilises a wide range of habitats and may inhabit any area where they are afforded suitable basking conditions (such as bare rock or sand that would reflect heat) and some nearby cover that they can quickly escape to in the presence of predators. Bare rock is in abundance at the Site, but areas where bare rock interfaces with vegetation are considered particularly suitable. The presence of hibernacula is considered a possibility, as common lizard has been observed hibernating in shallow excavations in the soil under rocks and dead wood (Hodges & Seabrook, 2022).

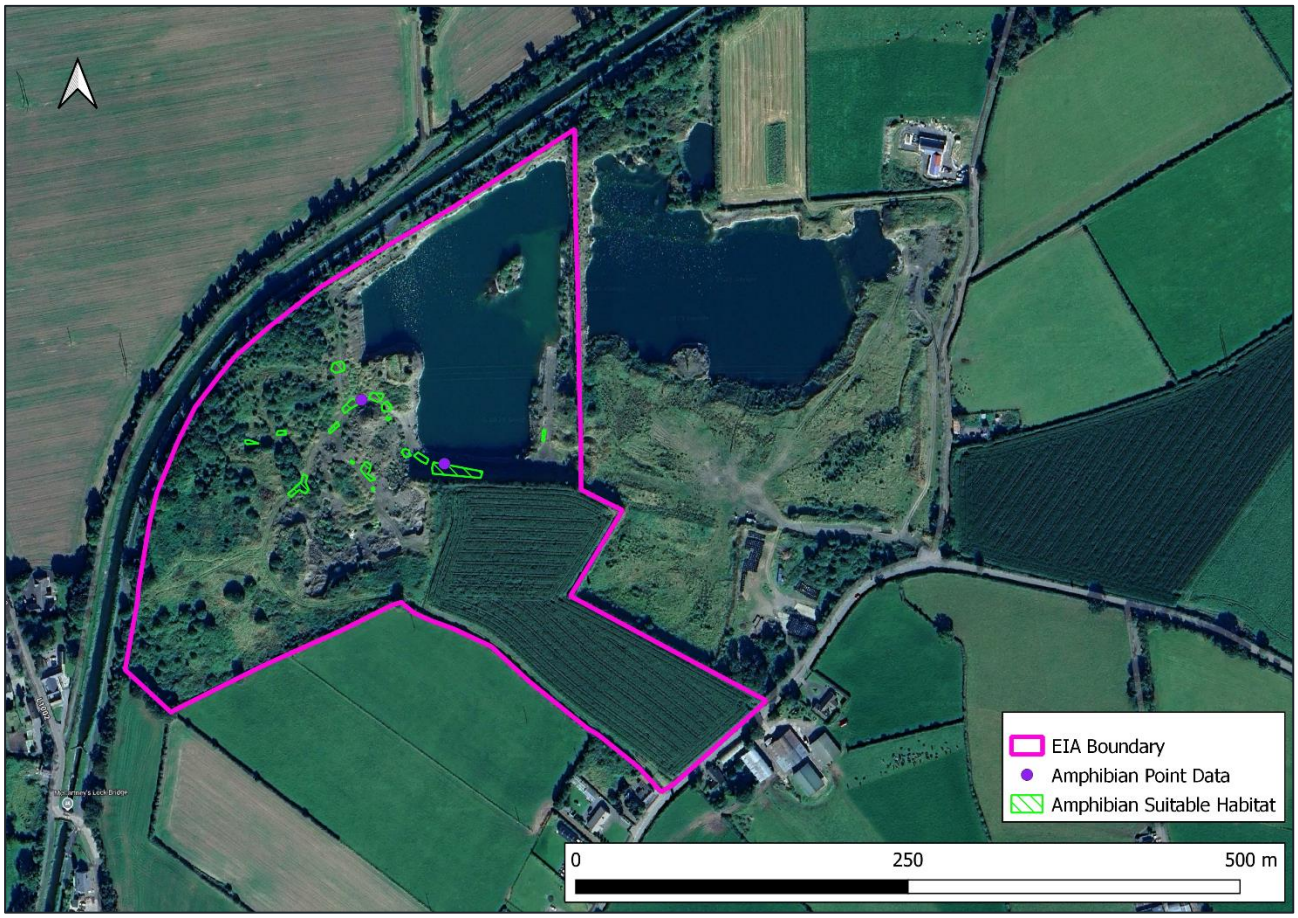

Figure 4-8 - Amphibian Survey Results

Breeding Amphibian survey

Of the 16 small water bodies identified during the survey, all 16 were noted to be suitable for breeding common frog whilst 9 were noted to be suitable for breeding smooth newt. Of these suitable water bodies, three contained positive samples of frog spawn on visit one with tadpoles being noted in two of these ponds during visit two. No newt eggs were observed during the survey. Full details of the results are within **Appendix 4C**, **Table 0-5**.

4.4.6. Terrestrial Invertebrates

4.4.6.1.1 Desk Study

Records of 377 different species of invertebrate were returned during the desk study. Of these, eight species are of enhanced conservation status being listed on the WA, Annex II of the Habitats Directive or being listed on the relevant Irish Red List as Near Threatened and above (see **Table 0-2** in **Appendix 4C**).

Review of Article 17 2019 distribution data showed N61 to be within the current range and favourable reference range for Marsh Fritillary *Euphydryas aurinia* [1065].

4.4.6.1.2 Field Survey

No targeted field surveys for terrestrial invertebrates were carried out. It should be noted that the larval foodplant of marsh fritillary (devil's bit scabious – *Succisa pratensis*) was **not** recorded – it is typically associated with acidic and peaty soils. All other notable invertebrates recorded in the desk study feed on a variety of foodplants.

4.4.7. Fish and Other Aquatic Species

4.4.7.1.1 Desk Study

Records of six different species of aquatic fauna including molluscs, crustaceans or fish were returned during a review of NBDC data.

Three aquatic species were identified during review of Article 17 2019 distribution data within N61 (NPWS, 2019). The Application Site is located within the current range, distribution and favourable reference range for all species described in **Table 4-19**.

Table 4-19 - Aquatic Species – Article 17 2019 Data

Species	Scientific Name	Habitats Directive Species Code
White clawed crayfish	*Austropotamobius pallipes*	[1092]
Brook lamprey	*Lampetra planeri*	[1096]
Atlantic salmon	*Salmo salar*	[1106]

4.4.7.1.2 Field Study

Targeted field surveys for fish or other aquatic species were not carried out. Within the Application Site, the artificial lagoon and freshwater ponds do not represent suitable habitats for any of the notable species recorded in the desktop study. It should be re-emphasised that there is no surface connectivity between waterbodies in the Application Site and surrounding waterbodies, such that the natural genesis of important populations of aquatic fauna onsite is unlikely.

The canal adjacent to the site may function as a corridor for commuting fish, including species of high conservation value such as Atlantic salmon and lamprey. However, the presence of multiple locks along the canal is likely to hinder upstream or downstream migration. Furthermore, for fish entering the canal from the River Barrow at Athy (25.6 km south), the waterway extends northeast for 70 km before ultimately discharging into Dublin Bay at Ringsend. There is no evidence of suitable spawning or feeding habitat for these species along this route, making it unlikely that the canal supports significant fish populations. It should also be noted that the NPWS Site Synopsis for Grand Canal pNHA does not refer to the presence of fish.

Canals are slow-flowing and sediment-rich – conditions that are not conducive to the spawning or rearing of species like salmon or lamprey, which prefer clean gravel beds and well-oxygenated flowing water.

It is theoretically possible that lamprey ammocoetes may occur within soft, silty sediment in slower-flowing sections of the canal, provided there is adequate organic matter and prior connectivity to a suitable spawning site. However, in the absence of such upstream habitat and connectivity with it, their presence is likely to be limited or incidental.

The canal's flow is heavily controlled by locks and other engineered structures. As such, the canal does not function as a typical flowing watercourse, and the direction and continuity of flow are uncertain and limited.

4.4.8. Flora

4.4.8.1. Desk Study

The desk study returned 137 records of conifers, ferns, flowering plants, horsetails, liverworts and mosses within the Search Area. None of these species are classified as vulnerable or above on the relevant Irish Red List (Jackson, et al., 2016; Lockhart, Hodgetts, & Holyoak, 2012), and none are afforded any protection. Two species, Giant Hogweed *Heracleum mantegazzianum* and *Rhododendron ponticum* were noted to be invasive and listed as high impact species and included within Regulations S.I 477/2011.

In addition, a review of protected flora amalgamated in the Flora Protection Order 2022 map viewer, returned no records of protected vascular plant species within the Study Area (**Table 4-1**).

A review of Article 17 2019 distribution data found N61 to host the current distribution and favourable reference range of one bryophyte species, White cushion moss *Leucobryum glaucum* [1400] (NPWS, 2019).

4.4.8.2. Field Study

No protected, notable or invasive plant species were identified during the 2023/2024 field surveys.

4.4.9. Evaluation of Baseline Conditions and Ecological Features

4.4.9.1. Bats

The discrepancy in bat recordings between Detector one and Detector two can be partially attributed to Detector two not recording during the final two-week survey period, as outlined in the survey limitations (Section 3.4). Additionally, the lagoon area is considered a valuable foraging resource during the autumn months, with bats likely gathering there throughout the night to feed. The consistently higher activity levels recorded at Detector one—particularly for soprano and common pipistrelle—may suggest a greater degree of bat movement in that area and could indicate the possible presence of nearby roosts. However, no definitive

evidence of roosting (e.g., emergence observations or confirmed roost features) has been recorded, and therefore the presence of roosts cannot be predicted with certainty.

4.4.9.2. Potential Roosts

The potential for roost presence was considered by assessing the availability of suitable roost features and by analysing bat activity patterns in relation to standard roost emergence times. However, due to limitations in data and observational constraints, it was not possible to confirm or rule out the presence of roosts based solely on acoustic monitoring.

Roost emergence times are influenced by several factors, including species-specific behaviour, the degree of vegetative or structural cover around the roost, reproductive status, and weather conditions (Collins, 2023). Some species may emerge earlier where surrounding habitat provides shading or shelter (Schofield, 2008). Notably, pipistrelle species—which primarily forage on small dipterans—tend to emerge earlier in the evening than species that target prey more evenly distributed throughout the night (Jones & Rydell, 1994). This is relevant to the Application Site, which likely becomes shaded prior to sunset, particularly near the bedrock wall where the static detectors were positioned. Given the high variability associated with re-entry times (Andrews & Pearson, 2022), only emergence patterns were considered for interpretation. However, in the absence of direct observation, these data alone are insufficient to confirm the presence of roosts.

Results from the surveys were analysed to compare recorded passes between species within the first 150 minutes of the survey and are detailed in Table 4-20 and Table 4-21

Table 4-21 below. This was to identify activity occurring around the known roost emergence times of individual species. The likelihood of potential roosts within or close to the Site was estimated by comparing activity and species-specific emergence times as described by Andrew & Pearson (2022). This activity is summarised within **Figure 4-9** and **Figure 4-10** below where the grey shaded area illustrates species-specific emergence times. Bat passes overlapping species-specific grey bars or occurring earlier than this time range, may potentially indicate the presence of a roost nearby. Detailed results are presented below in **Figure 4-11** to **Figure 4-23**. Some bat species such as common pipistrelle tend to emerge earlier in the night (closer to sunset) than others such as the brown long-eared bat which typically emerges later (Andrews & Pearson, 2022).

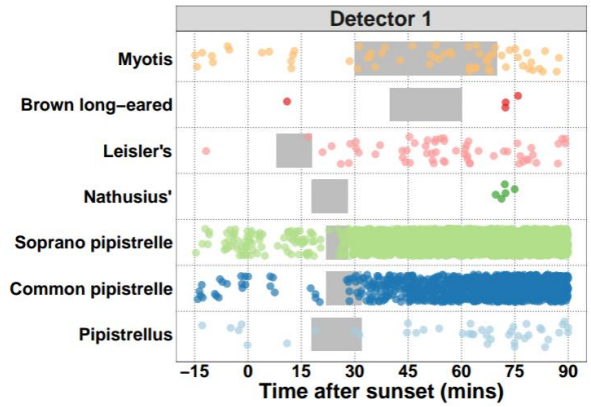

Figure 4-9 - Bat Passes Indicating Proximity to a Roost at Detector 1

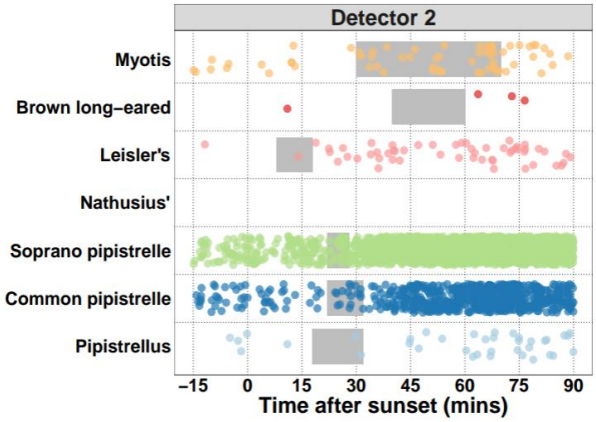

Figure 4-10 - Bat Passes Indicating Proximity to a Roost Near Detector 2

Soprano pipistrelles exhibited the highest levels of activity during the first hour of recording—defined as 30 minutes before to 30 minutes after sunset. During this period, Detector one recorded 322 soprano pipistrelle passes, while Detector two recorded 1,494 passes. The mean emergence time for soprano pipistrelles in July and August is approximately 27 to 29 minutes after sunset (Andrews & Pearson, 2022). The high levels of activity recorded within this time frame, particularly at Detector two, align closely with known emergence behaviour for this species. While no roosts were directly identified, the activity patterns are consistent with the possible presence of one or more soprano pipistrelle roosts in proximity to Detector two. However, in the absence of visual confirmation or identified Potential Roost Features (PRFs), the presence of a roost cannot be confirmed and remains speculative based on acoustic data alone.

Common pipistrelles showed the second highest levels of activity within the first hour of recording (30 minutes before to 30 minutes after sunset). Detector one recorded 234 passes, while Detector two recorded 756 passes during this period. The average emergence time for common pipistrelles is approximately 24.8 minutes after sunset (Andrews & Pearson, 2022). The concentration of activity within this expected emergence window suggests a possible association with nearby roosts, particularly in the vicinity of Detector two. Although no roosts were visually confirmed and no Potential Roost Features (PRFs) were identified during ground-level inspection, the timing and volume of activity are consistent with the potential presence of local common pipistrelle roosts. However, without direct evidence, the existence of such roosts remains inferred but unconfirmed.

