4

ECOLOGY AND BIODIVERSITY

4 ECOLOGY AND BIODIVERSITY

4.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) presents an assessment of the potential effects that may occur on ecological receptors as a result of proposed activities at the existing quarry site at Athgarrett, Philipstown and Redbog, Co. Kildare ('the Site'). This assessment characterises the (current) pre-extension baseline conditions and gives consideration to the potential effects of extension and restoration on ecological receptors.

4.1.1 PROJECT BACKGROUND AND OVERVIEW

The Site is located within an area of historical quarrying. The Site is accessed via a privately-owned track connecting to the N81 national road. The town of Blessington is located ca. 1.8 km south of the Site along the N81. The undulating land surrounding the Site slopes upwards in a north-westerly direction to the north of the Site, and away in a south-easterly direction to the south. The southern boundary of the Site lies adjacent to the Kildare-Wicklow County border. The quarry is accessed via Danker Lane through lands owned by the Applicant in Co. Wicklow. The Co. Wicklow land is accessed via the N81 National Secondary Road (Figure 4-1).

The quarry at the Site has been in use since the early 1950s and has been registered with Section 261, Planning & Development Act 2000 (Quarry Ref. No. QR42) and subsequent planning permission for continuance of quarrying operations was granted under Planning Reg. Ref. 07/267.

A detailed description of the Site and the activities that are proposed ('the Proposed Development') can be found in Chapter 2 of this EIAR (Project Description).

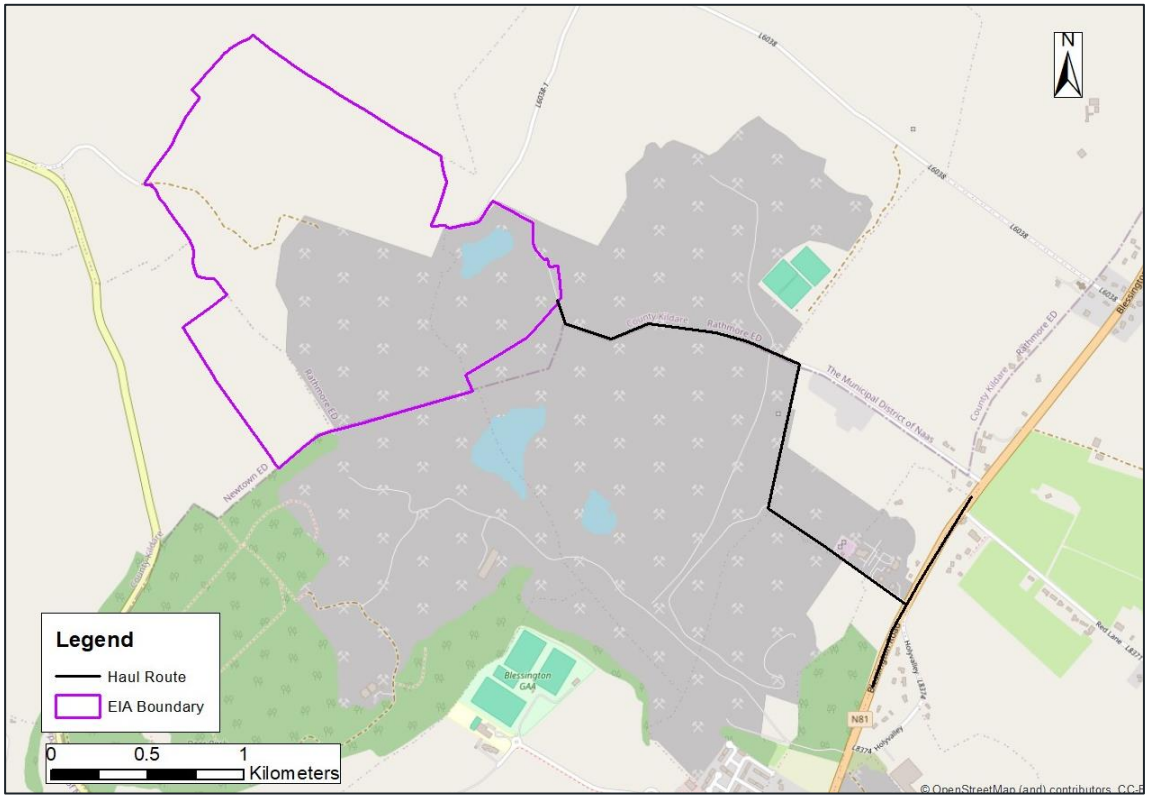

Figure 4-1 - EIA Boundary and Haul Route to the Site

4.1.1.1 Substitute Consent and Section 37L Applications

It should be noted that an rEIAR has been submitted separately to accompany an application for substitute consent under the Planning and Development Act 2000 as amended (hereafter 'PDA'), for unauthorised works at the existing quarry, by the same applicant.

This EIAR accompanies an application under Section 37L (S.37L) of the PDA, and is submitted in tandem with the substitute consent application.

4.1.2 TECHNICAL SCOPE

The focus of this assessment is centred on the establishment of current baseline ecological conditions (flora, fauna and habitat composition). This enables an assessment of potential impacts attributed to land take, disturbance and environmental emissions that may occur as a result of the Proposed Development.

4.1.3 GEOGRAPHICAL AND TEMPORAL SCOPE

The further development of the quarry is proposed over areas directly adjacent to the main operational lands already excavated as well as within the existing quarry for the purpose of recovering the economic reserve that remains in the void. The geographical study area for the assessment covers the EIA boundary, which is approximately 95.8 ha. For certain aspects of the ecology and biodiversity assessment effects may extend beyond the EIA boundary and these have been documented where appropriate. In the context of this rEIAR, this EIA boundary contains lands which form the existing quarry area and some areas which extend beyond the working areas. The EIA boundary encompasses the Section 37L application boundary (approximately 64.0 ha).

Under this programme, it is expected that the duration of the proposed extraction operations will be 13 to 15 years depending on market conditions. The restoration phase of the Proposed Development will last between 2 to 3 years. The duration of is therefore classified as 'medium-term' by the Environmental Protection Agency's (EPA) 2022 'Guidelines on the information to be contained in environmental impact assessment reports'.

4.2 LEGISLATIVE AND POLICY CONTEXT

The assessment of the likely impacts from the Proposed Development on ecological resources is in compliance with the following legislation and guidance:

4.2.1 LEGISLATION

- 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 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (hereafter referred to as EU Habitats Directive 92/43/EEC;
- 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 EU Birds Directive (2009/147/EC));
- 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 WA); and
- S.I. No. 356/2015 - Flora (Protection) Order, 2022.

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);
- County Kildare Biodiversity Plan 2009-2014;
- All Ireland Pollinator Plan 2015 – 2020; and
- County Kildare Heritage Plan 2019-2025

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 (2022) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.
- DAFM (2022). Nitrates Explanatory Handbook. Department of Agriculture, Food and the Marine.
- 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 Road Authority (2006) (NRA) Guidelines for the treatment of badgers prior to the construction of national road schemes.
- NatureScot standing advice for planning consultations: Red Squirrel. Available at: https://www.nature.scot/doc/standing-advice-planning-consultations-red-squirrels
- NatureScot standing advice for planning consultations: Pine Marten. Available at: https://www.nature.scot/doc/standing-advice-planning-consultations-pine-martens
- 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. Available at: https://www.tii.ie/technical-services/environment/planning/Guidelines-for-Assessment-of-Ecological-Impacts-of-National-Road-Schemes.pdf
- 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. Species Assessments (Volume 3). Version 1.0. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- NPWS (2024). Conservation Objectives and Site Synopses of SACs, SPAs, NHAs and pNHAs. Available at: https://www.npws.ie/protected-sites
- OPR Practice Note PN01 (2021) Appropriate Assessment Screening for Development Management. Office of the Planning Regulator.
- Smith, G. F., O'Donoghue, P., O'Hara, K., Delaney, E. (2011). Best Practice and Guidance for Habitat Surveying and Mapping. Heritage Council.
- SNH (2016) Assessing connectivity with Special Protection Areas (SPAs). Version 3 - June 2016.

4.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

The approach to this impact assessment comprises analysis of reports submitted with the 2020 planning application[1], environmental emissions monitoring results from the site, as well as data gathered in 2023 for this Section 37L application. Conclusions are drawn as to whether (and to what extent) site conditions are likely to change as a result of the Proposed Development, and whether these changes represent significant ecological impacts.

4.3.1 DESK STUDY

A review of freely available online data from the National Parks and Wildlife Services (NPWS) and of freely available data sets from the National Biodiversity Data Centre (NBDC) was undertaken in December 2023. A review of rare higher plants was undertaken from the National Biodiversity Data Centre (NBDC). The NPWS viewer for Flora Protection Order (FPO) (2022) protected bryophytes[2] was also reviewed. The aim of the review was to identify designated sites/protected areas, irreplaceable/priority[3] habitats and legally protected and notable[4] species that may be present within the Proposed Development's Ecological Zone of Influence (EZoI)[5], including:

- European sites such as SACs, SPAs, and international Ramsar sites; within 15 km of the Proposed Development. This was extended to 20 km for SPAs based on the upper-range commuting distance of pink-footed and greylag geese (outlined in Scottish Natural Heritage (SNH), 2016);

[1] Golder (2020) – EIAR and NIS

[2] https://www.npws.ie/maps-and-data/flora-protection-order-map-viewer-bryophytes

[3] Habitats that are considered irreplaceable or listed under Annex I on EU Habitats Directive 92/43/EEC.

[4] 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

[5] The CIEEM EcIA Guidelines define the EZoI as the area over which important ecological features may be subject to significant effects resulting from the Proposed Development; this may extend beyond the footprint of the Proposed Development. The EZoI may vary for each ecological feature due to the varying mobility range of the feature being assessed. For example, the EZoI for otter (which are mobile) will be greater than the EZoI for habitats (which are sedentary). The EZoI in the context of this project refers to the Survey Area (described in Section 6.1.9), as well as the areas searched during the desk study.

- Natural Heritage Areas (NHAs)[6] and proposed NHAs (pNHAs) within 5 km of the Proposed Development, unless hydrological connectivity exists, in which case these would be considered up to a distance of 15 km.
- Protected or notable species within 5 km of the Proposed Development, limited to records returned from within the last 20 years.
- Bird species listed in Annex I of the EU Birds Directive, and those currently on the Red and Amber list as per Birds of Conservation Concern in Ireland (BoCCI) (Gilbert, et al., 2021); and
- The Irish Wetland Bird Survey (I-WeBS) dataset[7] was reviewed to identify I-WeBS survey sites within 2 km of the Proposed Development.

In addition to the resources above, the desk study made use of free online resources to assess the context of the land associated with the Proposed Development (all accessed November and December 2023):

- Bing maps (https://www.bing.com/maps/);
- Google Earth;
- EPA maps (https://gis.epa.ie/EPAMaps/);
- 2019 Article 17 Spatial Data (https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17/2019); and
- Review of any other relevant ecological reports and literature – cited as necessary.

The freely available desk study results should not be considered definitive data sets for the desk study area. An absence of desk study data does not necessarily correspond that a site is absent of notable flora or fauna.

4.3.1.1 Site Boundaries

As mentioned in the Introduction to this chapter, the Site is subject to a concurrent substitute consent application and this Section 37L application, which have different spatial extents. In the interest of efficiency, WSP has combined both boundaries to create a consolidated 'EIA boundary', which is the basis of the impact assessment (see Figure 4-1). Distances between the Site and offsite ecological receptors are measured from the EIA boundary.

4.3.2 FIELD SURVEYS – 2019/2020

Field surveys were conducted in 2019 and 2020 by O'Donnell Environmental, and Delichon Ecology in the case of hedgerow surveys specifically. Methodologies are provided below for each ecological receptor, as described in the 2020 EIAR (Golder, 2020).

[6] Per the NPWS, the NHA is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection.

[7] Irish Wetland Bird Survey (2023) Available at: https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey.

4.3.2.1 Habitats

A walkover survey of the area was conducted by Golder on 13 August 2019 to record the habitats and flora in the area within and adjacent to the Proposed Development site, and to detect the presence or likely presence of protected species, and the presence of suitable habitat for those species. The study was also concerned with identifying the need for further, more specialist surveys as applicable.

Ecological survey methods were in accordance with those outlined in the following documents:

- Heritage Council (2011). Best Practice Guidance for Habitat Survey and Mapping;
- Phase 1 Habitat Survey methodology (JNCC, 2010)[8]; and
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009).

Aerial photographs and site maps assisted the habitat survey. Habitats have been named and described following Fossitt (2000). The survey also aimed to identify any invasive species which may occur on the Site.