Nathusius' pipistrelles have a mean emergence time of 30 minutes after sunset, however, due to a large standard deviation of 11 – 50 minutes after sunset, records within the first 90 minutes of the survey window correlate with emergence time. Five passes were recorded from Nathusius' pipistrelles within this timeframe at Detector one, however, no passes were recorded within this timeframe at Detector Two. This suggests a very small population of

Nathusius' pipistrelles may have been using features adjacent to Detector one as temporary roosts.

Brown long-eared bats have a later mean emergence time compared to pipistrelle species. Their mean emergence is 61 minutes after sunset (standard deviation 28-94 minutes after) and so passes recorded within the first 120 minutes of the survey could indicate emergence from a roost in proximity. Seven passes from brown long-eared bats were recorded within this timeframe at Detector one while ten passes were recorded at Detector two. As discussed in the limitations within Section 3.2, brown long-eared bats often echolocate at a frequency which cannot be picked-up by detectors. Due to the presence of suitable habitat for foraging and roosting on site, it was assumed that the population using the site is marginally larger than that recorded. This suggests a small number of brown long-eared bats may have been using features adjacent to the detectors as temporary roosts.

As discussed earlier in **Section 4.3,** calls from Myotis species are difficult to distinguish and so, Myotis calls were not assessed to species level. In Ireland, their mean emergence times range from 31 minutes after sunset by Natterer's bat to 43 minutes after sunset by Daubenton's bats however, the standard deviation is large. Calls emitted within 120 minutes after sunset were considered to be indicative of emergence from a nearby roost. 62 passes were recorded from Myotis species within this timeframe at Detector one while, 113 passes were recorded within this timeframe at Detector two.

Passes from Leisler's bats were recorded at both Detector one and Detector two throughout the survey period. The species mean emergence time is closer to sunset than other bat species present with a mean time of 18.6 minutes after sunset. Due to a large standard deviation in their known roost emergence time from before sunset to 77 minutes after sunset in August, records from the first two hours of the survey (30 minutes before sunset to 90 minutes after) were considered indicative of emergence from a nearby roost. 38 passes were recorded within this timeframe at Detector one, while 106 passes were recorded at Detector two.

Table 4-20 - Bat Activity at Detector 1 Within the First Two Hours of Surveying

Bat Species	PIPPYG	PIPPIP	PIPSPP	PIPNAT	PLEAUR	MYOSPP	NYCLEI
Sunset -30 to +30 minutes	322	234	36	0	3	17	7
Sunset +31 to +60 minutes	570	182	10	0	0	14	5
Sub Total	892	416	46	0	3	31	12
+61 to +90 minutes	626	433	4	5	2	7	10
+91 to +120 minutes	729	532	6	3	2	24	34
Sub Total	1355	965	10	8	4	31	44

Table 4-21 - Bat Activity at Detector 2 Within the First Two Hours of Surveying

Bat Species	PIPPYG	PIPPIP	PIPSPP	PIPNAT	PLEAUR	MYOSPP	NYCLEI
Sunset -30 to +30 minutes	1494	756	49	0	6	65	59
Sunset +31 to +60 minutes	622	235	15	0	1	22	19
Sub Total	2116	991	64	0	7	87	78
Sunset +61 to +90 minutes	594	271	28	0	3	19	18
Sunset + to +120 minutes	479	201	25	0	0	7	19
Sub Total	1073	472	53	0	3	26	37

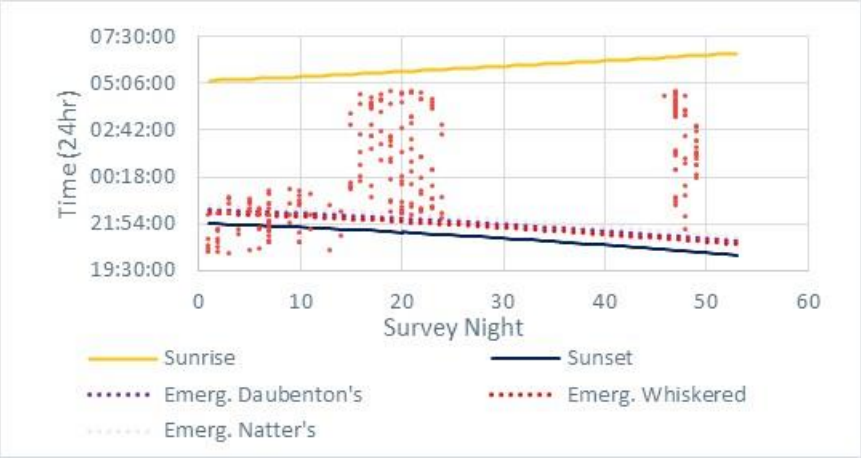

Figure 4-11 - Detector 1: *Myotis* sp. Activity

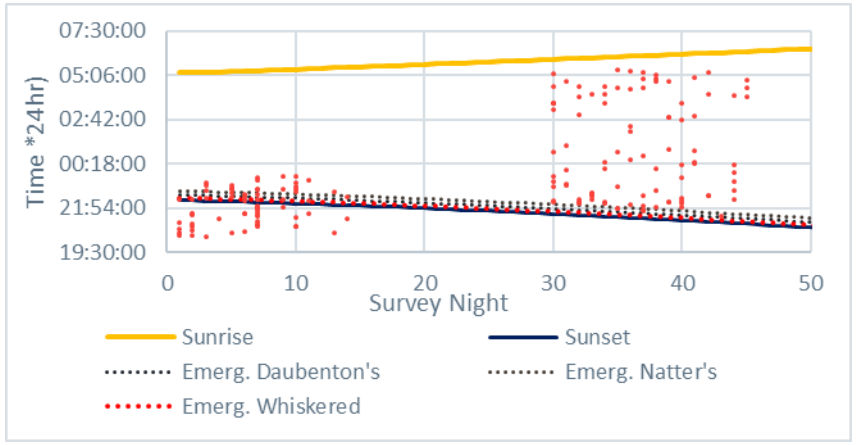

Figure 4-12 - Detector 2: *Myotis* sp. Activity

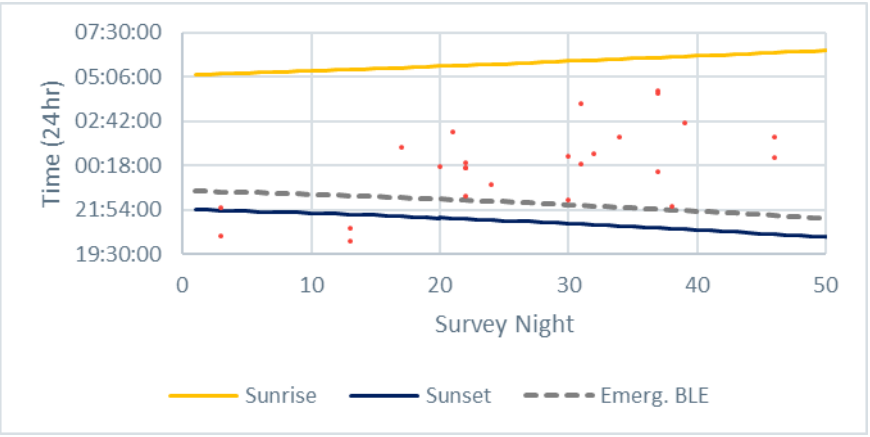

Figure 4-13 - Detector 1: Brown Long-eared Bat Activity

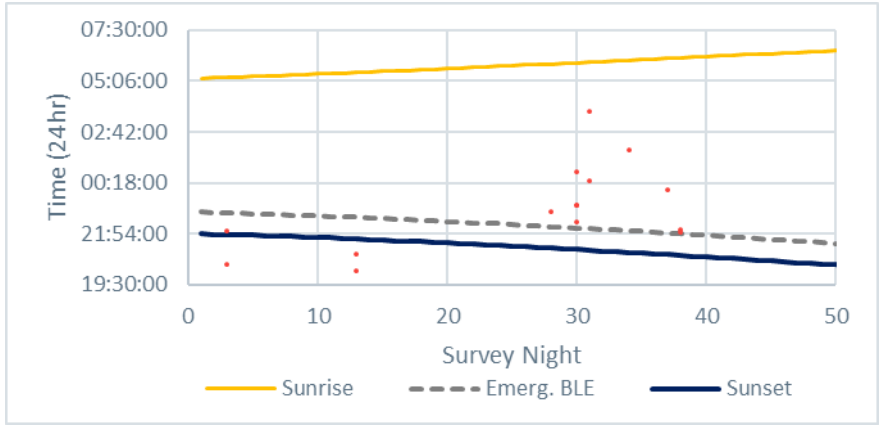

Figure 4-14 - Detector 2: Brown Long-eared Bat Activity

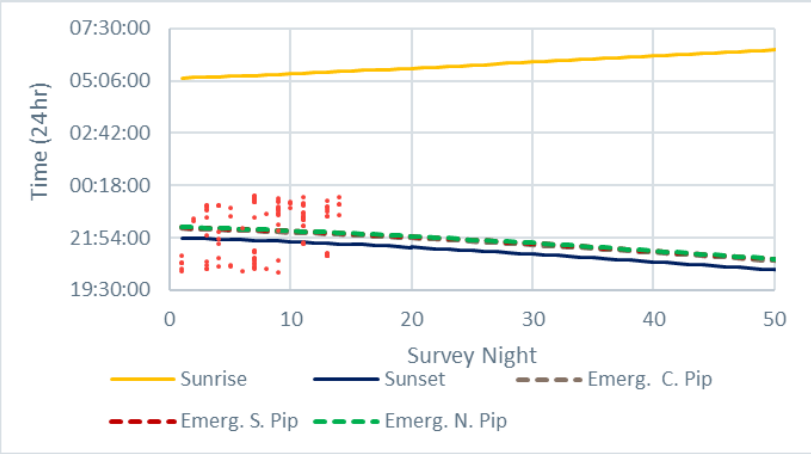

Figure 4-15 - Detector 1: Pipistrelle Species Activity

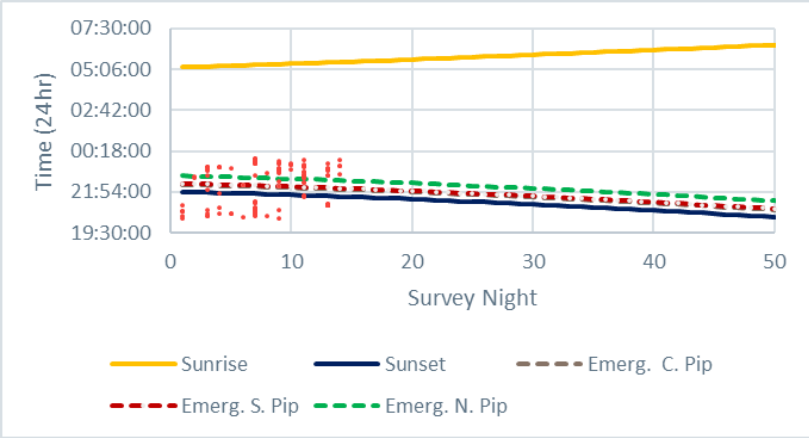

Figure 4-16 - Detector 2: Pipistrelle Species Activity

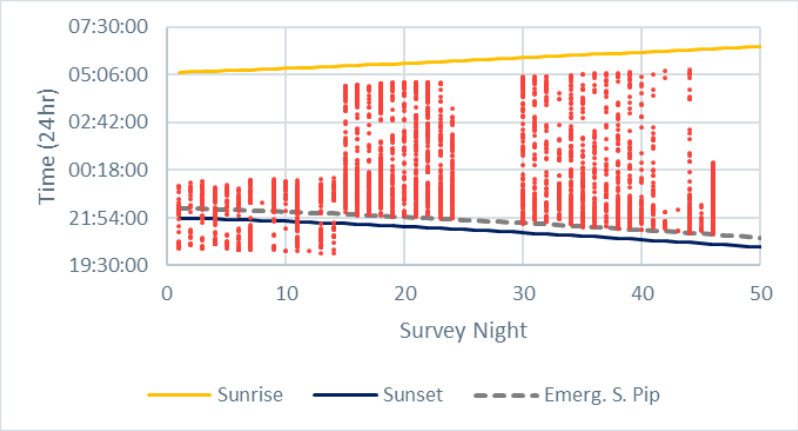

Figure 4-17 - Detector 1: Soprano Pipistrelle Activity

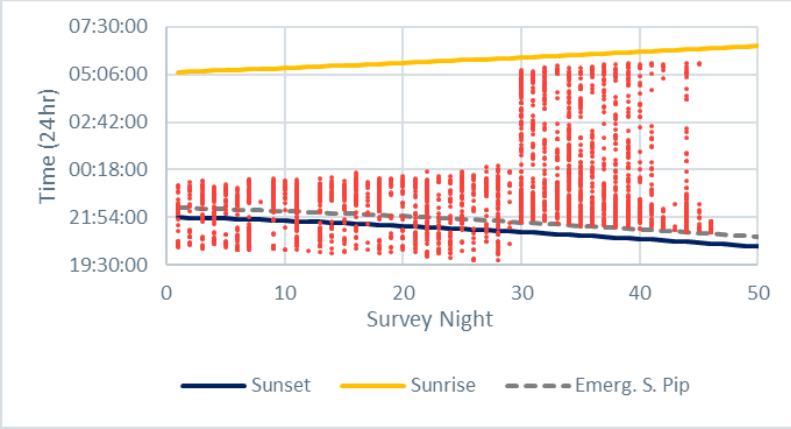

Figure 4-18 - Detector 2: Soprano Pipistrelle Activity

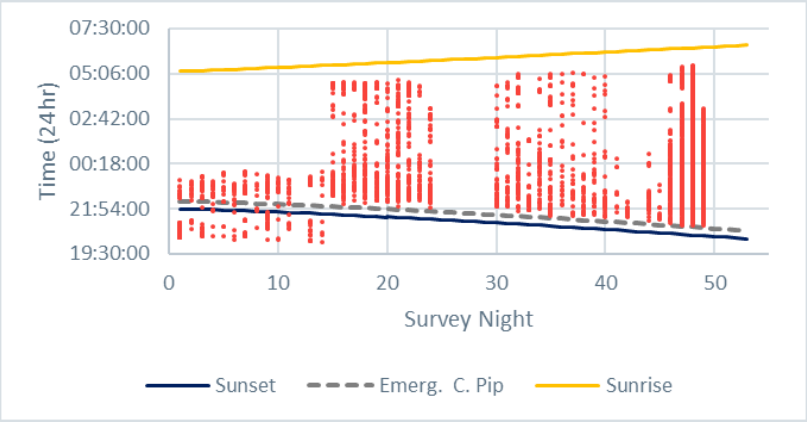

Figure 4-19 - Detector 1: Common Pipistrelle Activity

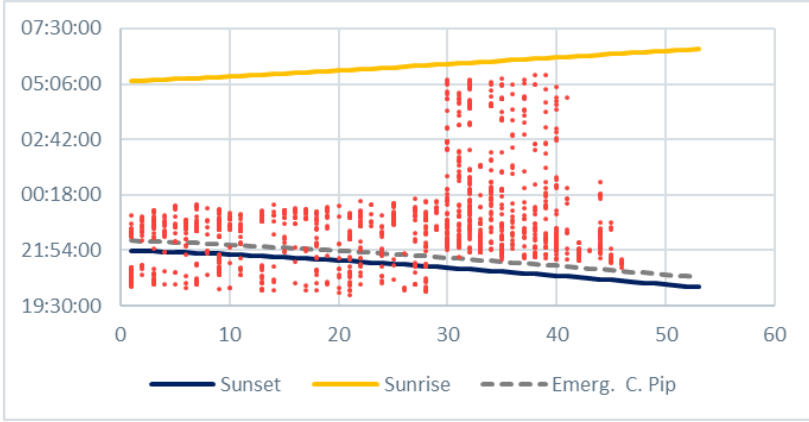

Figure 4-20 - Detector 2: Common Pipistrelle Activity

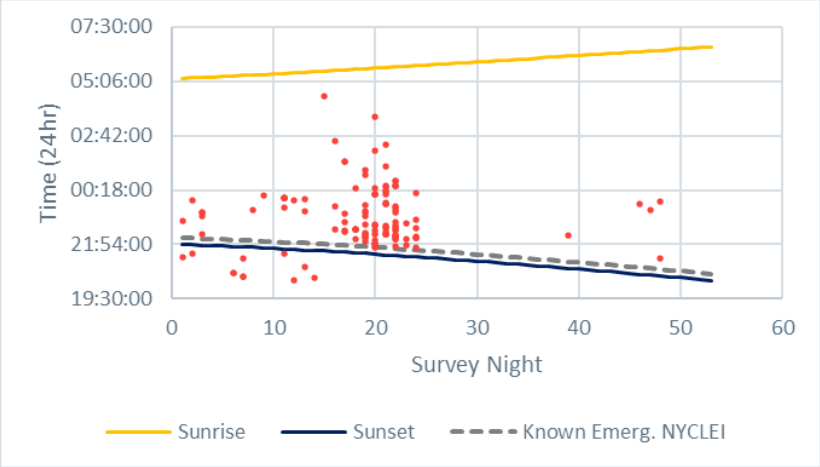

Figure 4-21 - Detector 1: Leisler's Bat Activity

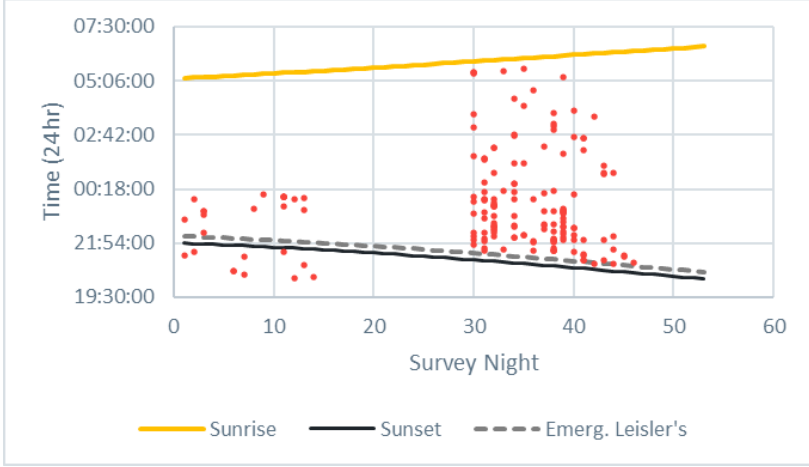

Figure 4-22 - Detector 2: Leisler's Bat Activity

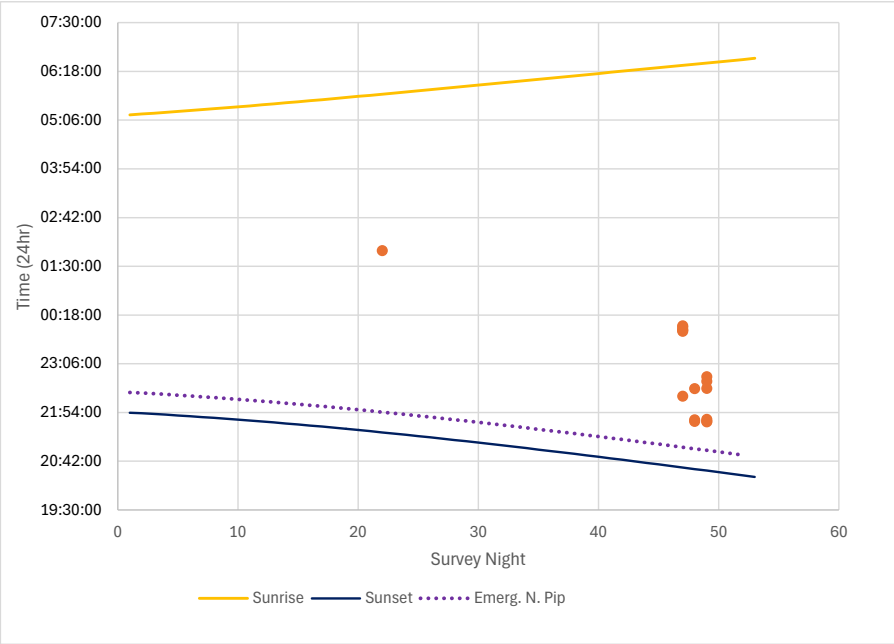

Figure 4-23 - Detector 1: Nathusius' Pipistrelle Activity

*No Nathusius' pipistrelle bats were recorded at d*etector 2

4.4.9.3. Summary

Although no bat roosts were confirmed during the survey period and no Potential Roost Features (PRFs) were identified during ground-level inspections, patterns of bat activity, particularly the volume and timing of soprano and common pipistrelle passes recorded within expected emergence windows—suggest a reasonable likelihood of nearby roosts, especially in the vicinity of Detector two. Activity by brown long-eared bats, *Myotis* species, and Leisler's bats is consistent with opportunistic use of the Site for night roosting, feeding, or shelter. In line with the precautionary principle and following CIEEM's Ecological Impact Assessment (EcIA) guidance (2018) and Reason & Wray (2023), these inferred features are considered IEFs. The level of importance is assessed as follows.

4.4.9.4. Population Importance

The bat population on site, the habitat features present, and the impacts of the Proposed Project were assessed following Bat Mitigation Guidelines for Ireland (Marnell, Kelleher, & Mullen, 2022) and the UK bat Mitigation Guidelines (Reason & Wray, 2023). The UK bat Mitigation Guidelines were followed as they present a thorough approach to mitigation for not just impacts to roosts but also additional loss of foraging and commuting habitat. The guidelines reflect updated research, good practice and new approaches.

The importance of the bat population on site should be assessed to provide contextual information to the results of the bat survey. The rarity of the species present on site were assessed by adapting the rarity categories presented by Reason and Wray (2023) following review of the distribution of Irish bats in the latest Article 17 report (NPWS, 2019). These categories combined with their distribution score are presented below in **Table 4-22**.

Table 4-22 - Assessing the Importance of an Irish Bat Assemblage

Common Name	Distribution Score	Species recorded	Notes
Common Pipistrelle	1	✓	Confirmed, widespread
Soprano Pipistrelle	1	✓	Confirmed, widespread
Leisler's bat	1	✓	Confirmed but low activity
Myotis sp.	1	✓	Not identified to species; treat as single record
Brown long-eared bat	2	✓	Low activity, possibly foraging only
Nathusius' Pipistrelle	3	x	Marginal presence; possibly vagrant or transient
Lesser Horseshoe bat	4	x	Not present

Distribution scores were summed to identify the maximum assemblage score available at the site (18). This maximum score was used to calculate the threshold score needed for any assemblage to meet a geographic level of importance. These thresholds are detailed below in **Table 4-23.**

Table 4-23 - Assemblage Threshold Scores

Thresholds	Score
County importance threshold: 45%	8.1
Regional Importance threshold: 55%	9.9
National Importance threshold: 70%	12.6
Maximum	18

Based on the confirmed species and recorded levels of bat activity, the total bat assemblage score for the Site is six. This population of bats is therefore considered to be of **Local importance**. This calculation reflects a precautionary approach, excluding assumptions about the presence of multiple Myotis species, which were not identified to species level, and considering the very low levels of Nathusius' pipistrelle activity as insufficient to include the species in the final score.

This score falls below the threshold for County importance (8.1) as defined in Reason & Wray (2023). As such, the bat assemblage recorded at the Site is assessed as being of Local Ecological Importance, in line with guidance from both the Bat Mitigation Guidelines for Ireland (Marnell et al., 2022) and Reason & Wray (2023). This level of importance reflects a population typical of the wider landscape and not of elevated conservation significance.

Soprano and common pipistrelles: Based on the frequency and emergence-timed activity levels, the Site is considered to support a medium population potentially using semi-regular night roosts or commuting routes. This qualifies as an IEF of local importance.

4.4.10. Overall Evaluation of IEFs

Based on a review of the existing environment described in the baseline as described, an evaluation of IEFs identified are provided in **Table 4-24**. Justification is provided for the omission and inclusion of IEFs. Only designated and notable sites deemed to have connectivity with the Site (see **Table 4-11)** have been considered.

Only important IEFs deemed of Local Importance (Higher Value) or above will be carried through to the assessment stage.

Table 4-24 - Evaluation of IEFs

Ecological Feature	Summary Description / Justification for inclusion or omission	Conservation Value[29]	Important Ecological Feature (IEF)
Designated and Notable Sites			
Grand Canal pNHA [002103]	Proposed National Heritage Area. This pNHA is adjacent to the Application Site.	National Importance	Yes
River Barrow and River Nore SAC [002162]	The River Barrow and River Nore SAC is classified as a European designated site. It is hydrologically removed from the Application Site by a distance of 25.6 km, with hydrological connectivity existing via the Grand Canal, which joins with the River Barrow and River Nore SAC in Athy. Nonetheless, there is potential functional connectivity for QI fauna which may migrate up the canal. This is discussed in further detail later in the report.	International Importance	Yes
Pollardstown Fen SAC [000396]	Pollardstown Fen SAC is classified as a European designated site. There is no connectivity between the Site and this SAC.	International Importance	No
Mountmellick SAC [002141]	Mountmellick SAC is classified as a European designated site. There is no connectivity between the Site and this SAC.	International Importance	No

[29] IEFs evaluated in line with NRA (2009) Guidelines for Assessment of Ecological Impacts of national Road Schemes. Available at: https://www.tii.ie/technical-services/environment/planning/Guidelines-for-Assessment-of-Ecological-Impacts-of-National-Road-Schemes.pdf

Ecological Feature	Summary Description / Justification for inclusion or omission	Conservation Value[29]	Important Ecological Feature (IEF)
Mouds Bog SAC	Mouds Bog SAC is classified as a European designated site. There is no connectivity between the Site and this SAC.	International Importance	No
Habitats			
BL1 Arable Crops	Directly associated with intensive agriculture, and floral diversity is inherently low.	Local Importance (Lower Value)	No
BL2 Earth Banks	Artificial in origin, likely subject to periodic management associated with upkeep of the canal towpath.	Local Importance (Lower Value)	No
ED2 Spoil and bare ground	Directly associated with anthropogenic disturbance and characterised by the absence of flora.	Local Importance (Lower Value)	No
ED3 Recolonising bare ground	Transitional habitat between ED2 and GS1 (thereby indirectly associated with disturbance). High floral diversity but lacking a 'high degree of naturalness' that is required for local importance (higher value).	Local Importance (Lower Value)	No
ER2 Exposed Calcareous Rock	Low floral diversity, and Annex 1 habitat 8210 is absent. Crevices provide suitability for roosting bats and bare rock provides basking habitat for reptiles, but fauna are evaluated separately.	Local Importance (Lower Value)	No

Ecological Feature	Summary Description / Justification for inclusion or omission	Conservation Value[29]	Important Ecological Feature (IEF)
ER4 Calcareous scree and loose rock	Low floral diversity, and Annex 1 habitat 8120 is absent. Bare rock provides basking habitat for reptiles, but fauna is evaluated separately.	Local Importance (Lower Value)	No
FL4 Mesotrophic lakes	Low floral diversity and resulting from topography modification during historical quarry operations. The site has been assigned a rank of 'D' (local importance, moderate value) by the Kildare Wetland Survey. Objective BIO49 of Kildare County Development Plan mandates the protection of wetlands with a ranking of C (local importance, high value) or higher. This habitat provides suitable breeding habitat for amphibians, notably frogs, but fauna is evaluated separately.	Local Importance (Lower Value)	No
FL8 Other artificial lakes and ponds	Site of main quarry void from historical extractive operations, and thus inherently artificial. Devoid of flora and unsuitable for amphibians due to its depth and steep sides. The site has been assigned a rank of 'D' (local importance, moderate value) by the Kildare Wetland Survey. Objective BIO49 of Kildare County Development Plan mandates the protection of wetlands with a ranking of C (local importance, high value) or higher.	Local Importance (Lower Value)	No
FW3 Canals	Inherently artificial in origin. Low-energy hydrological conditions and the presence of locks creates unsuitable habitat for spawning salmonids and	Local Importance (Higher Value)	Yes

Ecological Feature	Summary Description / Justification for inclusion or omission	Conservation Value[29]	Important Ecological Feature (IEF)
	lamprey, and for other highly sensitive species such as freshwater pearl mussel and white-clawed crayfish. However, Kildare County Development Plan recognises the value in canals as a resource for connecting people with nature (Policy BIP13). Similarly, Objective BIO36 encourages the regeneration of canal corridors. Its value as the site of Grand Canal pNHA, and its value to fauna are evaluated separately.		
GS1 Dry calcareous and neutral grassland	High floral diversity. Whilst it does not meet the criteria to be classified as an Annex 1 habitat, it is considered a high value grassland and has a 'high degree of naturalness' in accordance with the criteria for local importance (higher level).	Local Importance (Higher Value)	Yes
GS2 Dry Meadows and Grassy Verges	Its position adjacent to the canal towpath means that it serves an amenity function. Nonetheless, the importance of grassy verges along canals is highlighted in the County Development Plan. Its importance as part of Grand Canal pNHA is evaluated separately.	Local Importance (Higher Value)	Yes
GS4 Wet grassland	Moderate floral diversity, but no notable species. Not specifically mentioned in the County Development Plan. It should be noted that the Irish Wetlands Committee (2018) clarifies that wet grasslands are **not** considered wetlands.	Local Importance (Lower Value)	No