4.3.2.2 Hedgerow Survey

On behalf of Golder, Delichon Ecology carried out a site walkover survey on the morning and afternoon of Thursday 10 September 2020. The survey identified linear woodland habitats (i.e. treelines and hedgerows) within the proposed extension areas located to the north, west and south-west of the existing quarry footprint. Survey methodology was undertaken in accordance with the guidelines and parameters outlined in Hedgerow Appraisal System Best Practise Guidance on Hedgerow Surveying, Data Collation and Appraisal (Foulkes, et al., 2013). This allowed for a detailed and systematic assessment of each hedgerow and treeline within the extension boundary following fixed assessment criteria based on hedgerow management, growth form, integrity, structure and adjacent land use.

4.3.2.3 Fauna

Bats

Bat survey work at the Site was based upon guidance set out within '*Bat Mitigation Guidelines for Ireland'* (Kelleher & Marnell, 2006), and 'Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes' (NRA, 2006), with reference to good practice guidelines set out by the Bat Conservation Trust (Collins, 2016).

Visual examination

Visual inspections for bat roosting potential were carried out on 13 August 2019 in order to search for any features of bat roosting potential in trees. Inspections were carried out within daylight hours, using binoculars where necessary. Examples of the type of features searched for is outlined below:

[8] Joint Nature Conservation Committee

- Split limbs; rot holes; Lifted bark; cracks; and dense or mature ivy cover. Where trees were of a size and age that features could be present out of sight, these were also recorded; and
- Evidence for the presence of bats themselves was also searched for, such as live or dead bats, any audio cues, scratch marks, urine staining, prey remains or droppings.

Badger Survey

To supplement the general protected species walkover, targeted badger (*Meles meles*) surveys were also undertaken at a sett on the periphery of the Proposed Development site. The badger sett was inspected by O'Donnell Environmental on behalf of Golder on 19 August; 27 August and 7 September 2020. In addition, a camera trap was deployed at the sett location and recording was carried out for 23 days from 19 August to 10 September 2020. The camera was infra-red equipped to allow monitoring of activity by night as well as by day. The camera was triggered by movement, at which point a photo and 5 second video were recorded. The aim of the camera trap survey was to determine whether, and to what extent badgers were utilising the sett.

Breeding Bird Survey

Due to Covid-19 restrictions, appropriate surveys were not conducted prior to the submission of the 2020 planning application.

4.3.3 FIELD SURVEYS - 2023

A survey of the Site was carried out on 14 and 15 November 2023. The survey comprised a multi-disciplinary site walkover, with a view to updating baseline data since the previous surveys in August 2019 and August 2020. The survey area included the existing quarry pit, as well as surrounding lands within the EIA boundary as shown in Error! Reference source not found.. The survey area i ncluded a 50m buffer[9] to account for the potential presence of badger setts outside the EIA boundary.

The scope of the surveys included:

- Habitats – in accordance with guidance by Smith *et al.* (2011) and Fossitt (2000), but with a focus on comparing the habitat assemblage with that reported in the 2020 EIAR (Golder, 2020).
- Protected species:
  - Badger – in accordance with NRA (2009). A search was made for signs of badger activity, which included looking for evidence such as sett holes, footprints, latrines, dung pits, hairs and mammal paths with evidence of use by badgers.
  - Bats – potential bat roost assessment (PBRA) of trees in accordance with Collins (2023) and Marnell *et al.* (2022) – methodology as described earlier for 2019 surveys.
    - Potential roost features (PRFs) were classified in accordance with Collins (2023):
    - **PRF-I** – PRF is only suitable for individual bats or very small numbers of bats, either due to size or lack of suitable surrounding habitats.

[9] In accordance with guidance (NRA, 2006) recommending surveys within 50m of any proposed works.

- **PRF-M** – PRF is suitable for multiple bats and may therefore be used by a maternity colony.

- Other species – hedgehog, Irish hare, pygmy shrew and herpetofauna – incidental observations were recorded of any evidence of these species, with guidance from Olsen (2013).

- Birds – incidental observations of wintering birds were made – particularly any in association with waterbodies, or any waterfowl grazing on grassland.
- The suitability of habitats for the above-mentioned protected species was also assessed.

Field surveys and reporting was carried out by WSP ecologists Steven Tooher ACIEEM (Principal Ecologist) and Lisa O'Dowd (Consultant Ecologist), who have 8 and 3 years' experience respectively of habitat and protected species survey assessments. Both surveyors are at least 'capable'[10] in accordance with CIEEM's competency framework.

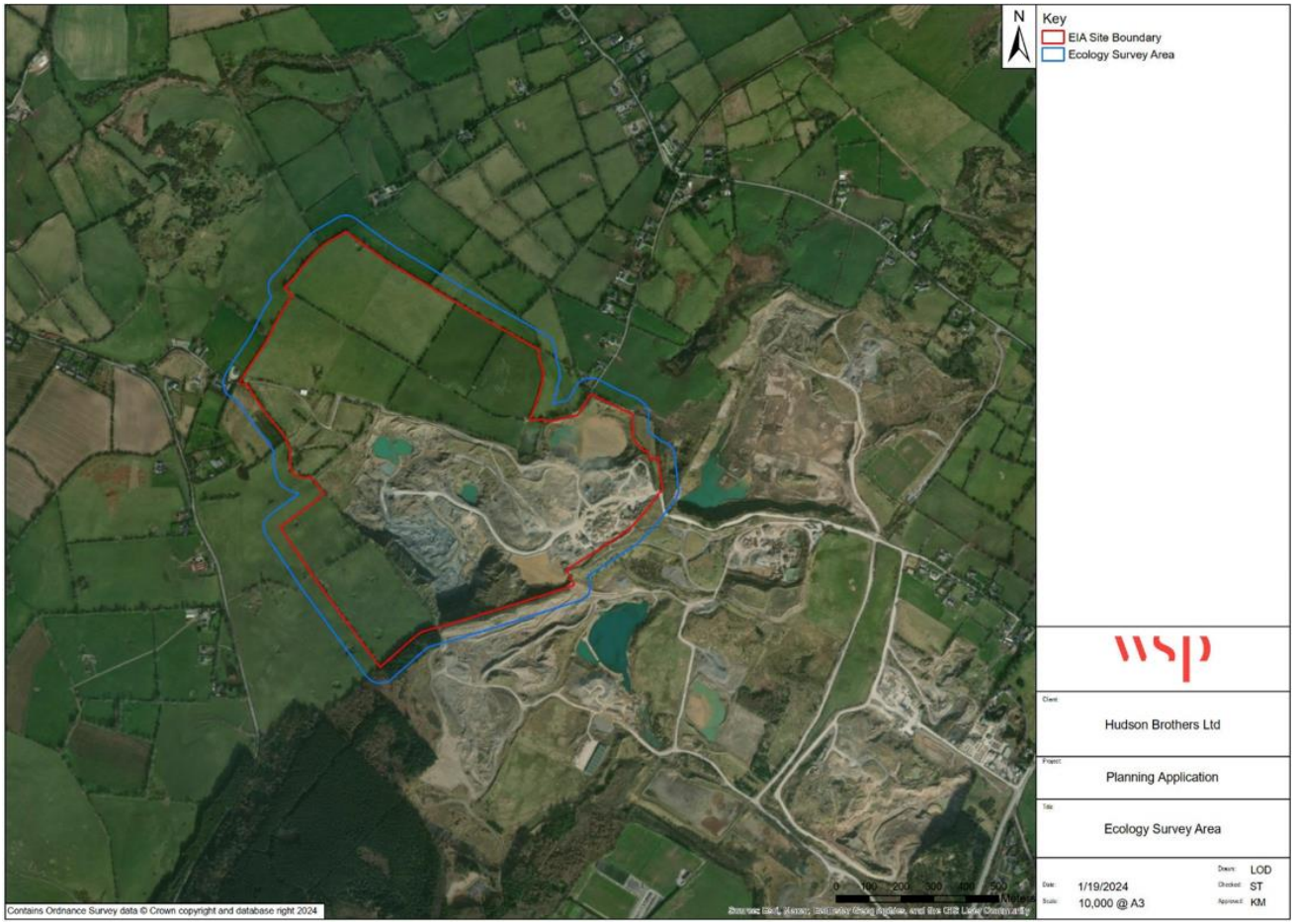

Figure 4-2 - Ecology Survey Area

[10] Using CIEEM's competency level framework (Available at cieem.net/wp-content/uploads/2022/01/Competency-Framework-2022-Web.pdf) a surveyor deemed as capable has the knowledge and experience to carry out standard relevant tasks confidently and consistently without supervision.

Aquatic Ecology

The assessment considers the potential for hydrological connectivity between the Site and surface water features, and also considered potential impacts to aquatic flora/fauna and habitat receptors. It is important to note that no watercourses cross the Site, and apart from silt lagoons associated with the operations of the quarry, there are no proposals to interfere with any open waterbodies.

4.3.4 INVASIVE SPECIES

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. In terms of invasive flora, the Regulations make it an offence to plant, disperse, allow or cause to disperse, spread or otherwise cause to grow any of the scheduled plant species. In terms of fauna, the Regulations make it an offence for a person to breed, reproduce or release, allow or cause to disperse, or escape from confinement, any of the scheduled animal species.

4.3.5 SURVEY LIMITATIONS

Details on survey limitations are provided in Section 4.4.6. Limitations are discussed after the results, because their significance is related to the existing conditions onsite, which are described in the results section.

4.3.6 BASELINE EVALUATION CRITERIA OF ECOLOGICAL FEATURES

Ecological features are evaluated following NRA (2009) guidelines (Table 4-1) which set out the importance of the resource/receptor in a geographic site-based context.

Table 4-1– Criteria for Establishing Important Ecological Features (IEFs)

Importance	Ecological Valuation
International Importance	▪ European Site including SAC, Site of Community Importance (SCI) or SPA ▪ Features essential to maintaining the coherence of the European Network[11]. Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. Resident or regularly occurring populations (assessed to be important at the national level)[12] 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.

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

[12] It is suggested that, in general, 1% of the national 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.

Importance	Ecological Valuation
	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).[13]
National Importance	Site designated or proposed as a Natural Heritage Area (NHA). Statutory Nature Reserve. Refuge for Fauna and Flora protected under the Wildlife Acts. National Park. Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA). Resident or regularly occurring populations (assessed to be important at the national level)[14] of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Site containing 'viable areas'[15] of the habitat types listed in Annex I of the Habitats Directive.
County Importance	Area subject to a Tree Preservation Order. Area of High Amenity[16], or equivalent, designated under the County Development Plan.

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

[14] 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.

[15] 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)

[16] 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.

Importance	Ecological Valuation
	Resident or regularly occurring populations (assessed to be important at the County level)[17] of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, if this has been prepared. Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (Higher Value)	Locally important populations of priority species or habitats or natural heritage features identified in the Local Biodiversity Action Plan (LBAP) if this has been prepared. Resident or regularly occurring populations (assessed to be important at the Local level)[18] of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Sites containing semi-natural habitat types with 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 links and ecological corridors between features of higher ecological vale.

[17] 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.

[18] 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.

Importance	Ecological Valuation
Local Importance (Lower Value)	Sites containing small areas of semi-natural habitat that are of some local importance for wildlife. Sites or features containing non-native species that are of some importance in maintaining habitat links.

In accordance with NRA (2009) 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.

4.3.7 IMPACT ASSESSMENT

The potential for impacts on IEFs has been assessed considering the habitats and species that are likely to be affected by the Proposed Development.

CIEEM (2022) defines an ecologically **Significant Impact** as an impact (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographic area. The integrity of a site is the coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats, and/or the levels of population of the species for which it was classified.

The following parameters in Table 4-2 are described when characterising impacts (following CIEEM (2022) and NRA (2009) guidance):

Table 4-2 - Methods of Characterising Impacts

Impact	Description
Direct and Indirect	An impact can be caused either as a direct or as an indirect consequence of a Development.
Magnitude	A measurement of the size of an impact, which is described as high, medium, low or negligible.
Extent	The area over which the impact occurs.
Duration	The time for which the impact is expected to last prior to recovery or replacement of the resource or feature: ▪ Temporary: Up to 1 year. ▪ Short Term: The effects would take 1-7 years to be mitigated. ▪ Medium Term: The effects would take 7-15 years to be mitigated. ▪ Long Term: The effects would take15-60 years to be mitigated. ▪ Permanent: The effects would take 60+ years to be mitigated.
Likelihood	▪ Certain/Near Certain: >95% chance as occurring as predicted. ▪ Likely: 50-95% chance as occurring as predicted. ▪ Unlikely: 5-50% chance as occurring as predicted. ▪ Extremely Unlikely: <5% chance as occurring as predicted.