Ecological Feature	Summary Description / Justification for inclusion or omission	Conservation Value[29]	Important Ecological Feature (IEF)
	Some value in a local context, but given the above rationale, as well as its scale within the site, it does not meet the criteria to be considered an IEF.		
WL1 Hedgerows and Treelines WL2	Hedgerows and treelines are important alternative habitats for species that would otherwise utilise woodland. Ireland has an extremely low coverage of woodland (DAFM, 2022) relative to other European countries, which is an important reason as to why linear woody habitats are considered important. The importance of hedgerows is acknowledged in the County Development Plan. Though they may not be part of a designated site, the significance of hedgerows is recognised by the EU Habitats Directive, which obliges member states to maintain them to improve the ecological coherence of the Natura 2000 network. Given the scale of the site, hedgerows and treelines are not considered to exceed local importance.	Local Importance (Higher Value)	Yes
WS1 Scrub	Similar to hedgerows and treelines, scrub is an important alternative habitat for species that would otherwise utilise woodland. In essence, a hedgerow is simply linear scrub. Scrub is not specifically highlighted in the County Development Plans. It lacks the status of a 'wildlife corridor' that is afforded to hedgerows. However, given the rationale above, and given that scrub occupies a	Local Importance (Higher Value)	Yes

Ecological Feature	Summary Description / Justification for inclusion or omission	Conservation Value[29]	Important Ecological Feature (IEF)
	notable area within the site, scrub has been afforded the same importance as hedgerows/treelines and is considered an IEF.		
Fauna			
Amphibians: Common frog and smooth newt	Common frog and smooth newt are protected under the WA. Suitable breeding habitat identified, and frogspawn identified, thereby confirming the presence of breeding individuals.	Local Importance (Higher Value)	Yes
Bats	All bats in Ireland are afforded full protection under the Habitats Directive and the Wildlife Acts. They are also included in the County Development Plan. Common and soprano pipistrelles were frequently recorded around their known emergence times, suggesting roosts may exist in proximity to the rock wall to the south of the lagoon, which presents suitable features. These species are widespread in Ireland and made up the majority of bat activity on site. The bat assemblage is considered to be of **Local Importance.** Leisler's bats and brown long-eared bats were recorded infrequently and in low numbers. Although both species are relatively widespread, their limited presence suggests opportunistic use of the site. Roosting could not be confirmed. Their occurrence contributes to an overall assemblage that is considered to be of **Local Importance.**	Local Importance (Higher Value)	Yes

Ecological Feature	Summary Description / Justification for inclusion or omission	Conservation Value[29]	Important Ecological Feature (IEF)
	Nathusius' pipistrelles were recorded at the site in low numbers and outside typical emergence times, suggesting foraging rather than roosting. While less common in Ireland, its occasional presence does not elevate the assemblage beyond Local Importance, particularly given the absence of roost evidence.		
Badger	Badgers and their setts are protected under the WA. However, they are listed as being of least concern on the Irish Red Data List as described by Marnell *et al*. (2019). The population, range and habitat for the species is stable nationally. A potential sett was confirmed to be inactive at the time of survey, but it is acknowledged that it may become active again, or that badgers construct a sett elsewhere before the commencement of works onsite.	Local Importance (Higher Value)	Yes
Otter	Otters and their holts are protected under the WA. Otters are also afforded protection under Annex II and IV of the Habitats Directive. However, they are listed as being of least concern on the Irish Red Data List as described by Marnell *et al*. (2019). The population, range and habitat for the species is stable nationally. No evidence of otter was recorded during the field surveys. A potential badger sett was assessed for its use by holting otters, but it was confirmed to be inactive at the time of survey. The distance of this feature from the canal makes it highly unlikely to be in use by otters.	Local Importance (Higher Value)	Yes

Ecological Feature	Summary Description / Justification for inclusion or omission	Conservation Value[29]	Important Ecological Feature (IEF)
	As a precaution, considering the proximity of the canal and the potential for holting otters to become established along the canal in advance of commencement of works, otters are considered an IEF.		
Breeding Birds	All nesting birds are protected under the WA, which makes it an offence to intentionally kill, injure or take any wild bird or take, damage, or destroy its nest whilst in use or being built, or take or destroy its eggs. As discussed in Section 4.4, three red-listed species (including kestrel, grey wagtail and yellowhammer) were observed to be holding five breeding territories within the Site. Ten amber-listed species were observed to be holding 13 breeding territories within the Site including sand martin, willow warbler, spotted flycatcher and linnet. These territories are illustrated in Figure 4-7. Yellowhammer and linnet are included in Objective BIO21 of the County Development Plan, where it is recognised that County Kildare supports a national stronghold of these species. Numerous habitats within the Site are suitable for breeding birds – in particular hedgerows/treelines and scrub. Although territory analysis was only carried out for red- and amber-listed birds, it can be assumed with confidence that numerous species use the above-described habitats for breeding.	County Importance	Yes

Ecological Feature	Summary Description / Justification for inclusion or omission	Conservation Value[29]	Important Ecological Feature (IEF)
Wintering Birds	The presence of the lagoon suggests the site's potential as a roosting site for waterfowl, but the presence of surrounding high walls is considered to make the site sub-optimal. The site has been assigned a rank of 'D' (local importance, moderate value) by the Kildare Wetland Survey. Objective BIO49 of Kildare County Development Plan mandates the protection of wetlands with a ranking of C (local importance, high value) or higher.	Local Importance (Lower Value)	No
Pine marten	Pine marten and their dens are protected under the WA. However, no suitable denning habitat was recorded. Their current Red List status is Least Concern, and their range is expanding (Marnell, Looney, & Lawton, 2019).	Local Importance (Lower Value)	No
Reptiles	Protected under the WA. Their current Red List status is Least Concern, and they have a widespread distribution with no evidence of any significant decline (King, et al., 2011). Habitats within the Site are suitable for common lizard, notably bare rock (for basking) as well as loose rocks and dead wood, often associated with hibernacula. No evidence of this species was recorded during surveys, but their presence is assumed as a precaution, noting the potential for occupancy within the site prior to the commencement of works.	Local Importance (Higher value)	Yes

Ecological Feature	Summary Description / Justification for inclusion or omission	Conservation Value[29]	Important Ecological Feature (IEF)
Other (Small) Mammals	In addition to the mammals described above, the desk study returned records of red squirrel, Irish hare and hedgehog. The site contains suitable habitats for squirrel dreys in the form of mature trees in the treeline on the northern boundary. Scrub represents suitable habitat for hedgehog, hare and pygmy shrew resting places. The current Red List status for **all** these species is Least Concern, including red squirrel, which has shown recent expansion in population and distribution (Marnell, Looney, & Lawton, 2019). No evidence of these species was recorded during surveys, but their presence is assumed as a precaution, noting the potential for occupancy within the site prior to the commencement of works.	Local Importance (Higher Value)	Yes
Terrestrial Invertebrates	The site overall has reasonable habitat and floral diversity, which indicates a high likelihood that it supports a correspondingly diverse population of invertebrates. Populations are likely important at a local scale.	Local Importance (Higher value)	Yes
Aquatic Fauna	Desktop records of several protected and notable species, although as explained in Section 4.4, these records are almost certainly not from within the Application Site. The canal adjacent to the site is considered to have limited potential to host aquatic fauna of high-conservation value, and limited potential as a pollutant	Local Importance (Lower value)	No

Ecological Feature	Summary Description / Justification for inclusion or omission	Conservation Value[29]	Important Ecological Feature (IEF)
	pathway to downstream receptors, owing to the presence of locks and discontinuous flow regime.		

4.5. Do Nothing Scenario / Future Baseline

As recommended by CIEEM (2024), consideration should be given to the likely baseline situation at the time of project construction, as it may not be the same as the conditions at the time of the impact assessment. To determine this, any changes that will alter the conditions prior to the start of the proposed construction should be considered. Enabling works related to the facility will likely begin within 2 years.

Within this timeframe, there will be no major changes to the condition and presence of flora and fauna on the site. Scrub habitat will expand slightly into areas of recolonising bare ground and grassland. Similarly, areas of bare ground will continue to recruit flora from the surrounding environment. Disturbance will remain a minimum with the exception of recreational users of the Application Site as well as maintenance of existing access tracks/haulage routes.

Consequently, baseline conditions are not likely to significantly change.

4.6. Assessment of Potential Effects

This section aims to quantify the ecological effects of the proposed works at the Application Site, with reference to the ecological evaluation presented in **Table 4-24**. Assessment of impacts is in accordance with the methodology described in **Sections 4.3**.

Table 4-26 lists potential effects (in the absence of mitigation) on IEFs that have been identified.

4.6.1. Consideration of Potential Ecological Effects – Rationale

Considering the nature of the proposed works at the Application Site, potential impacts have been considered in relation to groundwater, dust, vibration and noise emissions, as well as habitat loss and potential spread of invasive species. Where relevant, information has been obtained from other relevant chapters of this EIAR, namely Chapter 6 (Water), Chapter 7 (Air Quality), and Chapter 9 (Noise and Vibration). Further detail is provided in the relevant subsections below.

4.6.1.1. Noise and Vibration

4.6.1.2. Noise

The noise impact assessment, as presented in Chapter 9, predicted that noise emissions would not exceed 55 dB at any of the noise-sensitive receptors around the periphery of the Application Site. Considering this information, it was concluded proposed works would not result in significant changes to current noise emissions at the Application Site. It should be re-emphasised that the Proposed Project does not include blasting, rock breaking or any other aspects of extraction that may lead to substantial noise emissions.

It is acknowledged that the 55 dB threshold addressed in Chapter 9 is not necessarily driven by wildlife sensitivity to noise. However, Cutts *et al.* (2013) acknowledge that noise emissions below 55 dB are unlikely to cause a response in waterbirds.

4.6.1.3. Vibration

On the basis that extraction is not proposed as part of the Proposed Project, vibration effects were scoped out of the impact assessment in Chapter 9.

4.6.1.4. Habitat Loss

At the completion of infilling works (in the absence of compensation), varying areas of existing habitats will cease to exist at the Application Site, being replaced by Spoil and Bare Ground (ED2) initially, which will be seeded to form an improved pastoral grassland. These areas are presented in **Table 4-25**.

Table 4-25 - Predicted Habitat Loss

Habitat Code	Name	Area (ha)
BC1	Arable Crops	0.330
ED2	Spoil and Bare Ground	0.146
ED3	Recolonising Bare Ground	0.810
ER2	Exposed Calcareous Rock	0.105
ER4	Calcareous Scree and Loose Rock	0.354
FL4	Mesotrophic lakes	0.067
FL8	Artificial Lakes	2.164
GS1	Calcareous Grassland	1.064
GS4	Wet Grassland	0.004
WS1	Scrub	0.608

4.6.1.5. Water – Surface and Ground

Based on the information presented in Chapter 6 (Water), proposed works at the Application Site will not result in deleterious emissions to groundwater or surface water.

Functional connectivity for fish and other aquatic fauna from the River Barrow is considered extremely limited due to the presence of locks on the Grand Canal, as well as the lack of suitable habitat within the canal or upstream.

4.6.1.6. Dust

Based on the information presented in Chapter 7 (Air Quality), proposed works at the Application Site will not result in deleterious air quality emissions.

4.6.1.7. Invasive Flora

Considering the nature of the Proposed Project, the importation of fill material poses an inherent risk of importing seeds and/or other viable plant tissue, which without adequate management could become established within the Application Site.

Table 4-26 - Summary of Potential Effects

IEF	Evaluation	Potential Impacts	Impact Assessment	Conclusion
Designated/Notable Sites				
Grand Canal pNHA [002103]	National Importance	Contamination of watercourse and adjacent habitats (dust, surface and groundwater emissions); Disturbance of otter (noise/vibration emissions); Spread of invasive species.	Chapter 6 (Water) has ruled out hydrological and hydrogeological connectivity between the Application Site and the Grand Canal. Chapter 7 (Air Quality) has concluded that deleterious dust emissions will not occur from the Application Site. It should also be re-emphasised that a tall treeline exists on the northwestern boundary that separates the Application Site from the pNHA, which provides a natural barrier for dust emissions. Chapter 9 (Noise and Vibration) concludes that the Proposed Project will not give rise to deleterious noise/vibration emissions. Whilst the Application Site may be at risk of the importation of invasive flora, the same risk could only extend to the pNHA if vehicles and/or operatives were to travel into the pNHA from the Application Site. Such movement of staff and machinery is not part of the Proposed Project.	No Impact.
River Barrow and River Nore SAC [002162]	International Importance	Contamination of watercourse (dust,	Chapter 6 (Water) has ruled out hydrological and hydrogeological connectivity between the Application Site and the Grand Canal.	No Impact.

		surface and groundwater emissions); Disturbance of QI fauna (noise/vibration emissions); Spread of invasive species.	Chapter 7 (Air Quality) has concluded that deleterious dust emissions will not occur from the Application Site. Chapter 9 (Noise and Vibration) concludes that the Proposed Project will not give rise to deleterious noise/vibration emissions. Functional connectivity for fish and other aquatic fauna from the River Barrow is considered extremely limited due to the presence of locks on the Grand Canal, as well as the lack of suitable habitat within the canal or upstream. Whilst the Application Site may be at risk of the importation of invasive flora, the same risk could only extend to the SAC if vehicles and/or operatives were to travel into the SAC from the Application Site. Such movement of staff and machinery is not part of the Proposed Project.	
Habitats				
FW3 Canals	Local Importance (Higher Value)	Contamination of watercourse (dust, surface and groundwater emissions).	Chapter 6 (Water) has ruled out hydrological and hydrogeological connectivity between the Application Site and the Grand Canal.	No Impact.