4.3.8 MITIGATION

The approach to mitigation is as set out in the mitigation hierarchy (as per CIEEM (2022)), reproduced in Table 4-3. 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 should be included regardless of whether avoidance, mitigation or compensation is necessary.

4.3.8.1 Biodiversity Enhancement – Recent Policy

Kildare County Development Plan 2023-2029 (Chapter 12) has introduced a new objective (BI O7) to "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 biodiversity enhancement (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.

Table 4-3 – 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 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.

4.4 BASELINE CONDITIONS

Designated and Notable conservation sites Table 4-4 lists eight European sites of nature conservation importance located within the 20 km EZoI of the Proposed Development. For European sites a Natura Impact Statement (NIS) accompanies this Section 37L application. Figure 4-3 shows the proximity of designated sites to the Proposed Development.

4.4.1 There are no NHAs located within 5 km of the Proposed Development, with the closest being Hodgestown Bog NHA, located approximately 20.2 km north-west of the site.

4.4.2 Table 6.2 also lists three pNHAs within 5 km of the Proposed Development. Two of these, Red Bog, Kildare pNHA and Poulaphouca Reservoir pNHA are the nearest pNHAs to the Site. Given that these pNHAs are designated as European sites, which carry a higher level of protection, the impact

assessment for these sites is covered separately within the NIS which accompanies this application. Information and conclusions from the NIS are summarised where appropriate.

Table 4-4 – Designated and Notable Sites within the EZoI of the Proposed Development

Site Name and Code	Distance from Proposed Development	Connectivity	Qualifying Interests [Habitats/Birds Directive Code, where applicable]
Red Bog, Kildare SAC (000397) Red Bog, Kildare pNHA (000397)	SAC boundary[19] adjacent to EIA Boundary and 37L Boundary, but separated by a local (L) road.	Per Geological Survey Ireland (GSI) Spatial Resources[20], the Site and this SAC are situated within the same groundwater body (European Code: IE_EA_G_085). According to GSI, Red Bog SAC is a Groundwater-Dependent Terrestrial Ecosystem (GWDTE) within this groundwater body. However, Chapter 7 clarifies that the water associated with this SAC is perched, and not connected with the above groundwater body. Chapter 7 also shows that groundwater flows southwest from beneath the SAC, and leaves the quarry in a north-westerly direction. Furthermore, evidence is provided to show that the Proposed Development has not excavated below the groundwater table. As such, it is concluded that there is **no groundwater connectivity.** The SAC boundary is more than 100 m from the nearest source of dust emissions, which according to IAQM[21] (2016) is outside the range in which significant impacts are likely to occur. The haul road in question is separated from the SAC by an earthen berm. Further detail on the likely impacts of dust emissions from the Site on this SAC are discussed later in the report. At this stage it is concluded that there is **potential connectivity for dust emissions**	▪ Transition Mires [7140]

[19] It should be noted that the SAC boundary surrounds the main area of qualifying habitat (transition mire), as well as up to 240 m of peripheral improved agricultural grassland.

[20] https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228 (accessed 21 November 2023)

[21] Institute of Air Quality Management

Site Name and Code	Distance from Proposed Development	Connectivity	Qualifying Interests [Habitats/Birds Directive Code, where applicable]
Poulaphouca Reservoir SPA (004063) Poulaphouca Reservoir pNHA (000731)	2.2 km south-east	**No hydrological connectivity.** The qualifying species of this SPA are primarily associated with large bodies of water, which are present onsite in the form of (albeit small) settlement lagoons. The magnitude of disturbance associated with the activities at the Site is such that the lagoons are completely devoid of vegetation and do not provide a foraging resource for waterfowl (see Section 4.3.3). Greylag goose is known to occasionally forage away from water on agricultural grassland, which is present at the Site around the periphery of the existing quarry pit. According to the Bird Foraging Table, prepared by the Department of Agriculture, Food and the Marine (DAFM, 2019), projects more than 1 km from an SPA may be screened out for impacts on foraging lesser black-backed gulls, on the grounds that it is further than its established core foraging range. The core foraging range for greylag geese is accepted as being 20 km (SNH, 2016). Given that the Proposed Development is within the core foraging range of greylag geese, and given the presence of suitable foraging habitat on adjacent lands, **there is functional connectivity** with this SPA. There is no functional connectivity for lesser black-backed gull.	▪ Greylag Goose [A043] ▪ Lesser Black-backed Gull *Larus fuscus* [A183]
Kilteel Wood pNHA (1394)	4.5 km north	**No hydrological connectivity.** The site is proposed as a NHA for the woodland habitat that is present onsite. there is therefore **no functional connectivity** with the Proposed Development.	▪ Deciduous woodland
Wicklow Mountains SAC (002122)	4.7 km south-east	**No hydrological connectivity.** This SAC is designated for habitats only; there is therefore **no functional connectivity** with the Proposed Development.	▪ Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] ▪ Natural dystrophic lakes and ponds [3160] ▪ Northern Atlantic wet heaths with *Erica tetralix* [4010] ▪ European dry heaths [4030]

Site Name and Code	Distance from Proposed Development	Connectivity	Qualifying Interests [Habitats/Birds Directive Code, where applicable]
			▪ Alpine and Boreal heaths [4060] ▪ Calaminarian grasslands of the Violetalia calaminariae [6130] ▪ Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] ▪ Blanket bogs (* if active bog) [7130] ▪ Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) [8110] ▪ Calcareous rocky slopes with chasmophytic vegetation [8210] ▪ Siliceous rocky slopes with chasmophytic vegetation [8220] ▪ Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] ▪ Otter *Lutra lutra* [1355]
Wicklow Mountains SPA (004040)	7.9 km south-east	N**o hydrological connectivity.** According to SNH (2016), Merlin nests are separated by a mean distance of ca. 500 m, and a maximum of 1.5 km. Peregrine falcon nests are separated by a mean distance of ca. 3 km, and a maximum of 6.5 km. In a study of Co. Wicklow peregrine populations, Burke *et al.* (2015) found that the mean distance between nests was 5.7 km. The Proposed Development is therefore out of the range in which SPA populations would nest at the Site. There is **no functional connectivity** for nesting merlins or peregrine falcons. According to SNH (2016), the core foraging range for merlin is 5 km, and is 2 km for peregrine falcon. Peregrines have however been recorded foraging at a maximum of 18 km from their nest. Natural England (2020) states that peregrine falcons will defend a nesting territory ranging from 2-9 km from their nest. For this reason, Natural England recommends a	▪ Merlin *Falco columbarius* [A098] ▪ Peregrine falcon *Falco peregrinus* [A103]

Site Name and Code	Distance from Proposed Development	Connectivity	Qualifying Interests [Habitats/Birds Directive Code, where applicable]
		zone of influence of 10 km for peregrine falcon. The Proposed Development is within the range in which SPA populations of peregrine falcon may forage and defend a nesting territory. As such, **there is functional connectivity for foraging peregrine falcon. There is no functional connectivity for foraging merlin.** Previous reporting, as well as information provided to WSP by the Applicant, indicates that peregrine falcons regularly nest at the top of one of the walls of the quarry pit. **It should be noted that the presence of peregrine falcons at the Site does not represent connectivity with Wicklow Mountains SPA. For the reasons outlined above, these individuals are not associated with the population for which the SPA is designated. As such, they fall outside the remit of AA, but are addressed separately through the Ecological Impact Assessment process, as presented in the EIAR.**	
Glenasmole Valley SAC (001209)	12.6 km north-east	**No hydrological connectivity.** Petrifying springs are GWDTEs, but this SAC is not in the same groundwater body as the Site. There is **no groundwater connectivity**. This SAC is designated for habitats only; there is therefore **no functional connectivity** with the Proposed Development.	▪ Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites) [6210] ▪ Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] ▪ Petrifying springs with tufa formation (Cratoneurion) [7220]
Moud's Bog SAC	15.7 km west	**No hydrological connectivity.** This SAC is designated for habitats only; there is therefore **no functional connectivity** with the Proposed Development.	▪ Active raised bogs [7110] ▪ Degraded raised bogs still capable of natural regeneration [7120] ▪ Depressions on peat substrates of the Rhynchosporion [7150]
Ballynafagh Lake SAC	17.3 km north-west	**No hydrological connectivity.**	▪ Alkaline fens [7230] ▪ Desmoulin's Whorl Snail *Vertigo moulinsiana* [1016]

Site Name and Code	Distance from Proposed Development	Connectivity	Qualifying Interests [Habitats/Birds Directive Code, where applicable]
		Alkaline fens are GWDTEs, but this SAC is not in the same groundwater body as the Site. There is **no groundwater connectivity**. Given that there is no hydrological connectivity, and given the distance between the SAC and the Site, there is therefore **no functional connectivity**.	▪ Marsh Fritillary *Euphydryas aurinia* [1065]
Ballynafagh Bog SAC	17.7 km north-west	**No hydrological connectivity.** This SAC is designated for habitats only; there is therefore **no functional connectivity** with the Proposed Development.	▪ Active raised bogs [7110] ▪ Degraded raised bogs still capable of natural regeneration [7120] ▪ Depressions on peat substrates of the Rhynchosporion [7150]
Pollardstown Fen SAC	18.4 km west	**No hydrological connectivity.** Petrifying springs and alkaline fens are GWDTEs, but this SAC is not in the same groundwater body as the Site. There is **no groundwater connectivity**. The fauna associated with this SAC are species of snails. Given that there is no hydrological connectivity, and given the distance between the SAC and the Site, there is therefore **no functional connectivity**.	▪ Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae [7210] ▪ Petrifying springs with tufa formation (Cratoneurion) [7220] ▪ Alkaline fens [7230] ▪ Geyer's Whorl Snail *Vertigo geyeri* [1013] ▪ Narrow-mouthed Whorl Snail *Vertigo angustior* [1014] ▪ Desmoulin's Whorl Snail [1016]
Rye water Valley/Carton SAC (001398)	18.8 km north	There is **no hydrological connectivity** between this SAC and the Site. Petrifying springs and alkaline fens are GWDTEs, but this SAC is not in the same groundwater body as the Site. There **is no groundwater connectivity** with the Site. The fauna associated with this SAC are minute species of whorl snails. Given that there is no hydrological connectivity and given the distance between the SAC and the Site, there is therefore **no functional connectivity** with the Site.	▪ Petrifying springs with tufa formation (Cratoneurion) [7220] ▪ Narrow-mouthed Whorl Snail [1014] ▪ Desmoulin's Whorl Snail [1016]

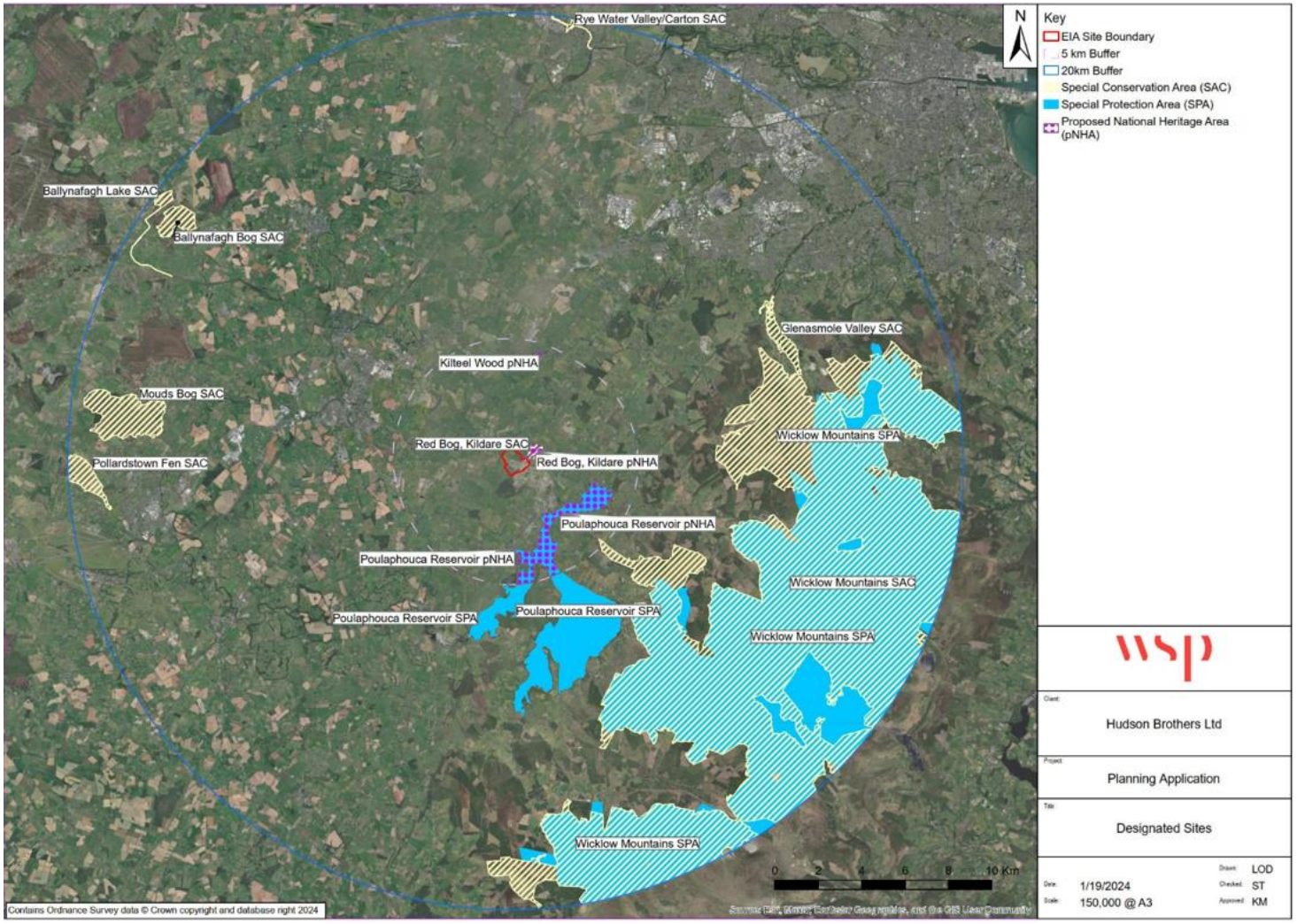

Figure 4-3 - Designated Sites

4.4.3 DESK STUDY

This section presents the available historical species records within 5 km of the Proposed Development (as per buffer shown in Figure 4-3) that have been submitted within the last 20 years.

Flora

The desk study returned 363 records of conifers, flowering plants, mosses, liverworts and horsetails. None of these species are listed as Vulnerable or above on the IUCN Red List, and nor are they afforded any protection.

Bats

Historical records for brown long-eared bat (*Plecotus auritus*), Daubenton's bat (*Myotis daubentonii*), pipistrelle (*Pipistrellus* sp.), soprano pipstrelle (*Pipistrellus pygmaeus*) and Leisler's bat (*Nyctalus leisleri*) exist within 5 km of the Site. All Irish bat species are protected under the WA, and listed under Annex IV of the Habitats Directive.

Birds

The desk study returned records of 101 bird species. Of these, 48 are afforded protection under the Birds Directive and/or are listed on the BoCCI Red or Amber list (Gilbert, et al., 2021) – see Table 4-5. All wild birds are protected under the WA.

Table 4-5 - Desk Study – Protected and Notable Bird Species

Common Name	Scientific Name	Designation and/or Conservation Status
Little Egret	*Egretta garzetta*	Birds Directive - Annex I
Red-footed Falcon	*Falco vespertinus*	Birds Directive - Annex I
Kingfisher	*Alcedo atthis*	Birds Directive - Annex I BoCCI - Amber List
Whooper Swan	*Cygnus cygnus*	Birds Directive - Annex I BoCCI - Amber List
Greater White-fronted Goose	*Anser albifrons*	Birds Directive - Annex I/II/III BoCCI - Amber List
Golden Plover	*Pluvialis apricaria*	Birds Directive - Annex I/II/III BoCCI - Red List
Goosander	*Mergus merganser*	Birds Directive - Annex II BoCCI - Amber List
Goldeneye	*Bucephala clangula*	Birds Directive - Annex II BoCCI - Red List
Curlew	*Numenius arquata*	Birds Directive - Annex II BoCCI - Red List
Lapwing	*Vanellus vanellus*	Birds Directive - Annex II BoCCI - Red List
Pheasant	*Phasianus colchicus*	Birds Directive - Annex II/III[Note 1]
Coot	*Fulica atra*	Birds Directive - Annex II/III BoCCI - Amber List

Common Name	Scientific Name	Designation and/or Conservation Status
Teal	*Anas crecca*	Birds Directive - Annex II/III BoCCI - Amber List
Tufted Duck	*Aythya fuligula*	Birds Directive - Annex II/III BoCCI - Amber List
Snipe	*Gallinago gallinago*	Birds Directive - Annex II/III BoCCI - Red List
Woodcock	*Scolopax rusticola*	Birds Directive - Annex II/III BoCCI - Red List
Shoveler	*Spatula clypeata*	Birds Directive - Annex II/III BoCCI - Red List
Red Grouse	*Lagopus lagopus*	Birds Directive - Annex II/III BoCCI - Red List
Barn Swallow	*Hirundo rustica*	BoCCI - Amber List
Kestrel	*Falco tinnunculus*	BoCCI - Amber List
Sandpiper	*Actitis hypoleucos*	BoCCI - Amber List
Starling	*Sturnus vulgaris*	BoCCI - Amber List
Tree Sparrow	*Passer montanus*	BoCCI - Amber List
Great Cormorant	*Phalacrocorax carbo*	BoCCI - Amber List
Great Crested Grebe	*Podiceps cristatus*	BoCCI - Amber List
House Martin	*Delichon urbicum*	BoCCI - Amber List
House Sparrow	*Passer domesticus*	BoCCI - Amber List
Lesser Black-backed Gull	*Larus fuscus*	BoCCI - Amber List
Mute Swan	*Cygnus olor*	BoCCI - Amber List
Wheatear	*Oenanthe oenanthe*	BoCCI - Amber List
Ringed Plover	*Charadrius hiaticula*	BoCCI - Amber List
Sand Martin	*Riparia riparia*	BoCCI - Amber List
Sky Lark	*Alauda arvensis*	BoCCI - Amber List
Black-headed Gull	*Larus ridibundus*	BoCCI - Amber List
Goldcrest	*Regulus regulus*	BoCCI - Amber List
Grey Wagtail	*Motacilla cinerea*	BoCCI - Amber List
Little Plover	*Charadrius dubius*	BoCCI - Amber List
Willow Warbler	*Phylloscopus trochilus*	BoCCI - Amber List
Swift	*Apus apus*	BoCCI - Red List
Red Kite	*Milvus milvus*	BoCCI - Red List
Redshank	*Tringa totanus*	BoCCI - Red List
Yellowhammer	*Emberiza citrinella*	BoCCI - Red List
Meadow Pipit	*Anthus pratensis*	BoCCI - Red List
Redwing	*Turdus iliacus*	BoCCI - Red List

Common Name	Scientific Name	Designation and/or Conservation Status
Greylag Goose	*Anser anser*	Invasive Species - S.I. 477/2011[Note 2] Birds Directive - Annex II/III BoCCI - Amber List

Note 1: *Pheasant does not fulfil 'notable' criteria[4] 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 Development).*

Note 2: *According to Burke et al.* (2022)*, much of Ireland's resident greylag goose population is descended from birds released in the 20th century. This group is referred to here as the 'feral' population. The term 'naturalised' may be more appropriate (or perhaps naturalised introduced) and the historic status of breeding greylag geese in Ireland is not fully clear. Although this population falls under the monitoring remit of the Irish Rare Breeding Birds Panel as a non-native breeding species, the true distribution and changes in numbers of the feral greylag goose population in Ireland has only been monitored intermittently and is not well understood. The other population is comprised of winter visitors that breed in Iceland. It is not possible to differentiate between individuals from these populations in the field, unless ringing data can be obtained. Greylag goose is a qualifying feature of Poulaphouca Reservoir SPA, and according to Burke et al.* (2022)*, the population in Poulaphouca Reservoir is Icelandic in origin. As such, in the context of the Proposed Development, records are assumed to be associated with the same population and therefore do not represent the presence of invasive species.*

Mammals

The desk study returned records of 21 mammal species (see Table 4-6). Of these, 8 are afforded protection under the Habitats Directive and/or the WA. There are 5 species that are designated as invasive under S.I. 477/2011.

Table 4-6 - Desk Study – Mammals

Common Name	Scientific Name	Designation and/or Conservation Status
Otter	*Lutra lutra*	Habitats Directive - Annex II/IV Protected Species - Wildlife Acts
Pine Marten	*Martes martes*	Habitats Directive - Annex V Protected Species - Wildlife Acts
Badger	*Meles meles*	Protected Species - Wildlife Acts
Pygmy Shrew	*Sorex minutus*	Protected Species - Wildlife Acts
Red Squirrel	*Sciurus vulgaris*	Protected Species - Wildlife Acts
Red Deer	*Cervus elaphus*	Protected Species - Wildlife Acts
Hedgehog	*Erinaceus europaeus*	Protected Species - Wildlife Acts
Irish Hare	*Lepus timidus hibernicus*	Protected Species - Wildlife Acts
Rabbit	*Oryctolagus cuniculus*	None
Feral Ferret	*Mustela furo*	None
Feral Goat	*Capra hircus*	None
Hazel Dormouse	*Muscardinus avellanarius*	None
House Mouse	*Mus musculus*	None
Red Fox	*Vulpes vulpes*	None

Common Name	Scientific Name	Designation and/or Conservation Status
Wood Mouse	*Apodemus sylvaticus*	None
American Mink	*Mustela vison*	Invasive Species - S.I. 477/2011
Brown Rat	*Rattus norvegicus*	Invasive Species - S.I. 477/2011
Grey Squirrel	*Sciurus carolinensis*	Invasive Species - S.I. 477/2011
Fallow Deer	*Dama dama*	Invasive Species - S.I. 477/2011
Sika Deer	*Cervus nippon*	Invasive Species - S.I. 477/2011

Herpetofauna

The desk study returned 3 records of herpetofauna. All herpetofauna are protected under the WA. Common frog is listed under Annex V of the Habitats Directive (see Table 4-7).

Table 4-7 - Desk Study - Herpetofauna

Type	Common Name	Scientific Name	Designation and/or Conservation Status
Amphibian	Common Frog	*Rana temporaria*	Habitats Directive - Annex V Protected Species - Wildlife Acts
Amphibian	Smooth Newt	*Lissotriton vulgaris*	Protected Species - Wildlife Acts
Reptile	Common Lizard	*Zootoca vivipara*	Protected Species - Wildlife Acts

Invertebrates

The desk study returned 5 notable invertebrate species (see Table 4-8). Four of the species listed are generalists (i.e. they will feed from a variety of foodplants). The small sallow mining bee is the only exception, favouring willow catkins.

Table 4-8 - Desk Study - Notable Invertebrates

Type	Common Name	Scientific Name	Designation and/or Conservation Status
Butterfly	Wall Butterfly	*Lasiommata megera*	IUCN Red List - Endangered
Bee	Small Sallow Mining Bee	*Andrena (Andrena) praecox*	IUCN Red List - Vulnerable
Bee	Buff Mining Bee	*Andrena (Melandrena) nigroaenea*	IUCN Red List - Vulnerable
Bee	Gooden's Nomad Bee	*Nomada goodeniana*	IUCN Red List - Endangered
Bee	Blunt-jawed Nomad Bee	*Nomada striata*	IUCN Red List - Endangered

4.4.4 SURVEY RESULTS (2019/2020)

The information presented in this section has been adapted from the EIAR submitted in 2020 (Golder, 2020).

4.4.4.1 Habitats

The Site was found to be almost entirely comprised of an active quarry, with surrounding habitats including improved grassland, trees, hedgerows, and trees (Table 4-9). The 2020 habitat map is presented in Figure 4-4. No protected habitats or flora were recorded during the 2019/2020 survey.

Table 4-9 – Habitats recorded during 2019/2020 surveys (nomenclature as per Fossitt, 2000)

Habitat	Code
Mesotrophic Lakes	FL4
Artificial Lakes and Ponds	FL8
Improved Agricultural Grassland	GA1
Conifer Plantation	WD3[22]
Scrub	WS1
Hedgerows	WL1
Treelines	WL2
Exposed Sand, Gravel and Till	ED1
Spoil and Bare Ground	ED2
Recolonising Bare Ground	ED3
Active Quarries and Mines	ED4
Buildings and Artificial Surfaces	BL3

[22] Having been to site, WSP considers WD3 to be the correct habitat classification, but the corresponding title should be 'Mixed Conifer Woodland'. Golder's classification of 'Conifer Plantation' should be coded WD4. WSP considers the code to be correct but the title erroneous.

Figure 4-4 - Habitat Map (Golder, 2020)

Active Quarries and Mines - ED4

The centre and south-east of the Site was dominated by bare ground, associated with the footprint of the quarrying activities. Whilst the vast majority of the active quarry footprint was sterile in terms of species presence and composition, some peripheral development of flora was noted. The steep quarry faces preclude vehicular disturbance and pioneering species were able to survive.