			Chapter 7 (Air Quality) has concluded that deleterious dust emissions will not occur from the Application Site.	
GS1 Dry calcareous and neutral grassland	Local Importance (Higher Value)	Habitat Loss.	The loss will occur of 1.064 ha of this habitat, which will be replaced with improved agricultural grassland (GA1). This is not considered a 'permanent' impact because it is reversible.	Direct, large magnitude, certain, temporary, adverse impact. **Significant at a local scale.**
GS2 Dry Meadows and Grassy Verges	Local Importance (Higher Value)	No impacts predicted – recorded outside the Application Site.	None	No Impact.
WL1 Hedgerows and Treelines WL2	Local Importance (Higher Value)	Proposed works do not interfere with hedgerows or treelines. No impacts predicted	None	No Impact.
WS1 Scrub	Local Importance (Higher Value)	Habitat Loss.	The loss will occur of 0.608 ha of this habitat, which will be replaced with improved agricultural grassland (GA1). This is not considered a 'permanent' impact because it is reversible.	Direct, large magnitude, certain, temporary , adverse impact. Significant at a local scale.
Fauna				

Amphibians	Local Importance (Higher Value)	Loss of breeding habitat.	The loss will occur of 0.067 ha of suitable breeding habitat. It is however proposed to create a waterbody approximating 0.08 ha in the northeastern area of the Application Site. The loss will therefore be temporary and will ultimately result in a gain in available breeding habitat. Magnitude of this impact is considered 'small' on account of the likely effects on populations, considering the availability of alternative suitable habitats in the surrounding environment, and the fact that Rana temporaria are common and widespread.	Direct, small magnitude, certain, temporary, neutral impact. **Not Significant.**
Amphibians	Local Importance (Higher Value)	Direct mortalities.	If works are carried out during the frog hibernation period (October-January inclusive), it poses a risk of mortality to individual adult frogs that may be hibernating in small ponds or in adjacent scrub. If unsupervised works are carried out in small ponds during the breeding season, it poses a risk of mortality to individual frogs and their offspring. This will result in a temporary reduction in the local population. The magnitude of this effect is considered 'small' on account of the fact that *Rana temporaria* are common and widespread.	Direct, small magnitude, likely, temporary, adverse impact. **Significant at a local scale.**

			Considering that breeding frogs have been confirmed within the Application Site, this event is considered ‘likely’.	
Bats	Local Importance (Higher Value)	Destruction of roosts; Direct mortalities.	If works are carried out during the active season (May–September), there is a risk of disturbing or destroying bat roosts in the rock wall and nearby habitats. This could result in the loss of potential roosting sites for small numbers of common pipistrelle and soprano pipistrelle bats. No confirmed maternity roosts have been recorded within the development footprint, but the presence of bats has been identified through acoustic monitoring. The magnitude of this effect is considered small, given the legal protection of bats, their conservation status, and the availability of similar habitats in the wider area. The likelihood of this impact occurring is considered ‘likely’.	Direct, small magnitude, possible, temporary, adverse impact. **Significant at a local scale.**
Bats	Local Importance (Higher Value)	Loss of foraging habitat.	The loss of scrub represents the loss of 0.608 ha of suitable foraging habitat for bats, including Soprano pipistrelle, Common pipistrelle, and Myotis species. While the area provides local foraging opportunities, similar habitats are available in the surrounding landscape. The magnitude of this effect is considered small, and the likelihood of occurrence is certain. Overall, this impact is considered temporary, adverse, and localised.	Direct, small magnitude, certain, temporary, adverse impact. **Significant at a local scale.**

Badger	Local Importance (Higher Value)	Destruction of potential sett; Direct mortalities.	The potential sett is located within the proposed infill area. Should the sett become active in advance of the commencement of works, its destruction would potentially result in the mortality of individuals within the sett. This would result in a temporary reduction in the local population. The magnitude of this effect is considered 'small' on account of the fact that badgers are common and widespread. Considering that badgers have not been confirmed within the Application Site, this event is considered 'unlikely'.	Direct, small magnitude, unlikely, temporary, adverse impact. Significant at a local scale.
Otter	Local Importance (Higher Value)	Contamination of canal and adjacent habitats (dust, surface and groundwater emissions); Disturbance of otter (noise/vibration).	Otters are unlikely to holt within the Application Site but may do so along the canal. Chapter 6 (Water) has ruled out hydrological and hydrogeological connectivity between the Application Site and the Grand Canal. Chapter 7 (Air Quality) has concluded that deleterious dust emissions will not occur from the Application Site. Chapter 9 (Noise and Vibration) concludes that the Proposed Project will not give rise to deleterious noise/vibration emissions.	No Impacts.

			It is also noted that otters are tolerant of substantial levels of anthropogenic disturbance, as evidenced by their frequent occurrence in urban environments (Marnell, Looney, & Lawton, 2019).	
Breeding Birds	County Importance	Disturbance during the breeding season; Direct mortalities and/or destruction of nests.	The unmitigated removal of scrub during the breeding season poses the following risks to breeding birds: Disturbance of active nests; Destruction of active nests; and Direct mortality of individuals. This would result in a temporary reduction in local populations. The presence of 3 red-listed species heightens the magnitude of such an event. This event is considered 'certain' in the event that unmitigated removal occurs during the breeding season, given the density of breeding birds recorded. It is noted that works proximal to sand martin nests in the quarry wall would also pose a risk of disturbance. It is not proposed to physically interfere with sand martin nests.	Direct, large magnitude, certain, temporary, adverse impact. **Significant at a county scale.**
Breeding Birds	County Importance	Loss of nesting habitat.	The loss of scrub represents the loss of 0.608 ha of suitable nesting habitat. While the area	Direct, small magnitude, certain,

			provides local nesting opportunities, similar habitats are available in the surrounding landscape. The magnitude of this effect is considered small, and the likelihood of occurrence is certain. Overall, this impact is considered temporary and adverse. Significance is deemed to remain at county scale due to the species recorded.	temporary, adverse impact. **Significant at a county scale.**
Reptiles	Local Importance (Higher Value)	Loss of suitable habitat, including hibernacula.	The Proposed Project will result in the loss of basking habitat, in the form of bare rock and loose rocks. Loose rocks also represent potential sites for hibernacula. In the absence of mitigation, this impact is considered permanent and adverse. Magnitude is deemed 'small' on account of the species being common and widespread.	Direct, small magnitude, certain, permanent, adverse impact. **Significant at a local scale.**
Reptiles	Local Importance (Higher Value)	Direct mortality.	Works occurring during the winter pose a risk of the destruction of hibernacula, specifically in areas under loose rocks and dead wood, as per Hodges and Seabrook (2022). In the absence of mitigation, this impact is considered temporary and adverse, on account of the local population's likely resilience to such a mortality event. Magnitude is deemed 'small' on account of the species being common and widespread. Since no live specimens were	Direct, small magnitude, unlikely, temporary, adverse impact. **Significant at a local scale.**

			noted during surveys, this event is deemed 'unlikely'.	
Other (small) Mammals	Local Importance (Higher Value)	Destruction of resting places; Direct mortalities.	There are no proposals to interfere with mature trees (suitable for red squirrel dreys) around the periphery of the Application Site. Clearance of scrub, and subsequent deposition of fill material in its place present risks of disturbance and destruction of the resting places of hedgehog, Irish hare and pygmy shrew. Works during the winter poses a risk of direct mortality to hibernating hedgehogs. The magnitude of this effect is considered 'small', and duration is considered temporary, on account of these species' conservation status, and the availability of similar habitats in the wider area. Since no live specimens were noted during surveys, this event is deemed 'unlikely'.	Red Squirrel – No Impact _____ Hedgehog, Irish hare, pygmy shrew Direct, small magnitude, unlikely, temporary, adverse impact. **Significant at a local scale.**
Other (small) Mammals	Local Importance (Higher Value)	Loss of suitable habitat.	The loss of scrub represents the loss of 0.608 ha of suitable resting and foraging habitat. Similar habitats are available in the surrounding landscape, the conservation status of these species is Least Concern, and populations are stable. The magnitude of this effect is considered small, and the likelihood of occurrence is	Direct, small magnitude, certain, temporary, adverse impact. **Significant at a local scale.**

			certain. Overall, this impact is considered temporary and adverse.	
Terrestrial Invertebrates	Local Importance (Higher Value)	Loss of suitable habitat.	The loss of 0.608 ha of scrub, and 1.064 ha of calcareous grassland represents a temporary loss of suitable habitat. Similar habitat exists in the surrounding environment. The larval foodplant for marsh fritillary was found to be absent, and all other notable species recorded in the desk study are generalist foragers. The magnitude of this effect is considered small, and the likelihood of occurrence is certain. Overall, this impact is considered temporary and adverse.	Direct, small magnitude, certain, temporary, adverse impact. Significant at a local scale.

4.7. Mitigation Measures and Monitoring

This section proposes mitigation and/or compensation measures for the effects deemed to be significant in **Table 4-26**. Following the implementation of mitigation and/or compensation, each effect is re-assessed to ascertain whether residual effects remain, and to what extent these are significant. The results of this exercise are presented in **Table 4-27**, and additional detail is provided in the following subsections.

4.7.1. Habitat Loss

4.7.1.1. Restoration Plan

A Restoration Plan has been prepared and submitted with this Section 37L Application, which proposes the creation of new habitats following the completion of infilling works. With regard to the loss of calcareous grassland and scrub, the Restoration Plan includes for the expansion of the existing boundary hedgerows/treelines via the planting of a mix of native shrubs. In addition, it proposes the inclusion of a buffer strip of semi-natural grassland, which will extend along the boundary and will be adjacent to the expanded hedgerow/treeline.

4.7.2. Amphibians

4.7.2.1. Mortalities

Where scrub adjacent to small ponds (i.e. not including the collected waters in the quarry void) needs to be cleared, vegetation will be trimmed to 15 cm to allow individuals to move out of the way prior to works and a hand search conducted prior to the works by a suitably experienced ecologist.

Any amphibian species found will be carefully moved out of harm’s way with a gloved hand to nearby and suitable vegetation outside of the working area.

In the event that breeding frogs and/or smooth newts are found in the footprint of the proposed works, the works will stop, and it may be necessary for an NPWS derogation licence to enable the works to continue (if it involves disturbing or destroying the breeding place of an amphibian). This assessment assumes that if a licence is granted then appropriate mitigation and compensation will be provided for the species concerned.

4.7.3. Bats

The Applicant will engage a suitably qualified and experienced bat ecologist to scope and carry out the further bat surveys and mitigation described below.

No works are to occur within 10m of the exposed quarry face (located south of the existing haul route/bench to the south of the artificial waterbody) until the following mitigation measures have been completed:

4.7.3.1. Initial Survey

Although the overall bat assemblage on site is considered to be of Local Importance, the static detector data indicated consistently high levels of bat activity near the rock wall. Frequent recordings of common and soprano pipistrelles around their emergence times suggest that roosts could be located nearby. However, no roosts have been confirmed. Therefore, a precautionary approach is recommended to determine the potential use of the rock wall by bats.

A Preliminary Roost Feature (PRF) inspection survey will be undertaken to assess the rock wall's suitability for bats. Access equipment such as ropes, ladders, MEWPs, or scaffold towers may be required to enable a full visual inspection. PRFs will be categorised in line with Bat Conservation Trust guidance (Collins, 2023) as None (no roosting suitability), PRF-I (suitable for or previously used by individual bats) and PRF-Ms (suitable for or used by multiple bats). Features categorised as None or PRF-I require no further assessment. PRF-Ms, however, must be subject to three dusk/dawn surveys during the active bat season (May–September) to determine occupation.

4.7.3.2. Initial Mitigation

If no PRFs are identified during the initial inspection, no further surveys are necessary, and works may proceed under ecological supervision.

If PRF-I or PRF-M features are identified, their occupation status must be assessed during the active season. Due to exposure, the wall is not considered suitable for hibernation. If PRFs are found to be unoccupied at the time of survey, they should be sealed (under supervision of a licensed bat ecologist) to prevent subsequent use by bats.

If any PRF is found to be occupied, disturbance or removal of a roost would constitute an offence under Section 23 (5)(d) of the Wildlife Acts. In such cases, a derogation licence must be obtained from the National Parks and Wildlife Service. A detailed Species Protection Plan would then be developed and implemented.

4.7.3.3. Infilling works

Infilling works near the rock wall must be conducted in a phased manner, under the supervision of the appointed bat ecologist. The ecologist will inspect the rock face incrementally to ensure any newly emerging PRFs are identified and assessed appropriately prior to disturbance.

4.7.4. Badger

4.7.4.1. Disturbance or Destruction of an Active Sett

Prior to the commencement of works, confirmatory badger surveys will be undertaken to determine if the potential setts identified are in use by badger, and if any additional badger setts are present within the Application Site.

Unless authorised to do so, heavy machinery will not be permitted within 30 m of an active badger sett, although lighter machinery may be used within 20 m and light work such as vegetation clearance can generally be undertaken within 10 m of setts (NRA, Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes, 2005). Where avoidance measures and exclusion zones cannot be used, consultation with NPWS will be necessary to permit disturbance (noting that the NPWS does not presently issue derogation licences for badger sett disturbance or destruction but can give authorisation and should be consulted). This assessment assumes that if authorisation is granted then appropriate mitigation and compensation will be provided.

During the breeding season (December to June inclusive), none of the above works shall be permitted within 50 m of any active setts.

4.7.5. Breeding Birds

4.7.5.1. Disturbance or Destruction of Active Nests

The clearance of woody vegetation (hedgerows, treelines, scrub and woodland) and any sand martin nests will **not** occur during the breeding season. If this is unavoidable, a suitably experienced ecologist must survey all areas where works are proposed with nesting habitat, and check for active nests before operations commence. If present, species-specific avoidance zones will be implemented and adhered to until any chicks have fledged, or the nest is deemed to be no longer in use. If this is not possible, clearance cannot proceed without a derogation licence.

4.7.5.2. Habitat Loss

The loss of scrub will be compensated by the planting of an equivalent area of woody habitat along the periphery of the Application Site, as outlined in the Restoration Plan.

The Restoration Plan also proposes for the installation of four bird nesting boxes (2GR Schwegler nest box, or similar) in areas of woody habitat. The boxes will be placed at least 2 m above the ground, in locations sheltered from prevailing wind, rain, and strong sunlight, ensuring birds have unobstructed access.

4.7.6. Reptiles

4.7.6.1. Mortalities

In advance of any winter works involving the potential loss of hibernacula for common lizard (areas with dead wood piles or loose rocks), a confirmatory survey will be carried out to determine the presence or absence of hibernating individuals. Surveys will involve the lifting of dead wood or stones, which may disturb the animals, and as such may require a derogation licence from the NPWS.

If individuals are found and destruction of hibernacula is unavoidable, bespoke mitigation must be designed and agreed with the NPWS. This will likely involve the creation of

alternative hibernacula in unaffected alternative habitat, and subsequently the careful translocation of individuals.

If possible, works in such an area will be delayed until the spring, when common lizard has left the hibernaculum.

4.7.6.2. Habitat Loss

The loss of areas of bare and loose rocks will be compensated by the provision of 4 reptile refugia, which will comprise some loose piles of boulders, which can be transported from their existing location onsite and reused. These will provide habitat for reptiles to use for basking and as hibernacula.