Improved Agricultural Grassland - GA1

A number of agricultural fields were present within the north and south-west of the Site. The grassland was dominated by grasses, with species including Yorkshire-fog (*Holcus lanatus*), cock's-foot (*Dactylis glomerata*), crested dog's-tail (*Cynosurus cristatus*), false oat-grass (*Arrhenatherum elatius*), sweet vernal-grass (*Anthoxanthum odoratum*), and perennial rye-grass (*Lolium perenne*). Very few herbaceous plants were recorded. Where present, these species were more prevalent at field boundaries, and included species such as thistle (*Cirsium* sp.), chickweed (*Stellaria media*), common nettle (*Urtica dioica*) and yarrow (*Achillea millefolium*).

The fields within the north of the Site were recorded to be subject to more intensive management than the field in the south-west. The south-western field supports a tussocky sward up to 30 cm in height, whilst the fields within the north of the Site were generally grazed to ground level, with a sward up to a maximum of 10 cm in height.

Treelines - WL2

Ash (*Fraxinus excelsior*) was the most dominant species recorded. Bracket fungus was observed on a number of the trees. No understorey was recorded associated with the treelines, whilst ground flora was recorded to be consistent with species present in the adjacent grassland.

Scrub - WS1

Areas of scattered scrub were present within the Site. Where this scrub was associated with field boundaries, it was considered likely to be representative of defunct hedgerows. Scrub species recorded within the Site included blackthorn (*Prunus spinosa*), hawthorn (*Crataegus monogyna*), and gorse (*Ulex europaeus*).

Hedgerows - WL1

Hedgerows marked field boundaries within the Site. These hedgerows were largely recorded as outgrown and leggy in nature, dominated by hawthorn, with some gorse.

The hedgerows were found to vary in structure, with some being relatively dense, whilst others did not appear to be subject to regular management and had become gappy and defunct in nature, beginning to resemble individual trees. A number of the hedges were set within shallow depressions.

Hedgerow Survey

In summary, this assessment found that the majority of hedgerows and treelines within the study area were located upon or adjoined by earth banks and were adjoined by improved grassland habitats. All hedgerows surveyed were single line hedges, were not stock proof and were adjoined by a small earth bank, typically less than 1 m in height. Most earth banks exhibited localised erosion and exposure due tracking or sheltering by sheep.

Most hedgerow shrubs within the Site were deemed to be overgrown, with the average hedgerow height being 2.5 m and 4 m. Hedgerows were gappy within the Site; on average 10-25% of the hedgerows surveyed no longer had a cover of hedgerow shrubs. In addition, all hedgerows within the Site had not received management in the recent past, with only one hedgerow exhibiting management in the short-term. The condition of most hedgerows surveyed were classified as either relict or overgrown.

Hedgerows within the Site were dominated by hawthorn shrubs with occasional occurrences of semi-mature ash trees, sycamore, beech, gorse and elder. Hedgerow ground flora was poor, with an absence of vernal or woodland ground flora species. Some hedgerows supported localised abundances of dense nettle growth spreading from the base. The site supports two treeline habitats comprising tall semi-mature and maturing ash trees. All hedgerows and treelines within the Site were bordered by post and wire (including barbed wire) fencing.

4.4.4.2 Fauna

Badger

One badger sett was noted in a field boundary in the south-western portion of the Site. It was deemed to be an 'outlier' sett[23], and appeared in recent use. It was subjected to an infrared camera survey between the 27th of August and the 7th of September, which did not detect the presence of badgers at the sett.

Other Terrestrial Mammals

During the camera survey of the badger sett, incidental recordings of fox (*Vulpes vulpes*), red squirrel (*Sciurus vulgaris*), Sika deer (*Cervus nippon*), rabbit (*Oryctolagus cuniculus*) and grey squirrel (*Sciurus carolinensis*) were made.

Of these, only red squirrel is afforded protection under the WA. Grey squirrel and Sika deer are designated as invasive species under the Birds and Natural Habitats Regulations (S.I. 477/2011).

Bats

A number of trees within the Site were deemed to have the potential to support roosting bats, in particular the trees in field boundaries in the south-west of the Site.

Birds

A small number of bird species were recorded within the Site at the time of the survey, largely associated with the grassland, hedgerows and trees within the west and north of the Site. Species recorded include woodpigeon (*Columba palumbus*) and pheasant (*Phasianus colchicus*). In particular, a number of birds were observed associated with a hedgerow in the north of the Site, including blue tit (*Cyanistes caeruleus*), chaffinch (*Fringilla coelebs*), chiffchaff (*Phylloscopus collybita*) coal tit (*Periparus ater*), robin (*Erithacus rubecula*), and treecreeper (*Certhia familiaris*), whilst buzzard (*Buteo buteo*) was observed flying over the land in the north of the Site. In addition, there are anecdotal reports of peregrine falcons (*Falco peregrinus*) nesting on one of the cliff faces of the quarry, although none were observed at the time of survey.

4.4.5 SURVEY RESULTS (2023)

This section presents the data gathered during the survey in November 2023.

4.4.5.1 Habitats

The assemblage of habitats onsite in 2023 was found to broadly correspond to that described in Golder (2020).

A small number of discrepancies were noted, as described in the following text, with reference to the annotations in Figure 4-5. It should be noted that not all discrepancies represent changes in

[23] Outlier setts are typically located on the periphery of a badger territory. They are smaller and experience comparatively little use relative to other sett types.

circumstance during the period between surveys – they may have simply been missed during the previous suite of surveys and reporting.

Figure 4-5 - Annotated 2020 Habitat Map (adapted from Golder, 2020) – 'Site Boundary' refers to the 2020 application boundary.

A. This ring of scrub surrounds a small depression, in which the surface is gravelled and what appears to be a manhole chamber is in place. It is labelled as a spring in historic mapping by Ordnance Survey Ireland (OSI, 2023), although it is not included in the database of springs maintained by Geological Survey Ireland (GSI, 2023). Downhill, approximately 60 m to the south-west, a small area (ca. 140 m^2) of standing water was observed (refer to 'A1' in Figure 4-5). This was considered most appropriately classified as another example of mesotrophic lakes (FL4) (see Figure 4-6). The pathway between this feature and the spring was surfaced with gravel, suggesting that spring discharge is piped along this route.

    a. It should be noted that this arrangement is evident in freely-available aerial imagery (Google Earth in this case) as far back as 2009.

b. Anecdotal evidence from the Applicant and from other WSP staff who have visited the Site in recent years suggests that standing water in this area is not always present.

B. The grassland habitat in this area was classified as GA1 (improved agricultural grassland) in 2020. In 2023 it was noted that this area is dominated by dry meadows and grassy verges (GS2), which is typical for what was once an improved pasture but has subsequently been left alone for some time. Occasional patches of wet grassland (GS4) were noted in lower-lying areas and fringing areas of the above-mentioned pond, marked by a notable abundance of soft rush (*Juncus effusus*). GS4 accounted for ca. 10% of the coverage within this area – the rest (ca. 90%) was GS2.

C. A new lagoon has been created in this area since 2020, labelled 'Pond K2', and is used as a supply of water to the aggregate plant (please refer to Chapter 7 for a detailed description of how the Site utilises and recycles water). The changes to this lagoon since 2020 are shown in Figure 4-7.

D. This area of GA1 has been subject to earthworks recently – between January and October 2023 (see Figure 4-7). This corner of the Site is now occupied by spoil and bare ground (ED2), and the grassland has been almost completely removed. The area of GA1 that has been removed is approximately 1.12 ha.

E. Pond K is no longer in use and has been backfilled since the surveys in 2020 (see Figure 4-7).

F. The shape of this lagoon has changed – the area that extends out to the south as shown has been backfilled (see Figure 4-7).

G. A new lagoon has been created in this area – this is a settlement lagoon that allows sediment to fall out of solution before the water is circulated back to Pond K2 (please refer to Chapter 7 for more detail) (see Figure 4-7).

Figure 4-6 - Infrastructure at the source of the 'spring' (left) and example of FL4 downhill (right)

Figure 4-7 - Site Aerials in June 2020, March 2022, January 2023 and October 2023 (Images from Google Earth, ESRI and site surveys).

Mixed Conifer Woodland (WD3)

Golder (2020) labelled this as a 'Conifer Plantation', which is normally assigned the Fossitt code WD4. WSP considers WD3 to be the correct habitat classification – this area of woodland did not appear to be part of the same forestry regime as (e.g.) the trees in Glen Ding Forest, which are in more distinct rows and appear much more homogenous in aerial imagery. The area of WD3 shown in Figure 4-4 was found to be dominated by Sitka spruce (*Picea sitchensis*), but several deciduous tree specimens were also observed, including hawthorn and ash. Spruce trees were tall (>10 m) but not particularly thick (trunk diameter <40 cm). This area was likely planted as a conifer plantation, but is now somewhat distant from the main body of Glen Ding Forest and therefore not subject to the same intensity of management.

Artificial Lakes and Ponds (FL8)

The lagoons within the quarry pit were found to be completely devoid of vegetation – an indication of the magnitude of disturbance associated with the activities in this area. Accordingly, their suitability

for fauna is considered extremely low, which is supported by the lack of sightings of any fauna associated with these waterbodies during the surveys in November 2023.

Red Bog, Kildare SAC and pNHA

The majority (ca. 80%) of the area within the SAC and pNHA is occupied by improved agricultural grassland (GA1), and grazing cattle were observed on the land at the time of survey. The qualifying habitat (the habitat for which the SAC was designated), 'transition mires and quaking bogs', is at least 160 m from the nearest part of the EIA/S.37L boundary. The nearest part of the Site where activity was likely to have previously occurred is a haul road, ca. 270 m from qualifying habitat associated with the SAC/pNHA.

4.4.5.2 Fauna

Badger

Six potential setts[24] were identified in field boundaries in the lands surrounding the existing quarry pit. Five of these were associated with fields to the north, and one with fields to the south-west. Precise locations, and details on each potential sett can be provided in a confidential badger appendix, which can be provided to An Bord Pleanála on request. In the context of this Section 37L application, three potential setts were located within the S.37L boundary, and within the area proposed for extension of the quarry pit. The remaining potential setts were located 53 m, 93 m and 161 m from the S.37L boundary respectively.

Other Terrestrial Mammals

Excluding the potential badger setts described above, a total of seventeen mammal burrows were identified along field boundaries in the lands peripheral to the existing quarry pit. Eight of these were classified as rabbit burrows, owing to the presence of fresh droppings at the entrance. Eight were considered likely to be attributed to rabbits also, but were lacking droppings to confirm. Of these, 14 were within the S.37L boundary. A wood mouse burrow (*Apodemus sylvaticus*) was identified along the northern edge of the EIA boundary, but outside the S.37L boundary. A live rabbit was observed by the north-western boundary

Two Sika deer were observed emerging from the area of scrub surrounding the spring to the north of the Site. A herd of ca. 20 feral goats was observed grazing in the area marked as 'B' in Figure 4-5.

None of these species are afforded any protection under the WA or any other Irish or European legislation.

Sika deer are designated as invasive under Schedule 3 of S.I. 477/2011. Feral goats are not legally-designated, but are often considered invasive in an ecological context due to their rigorous grazing habits.

[24] These were classified as 'potential' setts owing to their size and shape (i.e. they were large enough, and exhibited the typical D-shaped entrance associated with badger setts), but it is acknowledged that setts are often abandoned and become occupied by other species, such as rabbit or fox.

The field boundaries that were deemed suitable for the species described above, were also considered suitable for other protected mammals noted in the desk study. This includes pygmy shrew, hedgehog, Irish hare, red squirrel and pine marten. Although no direct evidence of their presence onsite was observed, habitats onsite were considered suitable for foraging, commuting and resting (i.e. for pine marten dens, squirrel dreys, hare forms etc.).

One suitable pine marten denning site was identified in one of the treelines to the southwest, in the form of a substantial cavity in an ash tree (See Figure 4-8).

Bats

Fifteen trees within the survey area were deemed to have the potential to support roosting bats. Thirteen of these were in hedgerows or treelines in the south-western portion of the S.37L boundary, with the remaining 2 along the northern edge of the EIA boundary (270 m and 320 m from the S.37L boundary respectively). In accordance with Collins (2023), four of these were classified as -M, by virtue of their perceived potential to accommodate multiple roosting bats. The rest were classified as PRF-I. The locations of these are provided in Figure 4-8. Detailed descriptions are provided in Appendix 4A.

Birds

Approximately forty sand martin (*Riparia riparia*) burrows (nests) were noted at the top of a cliff face in the northernmost corner of the existing quarry pit, which is within the S.37L boundary. Sand martins and their nests are protected under the WA, and are Amber-listed as per BoCCI (Gilbert, et al., 2021).

Whilst WSP ecologists were aware of reports of nesting peregrine falcons onsite, as noted in Golder (2020), none were observed. Sightings of peregrine falcons were not expected, considering that they utilise the quarry as a breeding site and surveys were carried out outside the breeding season. The Applicant was able to point out the approximate location on top of a quarry wall, where they frequently return to nest.

Peregrine falcons and their nests are protected under the WA, and are listed in Annex I of the Birds Directive. They are currently green-listed per Gilbert *et al.* (2021).

The locations of sand martin burrows and the known peregrine falcon nesting site are provided in Figure 4-8.

Herpetofauna

One live adult specimen of common frog was recorded in a puddle in the north-western area of the Site (see Figure 4-8). The ponds (FL4) noted outside the existing quarry pit were considered suitable for breeding amphibians, including common frog and smooth newt. As mentioned, due to the level of disturbance the lagoons in the quarry pit are not considered suitable habitat for herpetofauna.

Common lizard was not observed. However, this species utilises a wide range of habitats[25], 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 the areas around the upper fringes of the quarry pit are considered particularly suitable, where bare rock interfaces with vegetation. 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).

Aquatic Fauna

The aquatic habitats found onsite have no surface connections to the wider hydrological network. As such, it is unlikely that fish or any other aquatic macrofauna (including otter) are present at the Site.

Invasive Species

No invasive flora species were observed during the 2023 surveys. As described, Sika deer and feral goats were observed. Sika deer are designated as invasive in S.I. 477/2011, and while feral goats are not designated, they have been included as invasive species for this Site, considering the notable herd size that is present, and their reputation as voracious grazers.

[25] https://iwt.ie/species-list/

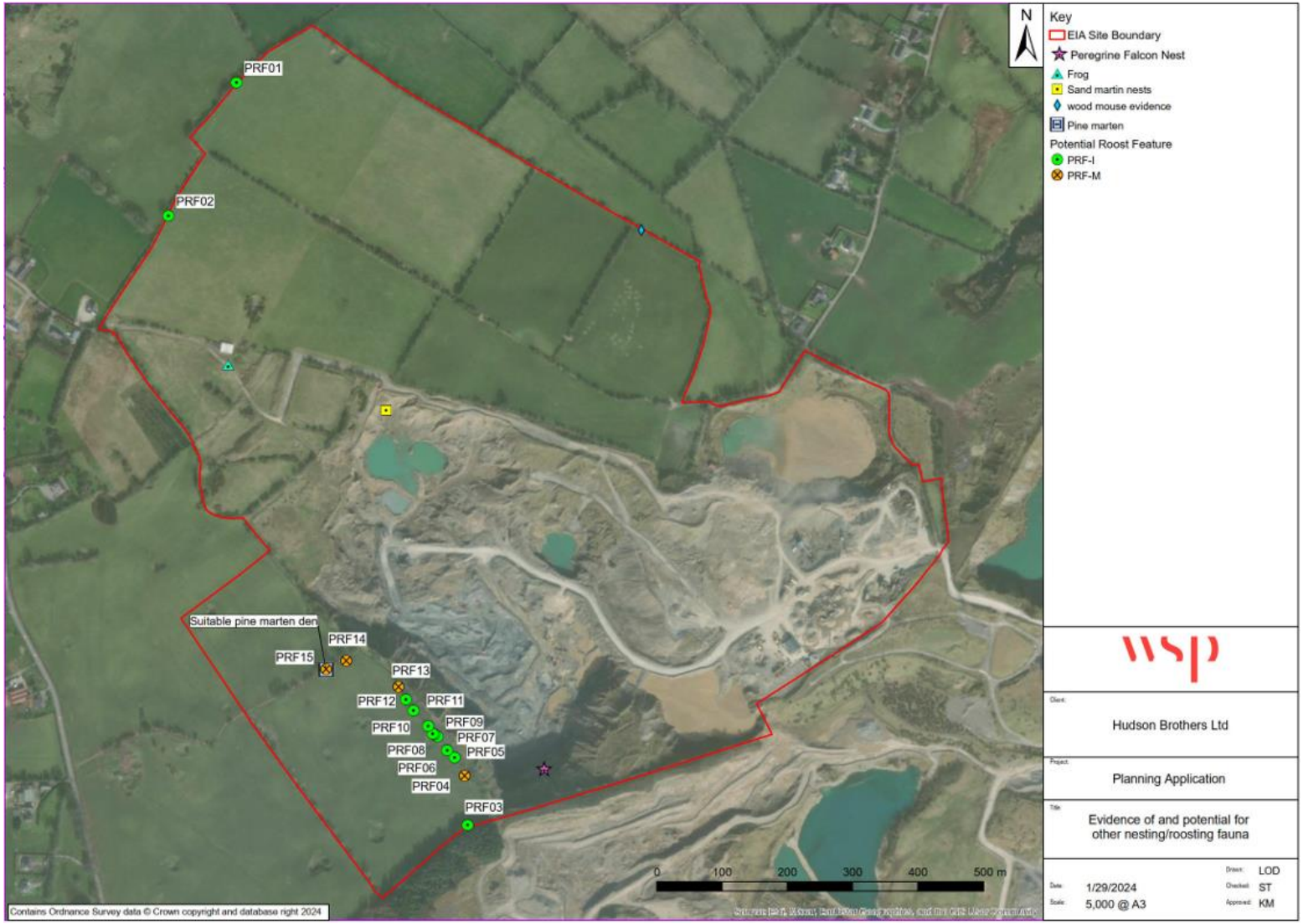

Figure 4-8 – Fauna Observations

4.4.6 SURVEY LIMITATIONS

Grant of leave to apply for substitute consent occurred on the 1st of August 2023, after which the Applicant had 12 weeks to submit an application. A series of extensions were granted by ABP, bringing the submission deadline to the end of February 2024. The S.37L application will be submitted alongside the substitute consent application. The scheduling of 2023 surveys was therefore constrained by these events. Details are provided in this section.

4.4.6.1 Breeding Birds

Surveys in 2019/2020 did not include breeding birds, due to Covid-19 restrictions. In 2023, breeding bird surveys were also not completed, as the site surveys were completed outside the optimal window – typically breeding bird surveys are completed over multiple visits between March and August.

4.4.6.2 Botany and Habitats

The 2023 surveys (November) took place outside the optimal season for botanical surveys. Many species will have experienced winter dieback and had no above-ground presence. However, the 2019/2020 surveys took place in August, which is within the optimal survey window.

4.4.6.3 Herpetofauna

The 2023 surveys took place outside the optimal seasons for herpetofauna. Typically, one can expect Irish herpetofauna to be hibernating by November. The 2019/2020 surveys occurred when adults would have been visible, although the breeding season was missed.

4.4.6.4 Invertebrates

The 2019/2020 surveys did not include a search for invertebrates. The 2023 surveys took place outside the optimal seasons for terrestrial invertebrates (ca. April-September inclusive).

4.4.6.5 Significance

Breeding Birds

The impact assessment is lacking site-specific data on breeding bird assemblages, and the Proposed Development will include the removal of suitable nesting habitat – most notably hedgerows, treelines and scrub, but also grassland, which may be utilised by ground-nesting birds. Several ground-nesting species were noted in the desk study, including meadow pipit, skylark, snipe and pheasant. WSP is aware of the potential presence of nesting peregrine falcons.

In the absence of site-specific breeding bird data, WSP has adopted a precautionary approach whereby the presence of breeding birds is assumed in areas of suitable habitat. In this manner it is possible to evaluate the ecological importance, and subsequently the significance of impacts on breeding birds based on a worst-case scenario. For this reason, this is not considered a significant limitation to the completion of this assessment.

WSP proposes to carry out a suite of breeding bird surveys at the appropriate time of year and submit a report as further information, which will contain results and recommendations. Further details are provided in Section 4.7.3.

Botany and Habitats

Considering the 2019/2020 surveys were conducted during the optimal window, and that the peripheral habitats surrounding the quarry pit are predominantly low-diversity agricultural grassland and hedgerows, WSP considers that sufficient data is available to complete a robust impact assessment.

In this context, this is not considered to be a significant limitation.

Herpetofauna

The 2019/2020 surveys were conducted during the optimal window. The silt lagoons within the quarry pit are so disturbed so as to be completely devoid of vegetation, and unsuitable for breeding amphibians. Impacts to herpetofauna can be minimised through the application of the precautionary principle and appropriate mitigation.

In this context, this is not considered to be a significant limitation.

Invertebrates

The peripheral habitats surrounding the quarry pit are predominantly low-diversity agricultural grassland and hedgerows, thereby offering limited value to terrestrial invertebrates. Impacts to invertebrates can be minimised through the application of the precautionary principle and appropriate mitigation (e.g. reinstatement of semi-natural grassland).

In this context, this is not considered to be a significant limitation.

4.5 OVERALL EVALUATION

Based on a review of the existing environment presented in the baseline above, an evaluation of IEFs identified are provided in Table 4-10, following the criteria outlined in Table 4-1. Justification is provided for the omission and inclusion of IEFs. Only designated and notable sites deemed to have connectivity with the Site (see Table 4-4) have been considered.

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

Reference is made to ‘core areas’, ‘stepping stones’ and ‘corridors’ as defined in Chapter 12 of the Kildare County Development Plan:

- **Core Areas** – these are large geographical areas of influence and importance, for reasons of ecology, landscape, designation, heritage, environmental management and ecosystem services.
- **Stepping Stones** – these are smaller geographical areas but either critically important because of their environmental quality (i.e., local native woodlands, intact bogs/peatlands, wetlands), local amenity value (i.e., urban parks) or because of their scale as undeveloped areas, such as Coillte forestry plantations.
- **Corridors** – these are the connectors providing vital linkages in the networks, for example, canals, stream/river corridors and the associated riparian corridors or valleys, disused railway lines, etc.

Table 4-10 - Evaluation of Ecological Features

Ecological Feature	Summary Description / Justification for inclusion or omission	Evaluation[26]	Important Ecological Feature (IEF)
Designated and Notable Sites			
Red Bog, Kildare SAC (000397) Red Bog, Kildare pNHA (000397)	European designated site and pNHA. There is no groundwater connectivity with the Proposed Development. There is potential connectivity for dust emissions, which will be discussed in more detail in the impact assessment.	International Importance	Yes
Poulaphouca Reservoir SPA (004063) Poulaphouca Reservoir pNHA (000731)	European designated site and pNHA. There is no groundwater or (surface) hydrological connectivity. However, there is functional connectivity for greylag geese, by virtue of the presence of suitable foraging habitat on the lands surrounding the quarry pit, including the grassland that has been removed (see Area 'D' in Figure 4-5).	International Importance	Yes
Wicklow Mountains SPA (004040)	European designated site Functional connectivity – it is within the maximum recorded range for foraging peregrine falcons.	International Importance	Yes
Habitats			
Mesotrophic Lakes FL4	Wetlands are 'stepping stones' as per County Development Plan. Suitable breeding habitat for local populations of amphibians.	Local Importance (Higher Value)	Yes

[26] 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	Evaluation[26]	Important Ecological Feature (IEF)
Artificial Lakes and Ponds FL8	Largely devoid of vegetation due to the magnitude of disturbance, and accordingly unsuitable for most fauna.	Local Importance (Lower Value)	No
Improved Agricultural Grassland GA1	This habitat, whilst utilised by wildlife is not considered as ecologically valuable as other habitats present within the Proposed Development. This habitat type is not listed in the local BAPs.	Local Importance (Lower Value)	No
Dry Meadows and Grassy Verges GS2	This habitat exhibits moderate floral diversity, and generally represents local grassland biodiversity 'hotspots' in a landscape that is otherwise dominated by agricultural pasture or tillage. Not mentioned in local BAPs, and no Annex I affinity.	Local Importance (Higher Value)	Yes
Wet Grassland GS4	As with GS2 above, this habitat exhibits moderate floral diversity, and generally represents local grassland biodiversity 'hotspots' in a landscape that is otherwise dominated by agricultural pasture or tillage. It is not a wetland (Irish Wetlands Committee, 2018) but it is suitable for amphibians, many invertebrates with an aquatic larval phase and some BoCCI. It should be noted that impacts to fauna are discussed separately.	Local Importance (Higher Value)	Yes
Mixed Conifer Woodland WD3	This woodland likely originated as a conifer plantation. Despite not being as intensively managed now, it lacks high floral diversity. It may be utilised by species such as badger, red squirrel, pine marten and BoCCI. Recent research[27] has found that red squirrel is more vulnerable to predation in conifer plantation, due to the lack of vegetative structural complexity. Recognised as a 'stepping stone' in the County Development Plan.	Local Importance (Higher Value)	Yes

[27] Twining, J. P., Sutherland, C, Reid, N. and Tosh D. G. (2022). Habitat mediates coevolved but not novel species interactions. Proceedings of the Royal Society B. **289 (1966)**.