4.7.7. Other (Small) Mammals

4.7.7.1. Disturbance or Destruction of Active Resting Places

A suitably experienced ecologist will check for the presence of hedgehog, Irish hare and pygmy shrew before and during the clearance of scrub. In the unlikely event that any of these species are found, but that cannot move out of the way of works of their own accord, they will be carefully moved with a gloved hand to nearby and suitable vegetation outside of the working area. If specific resting places (e.g. burrows that may be in use by hedgehogs or pygmy shrews, or hare forms) are found, works will stop, and avoidance zones will be implemented and adhered to until the nest is deemed to be no longer in use. If this is not possible, clearance cannot proceed without a derogation licence from the NPWS.

4.7.7.2. Habitat Loss

The loss of scrub will be compensated by the planting of an equivalent area of woody habitat along the periphery of the Application Site, as outlined in the Restoration Plan.

4.7.8. Terrestrial Invertebrates

4.7.8.1. Habitat Loss

The loss of scrub and calcareous grassland will be compensated by the creation of equivalent areas of habitat along the periphery of the Application Site, as outlined in the Restoration Plan.

In addition, four invertebrate boxes will be installed around the periphery of the Application Site.

4.7.9. Spread of Invasive Species

Whilst not identified as a significant impact to any IEFs, the failure to prevent the spread of invasive species is an offence under the Birds and Natural Habitats Regulations. To this end, and Invasive Species Management Plan (ISMP) has been prepared and is submitted with this Section 37L application. The ISMP proposes a suite of standard biosecurity measures, monitoring and broad actions in the event of accidental species introduction.

4.8. Residual Effects

This section presents the assessment of residual effects, following the implementation of mitigation and/or compensation. The results of this exercise are presented in **Table 4-27**.

Table 4-27 - Assessment of Residual Effects

Important Ecological Feature (IEF)	Potential Effects Identified	Impact Assessment Conclusion	Mitigation, Compensation, and Enhancement	Residual Impacts	Comments
Habitats					
GS1 Dry calcareous and neutral grassland	Habitat Loss.	Direct, large magnitude, certain, temporary, adverse impact. **Significant at a local scale.**	Habitat compensation, per Restoration Plan.	Direct, large magnitude, certain, temporary, neutral impact. **Not significant**	None
WS1 Scrub	Habitat Loss.	Direct, large magnitude, certain, temporary, adverse impact. **Significant at a local scale.**	Habitat compensation, per Restoration Plan.	Direct, large magnitude, certain, temporary, neutral impact. **Not significant**	None
Species					
Amphibians	Direct mortalities.	Direct, small magnitude, likely, temporary, adverse impact.	Pre-clearance checks and supervision.	Direct, small magnitude, unlikely, temporary, adverse impact.	Minor residual impact arising from limitations in detectability despite

Important Ecological Feature (IEF)	Potential Effects Identified	Impact Assessment Conclusion	Mitigation, Compensation, and Enhancement	Residual Impacts	Comments
		Significant at a local scale.		**Not Significant**	implementation of mitigation.
Bats	Destruction of roosts; Direct mortalities.	Direct, small magnitude, possible, temporary, adverse impact. **Significant at a local scale.**	PRF inspection of rock wall by qualified bat ecologist. Dusk/dawn surveys if PRFs present. Exclusion and sealing of unoccupied PRFs. Derogation licence and Species Protection Plan if occupied roosts found. Phased infilling works under ecologist supervision. Install 6 bat boxes (2 near pond, 4 along western boundary). Enhance foraging habitats with native planting. Avoid pesticide use in site management. Monitor bat activity and box usage post-construction.	Minor residual impact due to undetected roosts or limited habitat loss.	Local Importance bat assemblage. Rock wall has potential for roosts; precautionary approach applied. Mitigation minimises long-term impact.

Important Ecological Feature (IEF)	Potential Effects Identified	Impact Assessment Conclusion	Mitigation, Compensation, and Enhancement	Residual Impacts	Comments
Bats	Loss of foraging habitat.	Direct, small magnitude, certain, temporary, adverse impact. **Significant at a local scale**.	Plant native species around pond and along hedgerows (e.g., cuckoo flower, purple loosestrife, water mint). Manage habitats without pesticides/insecticides (except invasive species control). Install 6 bat boxes (as above). Enhance habitat diversity (pond, grassland, hedgerows). Post-construction monitoring of bat activity.	Minor residual impact; temporary habitat loss offset by long-term enhancement.	Foraging habitat loss temporary; new pond and habitat planting enhance long-term ecological value.
Badger	Destruction of potential sett; Direct mortalities.	Direct, small magnitude, unlikely, temporary, adverse impact. **Significant at a local scale.**	Pre-works surveys. If present, exclusion zones for breeding and non-breeding season. If the sett needs to be removed, consult NPWS and agree sensitive approach.	**No Impact.**	None
Breeding Birds	Disturbance during the	Direct, large magnitude,	Avoidance of scrub during breeding season.	**No Impact.**	None

Important Ecological Feature (IEF)	Potential Effects Identified	Impact Assessment Conclusion	Mitigation, Compensation, and Enhancement	Residual Impacts	Comments
	breeding season; Direct mortalities and/or destruction of nests.	certain, temporary, adverse impact. **Significant at a county scale.**	If necessary, supervision of scrub clearance and implementation of avoidance zones as necessary.		
Breeding Birds	Loss of nesting habitat.	Direct, small magnitude, certain, temporary, adverse impact. **Significant at a county scale**.	Habitat compensation, per Restoration Plan.	Direct, large magnitude, certain, temporary, neutral impact. **Not significant**	None
Reptiles	Loss of suitable habitat, including hibernacula.	Direct, small magnitude, certain, permanent, adverse impact. **Significant at a local scale.**	Habitat compensation, per Restoration Plan.	**No Impact.**	None
Reptiles	Direct mortality.	Direct, small magnitude,	Pre-works surveys.	Direct, small magnitude,	Minor residual impact arising from

Important Ecological Feature (IEF)	Potential Effects Identified	Impact Assessment Conclusion	Mitigation, Compensation, and Enhancement	Residual Impacts	Comments
		unlikely, temporary, adverse impact. **Significant at a local scale.**		unlikely, temporary, neutral impact. **Not Significant**	limitations in detectability despite implementation of mitigation.
Other (small) Mammals (Hedgehog, Irish hare, pygmy shrew)	Destruction of resting places; Direct mortalities.	Direct, small magnitude, unlikely, temporary, adverse impact. **Significant at a local scale.**	Pre-works surveys.	Direct, small magnitude, unlikely, temporary, neutral impact. **Not Significant**	Minor residual impact arising from limitations in detectability despite implementation of mitigation.
Other (small) Mammals (Hedgehog, Irish hare, pygmy shrew)	Loss of suitable habitat.	Direct, small magnitude, certain, temporary, adverse impact. **Significant at a local scale**.	Habitat compensation, per Restoration Plan.	**No Impact.**	None
Terrestrial Invertebrates	Loss of suitable habitat.	Direct, small magnitude, certain,	Habitat compensation, per Restoration Plan.	**No Impact.**	None

Important Ecological Feature (IEF)	Potential Effects Identified	Impact Assessment Conclusion	Mitigation, Compensation, and Enhancement	Residual Impacts	Comments
		temporary, adverse impact. **Significant at a local scale**.			

4.9. Cumulative Effects

As well as considering the potential significant effects from the Site in isolation, the assessment must also consider those effects in combination with those associated with other plans or projects.

Considering that mitigation is proposed for all effects deemed significant from the Proposed Project in isolation, the cumulative assessment only considers projects that have the potential to contribute to residual effects identified in **Table 4-27**.

The cumulative assessment considered planning applications for projects of a similar size to the Proposed Project for which permission was granted within the last five years (2020-2025 inclusive)[30]. Refused applications, applications for retention and incomplete or withdrawn applications were not included for consideration. Retention applications refer to unauthorised works that are already complete and therefore will not interact with the Proposed Project.

The search area included a 1km buffer around the Application Site, and focused on plans/projects that may result in substantial loss of woody habitat (scrub, hedgerows, treelines and woodland).

The following sources were used in the search:

- Planning Enquiry System – Kildare County Council (KCC, 2025).
- EIA Portal (DoHLGH, 2025).
- The Kildare County Development Plan 2023-2029 (KCC, 2023).

4.9.1. Results

Relevant planning applications are presented in **Table 4-28**.

Table 4-28 - Planning Applications

Planning Reference	Year Consented/ Status	Location/ distance from Proposed Project	Description of the proposal, and conclusion in respect of significant impacts in combination with the Proposed Project
24301	2024	ca. 500 m south	Extension of planning permission 19194. The original application was for the construction of a whiskey distillery and visitor centre. The application was submitted with an EIAR and NIS, both of which proposed a suite of mitigation

[30] Planning permission generally has a lifespan of 5 years in Ireland (Government of Ireland, Planning and Development Act 2000, Section 40.3 (b))

Planning Reference	Year Consented/ Status	Location/ distance from Proposed Project	Description of the proposal, and conclusion in respect of significant impacts in combination with the Proposed Project
			measures for the safeguarding of sensitive ecological features, which in turn were conditioned in the grant of permission. Per the planner's report, the majority of the works have been completed, such that the facility already has the capacity to produce 500,000 litres of pure alcohol – the outstanding works will elevate this capacity to 750,000 litres. The conditions, under which the original planning permission was granted, still apply. As such, there is no potential for this project to interact with the Proposed Project in any way so as to give rise to significant ecological effects. **No Impact.**
22208	2022	ca. 990 m east.	Extension of shed associated with a private dwelling. Aerial imagery from Google shows that these works are already complete. As such, there is no potential for this project to interact with the Proposed Project in any way so as to give rise to significant ecological effects. **No Impact.**
211414	2022	ca. 575 m south.	Refurbishment of existing cottage and associated outbuildings, demolition of certain ancillary structures, construction of 3 warehouses and one vatting building, all intended to supplement the whiskey distillery and visitor centre associated with planning application 19194 and 24301, which is across the road. This application was submitted with an Ecological Impact Assessment and Natura Impact Statement, as well as a Tree Removals and Protection Plan. All of these

Planning Reference	Year Consented/ Status	Location/ distance from Proposed Project	Description of the proposal, and conclusion in respect of significant impacts in combination with the Proposed Project
			reports proposed a suite of mitigation measures for the safeguarding of sensitive ecological features, which in turn were conditioned in the grant of permission. As such, there is no potential for this project to interact with the Proposed Project in any way so as to give rise to significant ecological effects. **No Impact.**

4.9.2. Conclusion

The Proposed Project will not interact with any other plans or projects so as to give rise to significant adverse impacts to ecological receptors.

4.9.2.1. Monitoring

Monitoring of enhancement measures should be proportionate to the site's Local Importance and aligned with any requirements under NPWS derogation licences, should these be needed.

Post-installation monitoring should include periodic bat activity surveys and visual inspection of bat boxes. Findings should be recorded and, where appropriate, submitted to Bat Conservation Ireland and the NPWS via the National Biodiversity Data Centre's online portal.

4.10. References

Andrews, H., & Pearson, L. (2022). *Review of empirical data in respect of emergence and return times reported for the UK's native bat species. Version 6.* Retrieved from https://drive.google.com/file/d/1DeGHxyr9-p5XH6R6CRimsmquVD188WY8/view (Accessed 06/11/2024)

Calladine, J., Garner, G., Wernham, C., & Thiel, A. (2009). The influence of survey frequency on population estimates of moorland breeding birds. *Bird Study, 56:3*, 281-288.

Chanin, P. (2003). *Monitoring the Otter Lutra lutra. Conserving Natura 2000 Rivers Monitoring Series No. 10.* Peterborough: English Nature.

Chenger, J. (2017, September 29). *Tips for Siting Bat Detectors*. Retrieved from Bat Management: https://batmanagement.com/blogs/acoustic-monitoring/tips-for-siting-bat-detectors?srsltid=AfmBOoohiEG8HZvFJwVfAAWvrkn6K5ruLW6mMI2ftRFVjCRNB76RlaaB

CIEEM. (2019). *Advice Note: On The Lifespan of Ecological Reports and Surveys.* Hampshire: Chartered Institute of Ecology and Environmental Management.

CIEEM. (2022). *Guidelines for Ecological Impact Assessment in the UK and Ireland.* Winchester: Chartered Institute of Ecology and Environmental Management.

CIEEM. (2023). *Briefing Paper: Biodiversity Enhancement for New Developments in Ireland.* Ampfield: Chartered Institute of Ecology and Environmental Management.

CIEEM. (2024). *Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Version 1.3.* Chartered Insitute of Ecology and Environmental Management.

CIEEM. (2024a). *Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Version 1.3.* Chartered Institute of Ecology and Environmental Management.

CIEEM. (2024b). *Competency Framework.* Chartered Institute of Ecology and Environmental Management.

Collins. (2023). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition).* London: The Bat Conservation Trust.

Collins, J. (ed.). (2023). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition).* London: The Bat Conservation Trust.

EPA. (2022). *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.* Ireland.

Fitzpatrick, Ú., Murray, T., Byrne, A., Paxton, R., & Brown, M. (2006). *Regional Red List of Irish Bees.* Higher Education Authority.

Fossitt, J. (2000). *A Guide to Habitats in Ireland.* Dublin: The Heritage Concil.

Gilbert, G., Gibbons, D., & Evans, J. (1998). *Bird Monitoring Methods: A Manual of Techniques for Key UK Species.* Sandy: RSPB.

Gilbert, G., Stanbury, A., & Lewis, L. (2021). Birds of Conservation Concern in Ireland 4: 2020-2026. *Irish Birds, 43*, 1-22.

Gilbert, G., Stanbury, A., & Lewis, L. (2021). Birds of Conservation Concern in Ireland 4: 2020-2026. Irish Birds, 43: 1-22. *Irish Birds, 43*, 1-22.

IEMA. (2024). *Implementing the Mitigation Hierarchy from Concept to Construction.* Institute of Environmental Management and Assessment .

IPCC. (2010). *Guidance Notes for Lead Authors of the IPCC Fifth Assessment Report on Addressing Uncertainties.* Intergovernmental Panel on Climate Change.

Jackson, W., FitzPatrick, U., Cole, E., Jebb, M., McFerran, D., Sheehy Skiffington, M., & Wright, M. (2016). *Ireland Red List No. 10: Vascular Plants. .* Dublin, Ireland.: National

Parks and Wildlife Service, Department of Arts, Heritgae, Regional, Rural and Gaeltacht Affairs.