Ecological Feature	Summary Description / Justification for inclusion or omission	Evaluation[26]	Important Ecological Feature (IEF)
	Considered important at a local scale.		
Scrub WS1	In areas largely devoid of woodland, scrub is an important alternative habitat for species that would otherwise utilise woodland. Unlike hedgerows (see below), scrub is not specifically mentioned in local BAPs or the County Development Plan. It lacks the status of a 'wildlife corridor' that is afforded to hedgerows. It is nonetheless an important resource for breeding birds (potentially BoCCI).	Local Importance (Higher Value)	Yes
Hedgerows WL1 and Treelines WL2	In areas largely devoid of woodland, hedgerows and treelines are important alternative habitats for species that would otherwise utilise woodland. The importance of hedgerows is acknowledged in local BAPs and the County Development Plan. Though they may not be designated sites, the significance of such features is recognised by the EU Habitats Directive (92/43/EEC), which obliges member states to maintain them to improve the ecological coherence of the Natura 2000 network. Considered important at a local scale.	Local Importance (Higher Value)	Yes
Spoil and Bare Ground ED2	This habitat is directly linked with anthropogenic disturbance, leading to a complete lack of vegetation. There is no reference to this habitat in the local BAPs or the County Development Plan.	Local Importance (Lower Value)	No
Recolonising Bare Ground (ED3)	This habitat is the first stage in ecological succession, after bare ground (see above) begins to experience colonisation by ruderal flora. Within the Proposed Development, this habitat is associated with portions of the quarry pit that have been recently disturbed but subsequently left alone for a short period. There is no reference to this habitat in the local BAPs or the County Development Plan.	Local Importance (Lower Value)	No
Active Quarries and Mines (ED4)	This habitat is directly linked with anthropogenic disturbance, and has no associated vegetative coverage. There is no reference to this habitat in the local BAPs or the County Development Plan. Please note that impacts to birds (i.e. sand martins and peregrine falcons) are covered separately.	Local Importance (Lower Value)	No

Ecological Feature	Summary Description / Justification for inclusion or omission	Evaluation[26]	Important Ecological Feature (IEF)
Buildings and artificial surfaces BL3	Buildings, haul roads and other man-made structures are not considered of high ecological importance within the Proposed Development. This habitat type is not included in any local BAPs or the County Development Plan.	Local Importance (Lower value)	No
Protected Species			
Breeding birds	Numerous habitats within the Proposed Development are suitable for breeding birds – in particular woodland, hedgerows/treelines and scrub. Ground-nesting species may breed in areas where land management intensity is low. Sand martins (Amber - BoCCI) and peregrine falcon (Annex I – Birds Directive) are known to breed at the Site. Populations using the Site, based on the available evidence, do not meet the threshold for county importance. Specific breeding bird surveys were not undertaken, but it can be assumed with confidence that numerous species use the above-described habitats for breeding, some of which may be BoCCI. 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.	Local Importance (Higher Value)	Yes
Overwintering birds	The presence of agricultural pasture within the Proposed Development and adjacent to the quarry pit equates to the presence of suitable foraging habitat for certain species of swan and goose. Note that impacts to greylag geese associated with Poulaphouca Reservoir SPA/pNHA are covered above under European Sites. The site is not considered a valuable foraging resource for non-QI species.	Local Importance (Lower Value) .	Yes
Bats	Habitats within the Proposed Development provide important foraging, commuting and roosting habitat for bats. All bat species are protected under the WA and are mentioned the County Development Plan.	Local Importance (Higher Value)	Yes

Ecological Feature	Summary Description / Justification for inclusion or omission	Evaluation[26]	Important Ecological Feature (IEF)
Badger	Badgers are likely present within the Proposed Development. Badgers are protected under the WA.	Local Importance (Higher Value)	Yes
Amphibians	Suitable habitat for breeding amphibians has been identified in both examples of FL4, and a live frog specimen was noted in a puddle to the north of the Site, outside the quarry pit. Smooth newt may also be present. Both are likely to be present in areas of periodic inundation. Common frog and smooth newt are protected under the WA.	Local Importance (Higher Value)	Yes
Reptiles	Certain areas of the Proposed Development are suitable for common lizard – particularly areas of exposed rock, which provide good opportunities for basking. It was noted in the desk study. Its presence is assumed. Common lizard is protected under the WA.	Local Importance (Higher Value)	Yes
Terrestrial invertebrates	Suitable habitat for invertebrates (in a general sense) was noted during the surveys. No protected or notable species were recorded during the surveys, although it is acknowledged that targeted invertebrate surveys were not carried out. Some notable species were noted in the desk study. Assigned Local Importance (Higher Value) as a precaution.	Local Importance (Higher Value).	Yes
Other notable species	Hedgehog, pygmy shrew, red squirrel, pine marten, Irish hare and red deer were noted during the desk study. Red squirrel was recorded during monitoring of a badger sett in 2020. The site contains suitable habitat for these species, all of which are protected under the WA.	Local Importance (Higher Value).	Yes
Rare flora	Neither the desk study nor the field surveys identified any rare flora.	Local Importance (Lower value)	No
Invasive species	Several species were noted in the desk study. During field surveys, grey squirrel and sika deer were observed. These species are listed in Schedule 3 of the Birds and Natural Habitats Regulations. Invasive species are mentioned in the County Development Plan.	Local Importance (Higher Value).	Yes

4.6 IMPACT ASSESSMENT

This section aims to quantify the ecological impacts of the Proposed Development with reference to the ecological evaluation of the Site as shown in Table 4-10. Assessment of impacts is in accordance with the methodology described in Section 4.3.7.

Potential impacts have been considered in the context of groundwater, dust and noise emissions, as well as habitat loss and the potential spread of invasive species. Further detail is provided in the following subsections.

Information relating to the above-mentioned emissions has been taken from the relevant chapters in this EIAR – please refer to Chapter 7 (surface water and groundwater), Chapter 9 (Air Quality) and Chapter 10 (Noise) for more detail. Monitoring locations are illustrated in Figure 4-9.

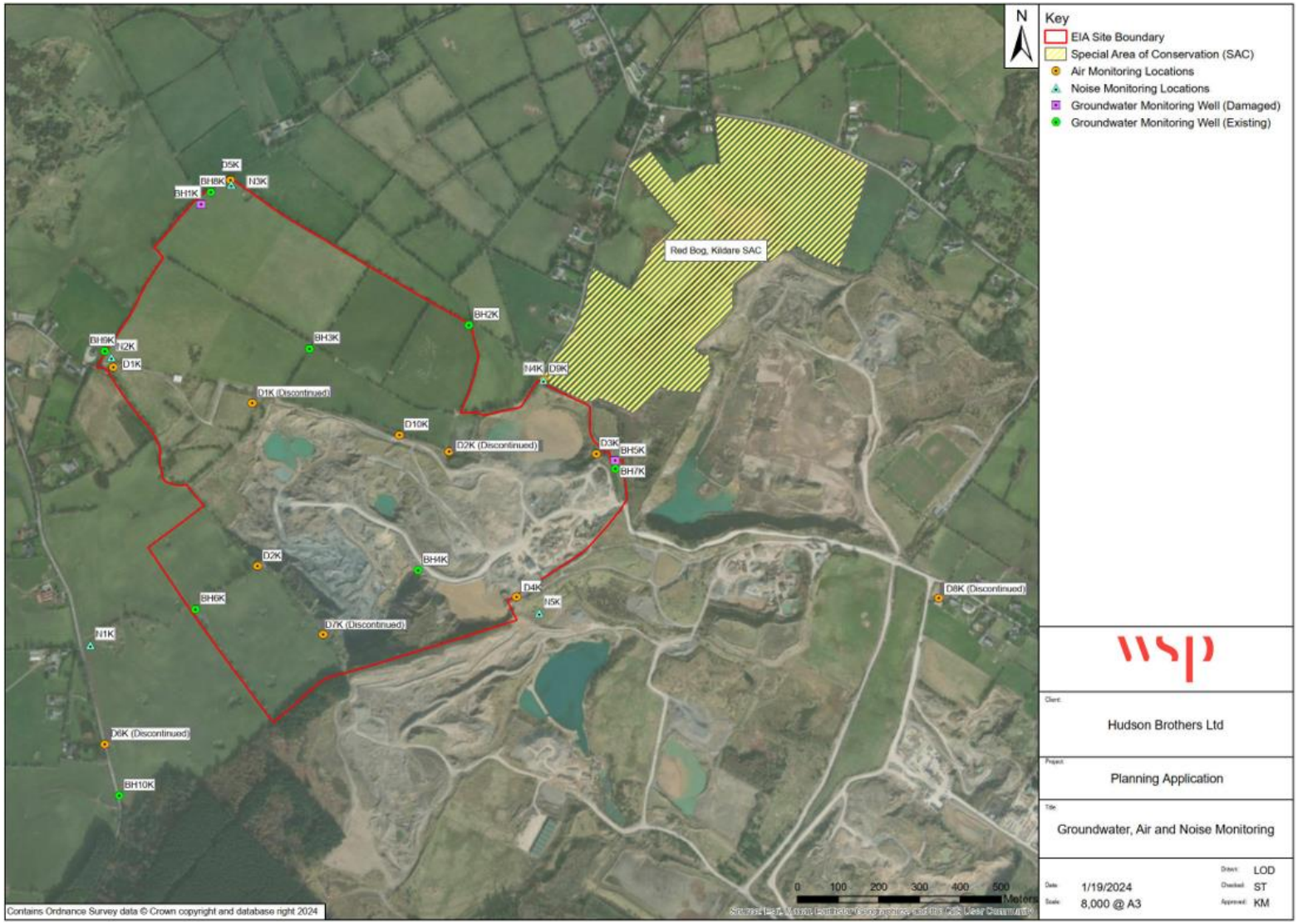

Figure 4-9 - Emissions Monitoring Locations

4.6.1 CONSIDERATION OF ECOLOGICAL IMPACTS - RATIONALE

The factors contributing to potential impacts have been considered. Impacts in relation to surface water, groundwater, dust and noise emissions, habitat loss and the spread of invasive species are considered plausible, considering the nature of the proposed activities onsite.

4.6.1.1 Water – Surface and Ground

In accordance with the surface water management arrangements at the Site (see Chapter 7) and the nature of the topography at the Site, surface water does not discharge from the Site.

With respect to groundwater:

- Groundwater gradient is to the west/northwest; and
- Physico-chemical analysis of groundwater within, and down-gradient of the Site indicate that groundwater quality perturbations have not occurred to date, with the ongoing implementation of standard site environmental protocols.

A hydrogeological report on Red Bog, Kildare SAC (100 m from Site boundary) carried out for Hudson Brothers Ltd. (Golder Associates, 2008) states the following in relation to the bog's water source:

'Notwithstanding the possibility of intermittent springs and seepages, the source of water for this type of formation (Red Bog) is principally confined to precipitation. The hydraulic catchment for Red Bog is expected to extend little further than its surface expression. Overland flow will occur around the immediate periphery during storm events, but this influence is not expected to extend the catchment radially by more than several metres'

It should also be noted that the most up-to-date groundwater monitoring data from monitoring well BH2K (adjacent to Red Bog, Kildare SAC) indicates that the groundwater table has not encroached any closer than 5.8 m below the top of the well casing (mBTOC). This is consistent with conclusions drawn in the Environmental Impact Statement (EIS) submitted with the planning application in 2007, and the EIAR submitted in 2020, both of which stated that the surface waterbody associated with Red Bog, Kildare SAC is a perched water feature. Red Bog, Kildare SAC is therefore isolated from the groundwater table.

4.6.1.2 Dust

The effect of airborne particulate matter on plants has been studied on several occasions, and the literature reviewed by Farmer (1993) and Prajapati (2012). Guidance from IAQM (2016) cites Farmer (1993) when making the following statement:

"The level of dust deposition likely to lead to a change in vegetation is very high (over 1 g/m^2/day[28]) and the likelihood of a significant effect is therefore very low except on the sites with the highest dust release close to sensitive habitats."

[28] >1000 mg/m^2/day

Prajapati (2012) states that chemical effects of reactive materials (such as cement dust, and particulate sulphates/nitrates[29]) become evident at concentrations of approximately 2 g/m^2, with reference to a study by Grantz *et al*. (2003).