Jones, G., & Rydell, J. (1994). Foraging Strategy and Predation Risks as Factors influencing Emergence Times in Echolocating Bats. *Philosophical Translations: Biological Sciences*, 445-455.

Kildare County Council. (2023). *Kildare County Development Plan 2023 - 2029.* Ireland: Kildare County Council.

Killeen, I. (2003). *Ecology of Desmoulion's Whorl Snail. Conserving Natura 2000 Rivers Ecology Series No. 6.* Peterborough: English Nature.

Kilroy, G., Dunne, F., Ryan, J., O'Connor, A., Daly, D., Craig, M., . . . Moe, H. (2008). *A Framework for the Assessment of Groundwater - Dependent Terrestrial Ecosystems under the Water Framework Directive.* Co. Wexford, Ireland: EPA.

Lockhart, N., Hodgetts, N., & Holyoak, D. (2012). *Ireland Red List No. 8: Bryophytes.* Dublin, Ireland: National Parks and Wildlife Service, Departments of Arts, Heritage and the Gaeltacht.

Lundy, M., Aughney, T., Montgomery, W., & Roche, N. (2011). *Landscape Conservation for Irish Bats & Species Specific Roosting Characteristics.* Bat Conservation Ireland.

MacGowan, F. (2021). *Monasterevin Biodiversity Action Plan 2021-25.* Kildare County Council.

Marnell, F., Kelleher, C., & Mullen, E. (2022). *Bat mitigation guidelines for Ireland v2. Irish Wildlife Mannuals, No. 134.* Ireland: National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

Marnell, F., Looney, D., & Lawton, C. (2019). *Ireland Red List No. 12: Terrestrial Mammals.* Dublin, Ireland: National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

Meehan. (2013). *IWT National Smooth Newt Survey 2013 Report.* Irish Wildlife Trust.

Meehan, S. (2013a). *IWT National Smooth Newt Survey 2013 Report.* Irish Wildlife Trust.

Meehan, S. T. (2013). *IWT National Smooth Newt Survey 2013 Report.* Irish Wildlife Trust.

Metcalf, O., Abrahams, C., Ashington, B., Baker, E., Bradfer-Lawrence, T., Browning, E., . . . Smyth, S. (2022). *Good Practice Guidelines for Long-Term EcoAcoustic Monitoring in the UK.* UK Acoustics Network.

Moorkens, E. A., & Killeen, I. J. (2011). *Monitoring and Condition Assessment of Populations of Vertigo geyeri, Vertigo angustior and Vertigo moulinsiana in Ireland. Irish Wildlife Mannuals, No. 55.* Dublin, Ireland: National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht.

NPWS. (2008a). *The Status of EU Protected Habitats and Species in Ireland.* Unpublished Report.

NPWS. (2019). *The Status of EU Protected Habitats and Species in Ireland. Volume 3. Speceis Assessements.* Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.

NRA. (2009a). *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes.* National Roads Authority.

NRA. (2009b). *Guidelines for Assessment of Ecological Impacts of National Roads Schemes. Revision 2.* National Roads Authority.

O'Flynn, C., Kelly, J., & Lysaght, L. (2014). *Ireland's Invasive and Non-native Species - Trends in Introductions.* Waterford: NBDC.

Olsen, L. (2013). *Tracks and Signs of the Mammals and Birds of Britain and Europe. 1st ed.* Princeton: Princeton University Press.

Reason, Newson, & Jones. (2016). *Recommendations for using automatic bat identification software with full spectrum recordings.* Bat Conservation Trust.

Reason, P., & Wray, S. (2023). *UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats. Version 1.1.* Ampfield: Chartered Insitute of Ecology and Environemntal Management.

Regan, E. C., Nelson, B., Aldwell, B., Bertrand, C., Bond, K., Harding, J., Wilson, C. (2010). *Ireland Red List No. 4 - Butterflies.* Ireland: National Parks and Wildife Service, Department of the Environment, Heritage and Local Government.

Reid, N., Dingerkus, S. K., Stone, R. E., Pietravalle, S., Kelly, R., Buckley, J., Wilkinson, J. (2013b). *National Frog Survey of Ireland 2010/11.* Dublin, Ireland: Irish Wildlife Manuals, No. 58. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Reid, N., Hayden, B., Lundy, M., Pietravalle, S., McDonald, R., & Montgomery, W. (2013). *National Otter Survey of Ireland 2010/12.* No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. : Irish Wildlife Manuals.

Roche, N., & Langton, S. (2024). *Population estimates, trends and background information for six Irish bat species. Article 17 Reporting 2018-2023: Supporting Documentation.* Unpublished report to National Parks and Wildlife Service.

Roche, N., Clarke, D., Healy, K., Langton, S., & Aughney, T. (2024). *Irish Bat Monitoring Schemes: Annual Report for 2023.* Retrieved from https://www.batconservationireland.org/wp-content/uploads/2024/05/2024_AnnualMonitoringReport2023.pdf (Accessed 06/11/2024)

Russ, J. (2012). *British Bat Calls.* Exeter: Pelagic Publishing.

Schofield, H. (2008). *The Lesser Horseshoe Bat Conservation Handbook.* Vincent Wildlife Trust.

Scottish Badgers. (2018). *Surveying for Badgers: Good Practice Guidelines. Version 1.* Scottish Badgers.

Smith, G. F., O'Donoghue, P., O'Hora, K., & Delaney, E. (2011). *Best Practice Guidance For Habitat Surveying and Mapping.* Kilkenny: The Heritage Council.

SNH. (2016). *Assessing Connectivity with Special Protection Areas (SPAs).* Scottish Natural Heritage.

Swift, S., & Racey, P. (2002). Gleaning as a foraging strategy in Natterer's bat *Myotis nattereri*. . *Behavioural Ecology and Sociobiology*, 52: 408-416.

Wildlife Acoustics. (2019, August 1). *Song Meter SM4BAT FS User Guide.* Retrieved from https://www.wildlifeacoustics.com/images/documen

Appendix 4A

Notes on Bat Legislation and Guidance

Bats

All Irish bat species are protected under the WA making it illegal to capture or kill any bat. Additionally, the Habitats Directive seeks to protect bats and their habitats and requires appropriate monitoring of populations. All Irish bats are listed on Annex IV of the Habitats Directive with the lesser horseshoe bat *Rhinolophus hipposideros* further listed on Annex II where SAC designation is required.

Furthermore, all European bats and their habitats are protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982) with migrant bat species protected by the Convention on the Conservation of Migratory Species of Wild Animals (Bern Convention 1978, enacted 1983).

Under the WA and Habitats Directive, it is an offence to:

- Kill, injure or capture a bat;
- Deliberately disturb a bat;
- Possess or control any live or dead specimen or anything derived from a bat;
- Wilfully interfere with any structure or place used for breeding or resting by a bat;
- Wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose; and
- Damage or destroy a breeding site or resting place of a bat, whether accidental or deliberate.

Works interfering with or constituting an offence to bats or their roosts may only be carried out under a derogation licence from Regulation 23 of the Habitats Regulation 1997 and Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011. Derogation licencing is governed by a strict licencing protocol administered by the National Parks and Wildlife Service (NPWS).

There are eleven recorded bat species in Ireland, nine of which are resident:

- Common pipistrelle *Pipistrellus pipistrellus*;
- Soprano pipistrelle *Pipistrellus pygmaeus*;
- Nathusius' pipistrelle *Pipistrellus nathusii*;
- Natterer’s bat *Myotis nattereri*;
- Daubenton’s bat *Myotis daubentonii*;
- Whiskered bat *Myotis mystacinus*;
- Brown long-eared bat *Plecotus auritus*;
- Leisler’s bat *Nyctalus leisleri* and;
- Lesser horseshoe bat *Rhinolophus hipposideros*.

The most recent Irish red data list assesses all Irish bat species as being of Least Concern (Marnell, Looney, & Lawton, 2019) however bat populations remain vulnerable to declines with national and EU law preventing losses (Marnell, Kelleher, & Mullen, 2022).

Appendix 4B

Assessment Methodology

Table 0-1 - Amphibian Survey Details

Date	Start Time	End Time	Weather Summary
23/02/2024	08:48	12:35	6 degrees, dry, overcast, No wind (F0 Beaufort scale)
08/03/2024	08:42	12:30	6 degrees, dry, sunny, fresh winds (F4 Beaufort scale)

Table 0-2 - Assessing Habitat Suitability for Bats (Collins 2023)

Suitability	Habitat Suitability Criteria
None	No habitat features on site likely to be used by roosting, commuting or foraging bats at any time of year.
Negligible	No obvious habitat features on site likely to be used by roosting, commuting or foraging bats however, some uncertainty is present.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically at any time of year, however, are not of sufficient size to be used regularly or for maternity/hibernation. Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by another habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat type but is unlikely to support a roost of high conservation status, such as maternity or hibernation. Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure with one or more potential roost sites that are obviously suitable for a larger number of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat. These structures have the potential to support high conservation status roosts e.g. maternity or classic cool/stable hibernation site.

Suitability	Habitat Suitability Criteria
	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

Table 0-3 - Static Bat Detector Surveys

Survey Night	Date	Start Time	End[31] Time	Duration	Weather Conditions[32]
1	11/07/2024	22:23:44	05:43:48	08:20:04	Temperature: 11.8°C; Rainfall: 0.4mm; Wind speed: 7.3kts; Wind direction: NNW
2	12/07/2024	21:22:47	05:45:00	08:22:13	Temperature: 11.8°C; Rainfall: 0mm; Wind speed: 5.6kts; Wind direction: NNW
3	13/07/2024	21:21:47	05:46:14	08:24:26	Temperature: 13.6°C; Rainfall: 0mm; Wind speed: 4kts; Wind direction: NW
4	14/07/2024	21:20:44	05:47:30	08:26:46	Temperature: 13.2°C; Rainfall 0.7mm; Wind speed: 3.1kts, Wind direction: SE
5	15/07/2024	21:19:38	05:50:07	08:30:29	Temperature: 12.3°C; Rainfall: 0mm; Wind speed: 3.2kts, Wind direction: SE
6	16/07/2024	21:18:30	05:51:28	08:32:58	Temperature: 13.6°C; Rainfall: 1.3mm; Wind speed: 3.1kts, Wind direction: W
7	17/07/2024	21:17:18	05:52:51	08:35:33	Temperature: 12.5°C; Rainfall: 0mm; Wind speed: 3.5kts, Wind direction: SSW

[31] The survey end time occurred +1 (day) from the start date.

[32] Weather conditions describe nighttime conditions for each survey night, starting at 19:00 on the date indicated and continuing to 07:00 the following day. Temperature, windspeed and wind direction are an average over the nighttime period with rainfall being a sum of the hourly amounts recorded. All values have been rounded to one decimal place.

Survey Night	Date	Start Time	End[31] Time	Duration	Weather Conditions[32]
8	18/07/2024	21:16:04	05:54:16	08:38:12	Temperature: 15.1°C; Rainfall: 2mm; Wind speed: 7.7kts; Wind direction: SSE
9	19/07/2024	21:14:48	05:55:42	08:40:54	Temperature: 16.7°C; Rainfall: 0.2mm; Wind speed: 7.1kts; Wind direction: S
10	20/07/2024	21:13:28	05:57:09	08:43:41	Temperature: 15.3°C; Rainfall: 2.4mm; Wind speed: 5.8kts; Wind direction: SSE
11	21/07/2024	21:12:06	05:58:38	08:46:32	Temperature: 12°C; Rainfall: 0mm; Wind speed: 4.2kts; Wind direction: NW
12	22/07/2024	21:10:42	06:00:07	08:49:25	Temperature: 15.4°C; Rainfall: 0.8mm; Wind speed: 6.4kts; Wind direction: SW
13	23/07/2024	21:09:15	06:01:38	08:52:23	Temperature: 14.5°C; Rainfall: 1.3mm; Wind speed: 7.2kts; Wind direction: WNW
14	24/07/2024	21:07:46	06:03:11	08:55:25	Temperature: 15.1°C; Rainfall: 0mm; Wind speed: 6kts; Wind direction SSE
15	25/07/2024	21:06:15	06:04:44	08:58:29	Temperature: 16.3°C; Rainfall: 0mm; Wind speed: 4.5kts; Wind direction SSW
16	26/07/2024	21:04:41	06:06:18	09:01:37	Temperature: 12.6°C; Rainfall: 0mm; Wind speed: 6.3kts; Wind direction: SW
17	27/27/2024	21:03:06	06:07:53	09:04:47	Temperature: 13.3°C; Rainfall: 2.1mm; Wind speed: 3.4kts; Wind direction: S
18	28/07/2024	21:01:28	06:09:29	09:08:01	Temperature: 13°C; Rainfall: 0mm; Wind speed: 3kts; Wind direction: S

Survey Night	Date	Start Time	End[31] Time	Duration	Weather Conditions[32]
19	29/07/2024	20:59:48	06:11:06	09:11:18	Temperature: 13.1°C; Rainfall: 0mm; Wind speed: 5.5kts; Wind direction: SSE
20	30/07/2024	20:58:06	06:12:43	09:14:37	Temperature: 15.9°C; Rainfall: 0mm; Wind speed: 3.7kts; Wind direction: S
21	31/07/2024	20:56:22	06:14:21	09:17:59	Temperature: 12.5°C; Rainfall: 0mm; Wind speed: 2kts; Wind direction: SE
22	01/08/2024	20:54:36	06:16:00	09:21:24	Temperature: 16.2°C; Rainfall: 0mm; Wind speed: 2.9kts; Wind direction: SSW
23	02/08/2024	20:52:49	06:17:39	09:24:50	Temperature: 17.1°C; Rainfall: 0mm; Wind speed: 7kts; Wind direction: S
24	03/08/2024	20:50:59	06:19:19	09:28:20	Temperature: 11.3°C; Rainfall: 0.2mm; Wind speed: 4.1kts; Wind direction: SW
25	04/08/2024	20:49:08	06:21:00	09:31:52	Temperature: 14.1°C; Rainfall: 0.1mm; Wind speed: 4.9kts; Wind direction: SSW
26	05/08/2024	20:47:15	06:22:22	09:35:07	Temperature: 18.1°C; Rainfall: 0.1mm; Wind speed: 15.1kts; Wind direction: S
27	06/08/2024	20:45:21	06:24:22	09:39:01	Mean temperature: 12°C; Rainfall: 0mm; Windspeed: 4.1kts; Wind direction: SSW
28	07/08/2024	20:43:25	06:26:03	09:42:38	Mean temperature: 14.1°C; Rainfall: 0mm; Windspeed: 8.5kts; Wind direction: SW
29	08/08/2024	20:41:27	06:27:45	09:46:18	Temperature: 14.8°C; Rainfall: 0.2mm; Wind speed: 6kts; Wind direction: SSE

Survey Night	Date	Start Time	End[31] Time	Duration	Weather Conditions[32]
30	09/08/2024	20:39:28	06:29:27	09:49:59	Temperature: 15.6°C; Rainfall: 0.1mm; Wind speed: 9.4kts; Wind direction: WSW
31	10/08/2024	20:37:27	06:31:09	09:53:42	Temperature: 16.5°C; Rainfall: 0mm; Wind speed: 6.5kts; Wind direction SSW
32	11/08/2024	20:35:25	06:32:52	09:57:27	Temperature: 13.1°C; Rainfall: 0mm; Wind speed: 2.2kts; Wind direction: SW
33	12/08/2024	20:33:22	06:34:35	10:01:13	Temperature: 18.4°C; Rainfall: 0.1mm; Wind speed: 9.1kts; Wind direction: SSE
34	13/08/2024	20:31:18	06:36:18	10:05:00	Temperature: 16.4°C; Rainfall: 0.7mm; Wind speed: 11.3kts; Wind direction: S
35	14/08/2024	20:29:15	06:38:01	10:08:46	Temperature: 11.2°C; Rainfall: 0mm; Wind speed: 2.9kts; Wind direction: WSW
36	15/08/2024	20:27:05	06:39:44	10:12:39	Temperature: 16.7°C; Rainfall: 2.1mm; Wind speed: 10.7kts; Wind direction: S
37	16/08/2024	20:24:57	06:41:27	10:16:30	Temperature: 11.6°C; Rainfall:0mm; Wind speed: 5kts; Wind direction: SSE
38	17/08/2024	20:22:48	06:43:11	10:20:23	Temperature: 13.8°C; Rainfall: 0mm; Wind speed: 5.6kts; Wind direction: SW
39	18/08/2024	20:20:37	06:44:54	10:24:17	Temperature: 12.9°C; Rainfall:0mm; Wind speed: 6.2kts; Wind direction: SSW
40	19/08/2024	20:18:26	06:46:37	10:28:11	Temperature: 12.5°C; Rainfall: 0mm; Wind speed: 3.4kts; Wind direction: S

Survey Night	Date	Start Time	End[31] Time	Duration	Weather Conditions[32]
41	20/08/2024	20:16:14	06:48:21	10:32:07	Temperature: 13.3°C; Rainfall: 1.3mm; Wind speed: 7.1kts; Wind direction: S
42	21/08/2024	20:14:00	06:50:04	10:36:04	Temperature: 11.5°C; Rainfall: 0.1mm; Wind speed: 8.4kts; Wind direction: SW
43	22/08/2024	20:11:46	06:51:48	10:40:02	Temperature: 15.8°C; Rainfall: 0.8mm; Windspeed: 13.8kts; Wind direction: SSW
44	23/08/2024	20:09:31	06:53:31	10:44:00	Temperature: 12.5°C; Rainfall: 11.2mm; Wind speed: 10.3kts; Wind direction: SSW
45	24/08/2024	20:07:15	06:55:15	10:48:00	Temperature: 11.4°C; Rainfall: 2.5mm; Winds peed: 5.8kts; Wind direction: S
46	25/08/2024	20:04:58	06:56:58	10:52:00	Temperature: 10.4°C; Rainfall: 0.1mm; Wind speed: 6.5kts; Wind direction: SSW
47	26/08/2024	20:02:41	06:58:41	10:56:00	Temperature: 13.8°C; Rainfall: 0mm; Wind speed: 8kts; Wind direction: SSW
48	27/08/2024	20:00:23	07:00:25	11:00:02	Temperature: 16.5°C; Rainfall: 6.8mm; Wind speed: 14.8kts; Wind direction: S
49	28/08/2024	19:58:04	07:02:08	11:04:04	Temperature: 14.8°C; Rainfall: 0.1mm; Wind speed: 8.3kts; Wind direction: S
50	29/08/2024	19:55:44	07:03:51	11:08:07	Temperature: 12.4°C; Rainfall: 0mm; Wind speed: 7.3kts; Wind direction: SW

Table 0-4 - Survey effort and weather conditions

Date	Start Time	End Time	Duration (hours)	Weather Conditions
30/05/2023	08:15	10:02	01:47	Temp: 11-15°C; Cloud cover: 0 oktas; Rainfall: light drizzle; Wind: Beaufort 1, West; Visibility: Excellent
27/06/2023	07:15	08:45	01:50	Temp: 11-15°C; Cloud cover: 6 oktas; Rainfall: dry; Wind: Beaufort 1, West; Visibility: Excellent
17/07/2023	07:35	09:30	01:55	Temp: 11-15°C; Cloud cover: 0 oktas; Rainfall: dry; Wind: Beaufort 1, West; Visibility: Excellent
27/07/2023	07:15	09:45	02:30	Temp: 11-15°C; Cloud cover: 8 oktas; Rainfall: light drizzle; Wind: Beaufort 2, West-Northwest; Visibility: Good

Appendix 4C

Baseline Ecological Conditions

Table 0-1 - Protected and Notable Bird Species Identified within the Desk Study

Common Name	Scientific Name	Designation and/or Conservation Status
Kingfisher	*Alcedo atthis*	Birds Directive: Annex I BoCCI: Amber
Whooper Swan	*Cygnus cygnus*	Birds Directive: Annex I BoCCI: Amber
Eurasian Teal	*Anas crecca*	Birds Directive: Annex II/III BoCCI: Amber
Pheasant	*Phasianus colchicus*	Birds Directive: Annex II/III[33]
Swallow	*Hirundo rustica*	BoCCI: Amber
Linnet	*Carduelis cannabina*	BoCCI: Amber
Starling	*Sturnus vulgaris*	BoCCI: Amber
Tree Sparrow	*Passer montanus*	BoCCI: Amber
Greenfinch	*Carduelis chloris*	BoCCI: Amber
Goldcrest	*Regulus regulus*	BoCCI: Amber
House Martin	*Delichon urbicum*	BoCCI: Amber
House Sparrow	*Passer domesticus*	BoCCI: Amber
Mallard	*Anas platyrhynchos*	BoCCI: Amber
Sand Martin	*Riparia riparia*	BoCCI: Amber
Sky Lark	*Alauda arvensis*	BoCCI: Amber
Willow Warbler	*Phylloscopus trochilus*	BoCCI: Amber
Grey Wagtail	*Motacilla cinerea*	BoCCI: Red
Meadow Pipit	*Anthus pratensis*	BoCCI: Red
Lapwing	*Vanellus vanellus*	BoCCI: Red

[33] *Pheasant does not fulfil 'notable' criteria*[Error! Bookmark not defined.] *but is retained for visibility as it is a ground-nesting species (relevant in this case because it is proposed to remove grassland as part of the Proposed Project).*

Common Name	Scientific Name	Designation and/or Conservation Status
Redwing	*Turdus iliacus*	BoCCI: Red
Stock Dove	*Columba oenas*	BoCCI: Red
Yellowhammer	*Emberiza citrinella*	BoCCI: Red

Table 0-2 - Desk Study – Notable Invertebrates

Common Name	Scientific Name	Record Count	Designation and/or Conservation Status
Freshwater white-clawed crayfish	*Austropotamobius pallipes*	12	Habitats Directive: Annex II/V Protected species: WA
Marsh fritillary	*Euphydryas aurina*	4	Habitats Directive: Annex II
Small heath	*Coenonympha pamphilus*	4	Irish Red List: Near Threatened (Regan, et al., 2010)
Buffish Mining Bee	*Andrena nigroaenea*	1	Irish Red List: Vulnerable (Regan, et al., 2010)
Gooden's Nomad Bee	*Nomada goodeniana*	1	Irish Red List: Endangered (Regan, et al., 2010)
Large red tailed bumble bee	*Bombus (Melanobombus) lapidarius*	8	Irish Red List: Near threatened (Regan, et al., 2010)
Patchwork Leafcutter Bee	*Megachile centuncularis*	2	Irish Red List: Near Threatened (Regan, et al., 2010)
Moss Carder Bee	*Bombus muscorum*	1	Irish Red List: Near Threatened (Regan, et al., 2010)

Table 0-3 - Desk Study – Other Notable Terrestrial Mammal Species

Common name	Scientific Name	Record Count	Designation and/or Conservation Status
Brown rat	*Rattus norvegicus*	1	Invasive Species: Regulation S.I. 477

Common name	Scientific Name	Record Count	Designation and/or Conservation Status
Grey Squirrel	*Sciurus carolinensis*	2	Invasive Species: Regulation S.I. 477
Badger	*Meles meles*	19	Protected species: WA
Red squirrel	*Sciurus vulgaris*	7	Protected species: WA
Otter	*Lutra lutra*	1	Protected species: WA
Irish hare	*Lepus timidus subsp. Hibernicus*	2	Protected species: WA
Pine marten	*Martes martes*	9	Protected species: WA
European hedgehog	*Erinaceus europaeus*	3	Protected species: WA

Table 0-4 - Amphibian Survey - Habitat Suitability

Date	Habitat Type	Habitat Description	Area (ha)
23/02/2024	Pond	Large area of pooled water on track. Some old and unfertilised frogspawn	0.00957004
23/02/2024	Pond	Shaded by some small willows, sloping banks, no positive ID however suitable for breeding common frog.	0.00189652
23/02/2024	Pond	Shaded by willow, sloped banks, no positive ID however, suitable for breeding common frog.	0.00197301
23/02/2024	Puddle on track	Puddle on track with lots of aquatic veg, some broad leaves, checked for eggs on these however, no positive ID. Puddle suitable for breeding smooth newts and common frogs.	0.00236172
23/02/2024	Pond	Large area on track with aquatic vegetation. Suitable for breeding smooth newts and common frogs.	0.00697368
23/02/2024	Pond	Located partially on track. Suitable for breeding common frogs.	0.00500949

Date	Habitat Type	Habitat Description	Area (ha)
23/02/2024	Puddle on track	Puddle approximately 3.5m wide. Compacted gravel substrate with floating aquatic algae/moss and suitability for breeding smooth newts and common frogs.	0.00407858
23/02/2024	Puddle on track	Puddle on gravel track with emergent grasses and rushes. depth 0.3m. Suitability for breeding smooth newts and common frogs.	0.00274944
23/02/2024	Puddle on track	Compacted gravel substrate, submerging and emergent grasses, herbs and moss. Approx 20cm deep. Suitable for breeding smooth newts and common frogs.	0.00434162
23/02/2024	Small pond/puddle	Two small ponds/puddles located within an area of grassland off track. Suitable for breeding common frog.	0.0005524
23/02/2024	Puddle on track	Puddle approximately 0.5m deep with frog spawn present and gravel substrate. Vegetation including green algae and emergent rushes and grasses present. Suitable for breeding smooth newt and common frog.	0.02539799
23/02/2024	Puddle on track	Puddle approximately 3m long and 1.5m wide, 10cm deep with a gravel substrate. Suitable for breeding common frog.	0.00139374
23/02/2024	Pond	Located on track with aquatic vegetation present and gravel substrate. Suitable for breeding smooth newt and common frog.	0.00628337
23/02/2024	Puddle track	Small puddle on track with a gravel substrate. Approximately 1x1.5m with emergent grasses and herbs. No evidence of amphibians however, suitability for breeding smooth newt and common frog	0.00039741
23/02/2024	Pond	Pond located off track with aquatic vegetation including grasses and sedges such as curly dock *Rumex crispus*.	0.00650204

Date	Habitat Type	Habitat Description	Area (ha)
		Suitability for breeding smooth newt and common frog.	
23/02/2024	Puddle on track	Approximately puddle 1 x 1 m on track with a gravel substrate. Shallow 3in deep with no vegetation or evidence of amphibians. Suitability for breeding common frog.	0.00035817

Table 0-5 - Amphibian Survey Point Data

Date	Visit	Species	Life Stage	Description	Habitat Type	X	Y
23/02/2024	1	Common Frog	Spawn	clump of approximately 150 viable frog spawn	Puddle	663365.5002	713155.5545
23/02/2024	1	Common Frog	Spawn	clump of approximately 300 viable frog spawn	Puddle	663428.0078	713107.6008
08/03/2024	2	Common Frog	Spawn	unfertilised frog spawn	Puddle	663323.0089	713095.519
08/03/2024	2	Common Frog	Spawn	tadpoles forming in older spawn	Puddle	663363.1893	713153.2982
08/03/2024	2	Common Frog	Tadpole	tadpoles observed within frog eggs. same location as visit one	Puddle	663425.9508	713106.7485

Table 0-6 - Complete Species List from the 2023 Breeding Bird Surveys at Ballykelly

Species common name	Scientific name	Conservation Status (BoCCI 4)
Blackbird	*Turdus merula*	Green
Blackcap	*Sylvia atricapilla*	Green
Blue tit	*Cyanistes caeruleus*	Green

Species common name	Scientific name	Conservation Status (BoCCI 4)
Chaffinch	*Fringilla coelebs*	Green
Chiffchaff	*Phylloscopus collybita*	Green
Collared dove	*Streptopelia decaocto*	Green
Dunnock	*Prunella modularis*	Green
Goldcrest	*Regulus regulus*	Green
Grey wagtail	*Motacilla cinerea*	Red
Goldfinch	*Carduelis carduelis*	Green
Greenfinch	*Carduelis Chloris*	Amber
Great tit	*Parus major*	Green
Grey heron	*Arda cinerea*	Green
House martin	*Delichon urbica*	Green
Jackdaw	*Corvus monedula*	Green
Kestrel	*Falco tinnunculus*	Annex 1, Red
Linnet	*Linaria cannabina*	Amber
Magpie	*Pica pica*	Green
Moorhen	*Gallinula chloropus*	Green
Meadow pipit	*Anthus pratensis*	Red
robin	*Erithacus rubecula*	Green
Reed bunting	*Emberiza schoeniclus*	Green
Raven	*Corvus corax*	Green
Rook	*Corvus frugilegus*	Green
Spotted flycatcher	*Muscicapa striata*	Amber
Starling	*Sturnus vulgaris*	Amber
Swift	*Apus apus*	Red

Species common name	Scientific name	Conservation Status (BoCCI 4)
Swallow	*Hirundo rustica*	Amber
Sand martin	*Riparia riparia*	Amber
Whinchat	*Saxicola rubetra*	Red
Whitethroat	*Curruca communis*	Green
Woodpigeon	*Columba palumbus*	Green
Wren	*Troglodytes aedon*	Green
Willow warbler	*Phylloscopus trochilus*	Amber
Yellowhammer	*Emberiza citrinella*	Red