The paper by Farmer (1993) refers to studies by Spatt and Miller (1981) and Walker and Everett (1987), both of which examined effects of dust deposition on more sensitive bryophyte communities[30] alongside a major road in Alaska. It was found that species of *Sphagnum* declined where dust deposition was between 1000-2500 mg/m^2/day. Decline of *Sphagnum* coverage was noted up to 20 m from the road.

Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014) provides a mechanism for determining the sensitivity of an area to ecological impacts. It is reproduced in Table 4-11 below. It essentially considers the sensitivity of an ecological receptor and the distance between it and the source of dust, in determining the likelihood of significant impacts. In the context of the Proposed Development, Red Bog, Kildare SAC is an ecological receptor of 'High' sensitivity. Dust emissions arising from within 20 m would be considered to pose a high risk of significant impacts[31], and those arising from within 50 m would be considered to pose a medium risk of significant impacts. Whilst the table does not provide details for further distances, it can be reasonably inferred that emissions arising further than 50 m from a receptor of 'High' sensitivity would be considered to pose a low risk of significant impacts.

Table 4-11 – Characterising the Sensitivity of an Area to Ecological Impacts (from IAQM, 2014)

Receptor Sensitivity	Distance from the source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Site Dust Emissions

The most recent area of lateral expansion (Area D as shown in Figure 4-5) occurred in 2023. The two nearest dust monitoring locations to this area are D1K and D2K (refer to Figure 4-9). The maximum recorded dust emissions in 2023 was 118 mg/m^2/day and 135 mg/m^2/day for D1K and

[29] It should be noted that no cement dust, nor any sulphate/nitrate mineral dust is produced by the Site.

[30] Relevant in the context of Red Bog, Kildare SAC.

[31] This is consistent with the studies cited by Farmer (1993).

D2K respectively. The average dust emissions for the overall site (comprising records from 2019-2023) is 231.2 mg/m^2/day (please refer to Chapter 9 for additional details).

The smallest distance between the S.37L boundary (area of proposed new extraction) and the SAC is ca. 150 m.

4.6.1.3 Noise

Modelling of predicted noise emissions has been carried out and the results are presented in Chapter 10. Modelling is informed by recent monitoring results and site topography, and four hypothetical scenarios are assessed for their potential noise emissions in relation to 24 different noise receptors in the surrounding landscape. The modelling predicts that:

- The maximum increase in noise emissions as a result of the Proposed Development (in any of the 4 scenarios) is 3.1 dB[32];
- Increases are only predicted at 4 locations;
- At each of the other locations, future noise emissions will be lower than current emissions; and
- None of the predicted emissions at any of the locations exceeds the limit of 55 dB.

The threshold for noise emissions (55 dB), as applied in Chapter 10, is based on thresholds set by the Environmental Noise Regulations (S.I. 140/2006) and incorporated into Kildare County Council's Third Noise Action Plan 2019 - 2023[33]. This threshold is based primarily on impacts to humans, and is an indicator of optimal, quiet conditions. Nonetheless, the Waterbird Disturbance Mitigation Toolkit (Cutts, et al., 2013) acknowledges that noise emissions below 55 dB is unlikely to cause a response in waterbirds.

4.6.1.4 Invasive Species

Flora

Considering the nature of the proposed activities at the Site, in particular the ingress of vehicles, plant and machinery and their associated soil disturbance, the transport into the Site of seeds and viable tissue of invasive flora is an inherent possibility. However, the below points have also been considered:

- No invasive flora were observed in 2019 or 2023;
- It is not proposed to import soil from offsite for the purpose of restoration – topsoil will be retained onsite for that purpose.
- Access to the Site is via the haul road to the south, which does not intersect or run adjacent to Red Bog, Kildare SAC and pNHA;
- The qualifying species of Poulaphouca Reservoir SPA and pNHA are not considered to be sensitive to the potential movement of terrestrial invasive flora. However, over a prolonged period, greylag goose terrestrial foraging habitat might be lost to (e.g.) Japanese knotweed scrub.

[32] To give context to these increases, a 3 dB difference in noise level is usually considered to be the minimum change normally perceptible by the human ear under 'real world' situations (as opposed to a controlled laboratory environment).

[33] https://kildarecoco.ie/AllServices/Environment/NoiseNuisance/

Fauna

Grey squirrel, sika deer and feral goats were observed during site surveys. Sika deer and feral goats are known to contribute to the deterioration of habitat condition through overgrazing, and grey squirrel out-competes native red squirrel for ecosystem resources. However, the habitat assemblage in 2023, when compared to that from 2019/2020 did not exhibit signs of substantial alteration that could be attributed to invasive fauna. Sika deer and feral goats were observed during both surveys, so their presence does not represent the recent introduction of invasive fauna.

4.6.1.5 Habitat Loss

The Proposed Development will involve the removal of ca.:

- 2.75 km of hedgerow/treelines (WL1/WL2);
- 28 ha of improved agricultural grassland (GA1);
- 2.7 ha of dry meadows and grassy verges/wet grassland mosaic habitat (GS2/GS4); and
- 0.19 ha of scrub

It is not proposed to disturb or remove any examples of mesotrophic lakes noted onsite.

GA1 has not been identified as an IEF (Table 4-10). Considering the abundance of this habitat in the surrounding environment, its value as a resource (for foraging waterfowl or ground-nesting birds for example) is considered low.

Fauna

Impacts to fauna as a result of proposed habitat loss are explored in Table 4-13.

4.6.2 IMPACT ASSESSMENT

Table 4-12 lists potential impacts on European designated sites and pNHAs identified within the EZoI of the Proposed Development. There are no NHAs within the EZoI.

Table 4-13 lists potential impacts (in the absence of mitigation) on other habitats and protected species identified within the EZoI of the Proposed Development. It is noted that restoration is included as part of the Proposed Development, but for the purpose of impact assessment, impacts are considered in the absence of mitigation so as to appropriately inform the Restoration Plan.

Table 4-12 – Potential Impacts on Designated or Notable Conservation Sites

Designated Site	Evaluation	Potential Impacts	Impact Assessment	Conclusion
Red Bog, Kildare SAC (000397) Red Bog, Kildare pNHA (000397)	International Importance	Groundwater contamination, leading to deterioration in habitat condition; Changes to groundwater regime (i.e. fluctuations in level).	As per Section 4.6.1.1: ▪ Groundwater gradient is to the west/northwest (and therefore away from the SAC/pNHA); ▪ Physico-chemical analysis of groundwater within, and down-gradient of the Site indicate that groundwater quality perturbations have not occurred; and ▪ The SAC/pNHA is a perched water feature and therefore does not interface with the groundwater table. There is no groundwater connectivity between the Proposed Development and the SAC/pNHA. It has therefore been concluded that significant impacts to qualifying habitat (transition mires) will not occur as a result of groundwater emissions.	No Impact.
		Dust emissions, leading to deterioration in habitat condition.	With reference to guidance from IAQM (2014, 2016) and literature reviews by Farmer (1993) and Prajapati (2012) (refer to Section 4.6.1.2), the dust emission levels from the Site (as measured between 2019 and 2023) have been substantially below the levels at which any appreciable impacts could occur. It has therefore been concluded that significant impacts to qualifying habitat (transition mires) will not occur as a result of dust emissions.	No Impact.
		Spread of invasive species, leading to a deterioration of habitat condition, and a decrease in area coverage of qualifying habitat.	As per Section 4.6.1.4, the spread of invasive flora into the Proposed Development is theoretically possible, but the likelihood of seeds and/or viable plant tissue being transported inside the SAC boundary (from the Proposed Development specifically) is considered extremely low – for this to occur the same vehicles, machinery and/or personnel would need to enter both sites, and viable seeds/tissue transported in tyre treads and/or the soles of footwear. There is no scope for this eventuality as part of the Proposed Development. It has therefore been concluded that significant impacts to qualifying habitat (transition mires) will not occur as a result of the spread of invasive flora.	No Impact.

Designated Site	Evaluation	Potential Impacts	Impact Assessment	Conclusion
			Considering the current and ongoing presence of sika deer and feral goats within the Proposed Development Site, and that the barriers preventing their ingress to the SAC (i.e. stock-proof fencing) are not proposed to change, the Proposed Development in the absence of mitigation does not represent any change in circumstance.	
Poulaphouca Reservoir SPA (004063) Poulaphouca Reservoir pNHA (000731)	International Importance	Noise emissions, leading to disturbance of foraging greylag geese in adjacent agricultural grassland.	Noise monitoring and modelling has confirmed that noise emissions will not increase by an appreciable margin, and nor will they exceed the 55 dB limit that is currently enforced, and below which impacts to waterfowl are unlikely to be impacted (Cutts, et al., 2013) (see Section 4.6.1.3). It has therefore been concluded that significant effects to foraging greylag geese will not occur as a result of noise emissions.	No Impact.
		Spread of invasive species, leading to a decrease in available foraging habitat for greylag goose.	As per Section 4.6.1.4, the spread of invasive flora from the Site is possible. Even in the event that the peripheral grassland surrounding the Site is an important foraging resource for greylag goose, the spread of invasive flora (e.g. Japanese knotweed scrub) will be slow. The resulting amount of unavailable habitat is predicted to be slight in the context of the abundance of similar habitat in the wider environment. Impacts are therefore permanent and negative, but of a negligible magnitude.	Permanent, negative impact. **Not significant.**
		Foraging habitat loss – ca. 28 ha of agricultural grassland.	The area of affected habitat (28 ha) represents ~0.027% of available foraging habitat (a maximum of approximately 104321 ha[34]) for greylag geese from Poulaphouca SPA.	Permanent, negative impact.

[34] This area is the area of a circle with a radius of 20 km from the Site, but with the combined areas of Wicklow Mountains and Dublin City within the circle subtracted. This metric is intended to be indicative, and is applied on the premise that the majority of land coverage in Ireland is grassland and tillage agriculture, but the upland peat landscape of Wicklow Mountains and the urban landscape of Dublin suburbs are notable exceptions.

Designated Site	Evaluation	Potential Impacts	Impact Assessment	Conclusion
			The loss of habitat is a permanent, negative impact, but considering this in the context of the wider landscape, as described above, this impact is not considered significant.	**Not significant.**
		Visual disturbance, leading to displacement of foraging greylag geese in adjacent agricultural grassland, and ensuing population declines.	Considering: ▪ The abundance of suitable foraging habitat in the surrounding landscape; ▪ The size of the affected area relative to the available habitat (~0.027% as described above); ▪ The most recent peak count data for Poulaphouca Reservoir suggest that greylag geese are present in very small numbers (8 individuals); ▪ The quarry has been in operation since the 1950s and fauna have become acclimatised to conditions arising from Site operations; ▪ The Proposed Development is temporary in nature, it is considered that disturbance from the Proposed Development will not undermine the conservation objectives of the SPA.	Temporary, negative impact. **Not significant.**
Wicklow Mountains SPA (004040)	International Importance	Foraging habitat loss - ca. 28 ha of agricultural grassland.	Approximately 28 ha of agricultural grassland is proposed for removal. Considering the abundance of this habitat in the context of the surrounding environment, and considering also the distance of the Site from the SPA (beyond peregrine falcon's core foraging range), the loss of this quantity of agricultural grassland is not considered to represent a significant loss of foraging resource for SPA populations of peregrine falcon.	No Impact.

Table 4-13 – Potential Impacts on Habitats and Species deemed IEFs

Ecological Feature	Evaluation	Potential Impacts	Impact Assessment	Conclusion
Habitats – Outside Designated or Notable Sites				
Mesotrophic Lakes FL4	Local Importance (Higher Value)	Habitat loss; Deterioration of condition, through pollution.	There will be no loss of this habitat – there are no proposals to interfere with any existing examples. The proposed earthworks have the potential to cause temporary deterioration of habitat condition, due to pollution (e.g. ingress of petrochemicals) or sedimentation.	Temporary, negative impact. **Significant at a local scale.**
Dry Meadows and Grassy Verges GS2 Wet Grassland GS4 Mosaic habitat	Local Importance (Higher Value)	Habitat loss	There will be ca. 2.7 ha of GS2/GS4 removed to make way for extraction activities.	Permanent, negative impact. **Significant at a local scale.**
Mixed Conifer Woodland WD3	Local Importance (Higher Value)	Habitat loss	There will be no loss of this habitat.	No Impact
Scrub WS1	Local Importance (Higher Value)	Habitat loss	There will be ca. 0.19 ha of WS1 removed to make way for extraction activities.	Permanent, negative impact. **Significant at a local scale.**
Hedgerows WL1 and Treelines WL2	Local Importance (Higher Value)	Habitat loss	There will be ca. 2.75 km of WL1/WL2 removed to make way for extraction activities.	Permanent, negative impact. **Significant at a local scale.**
Species				
Breeding birds	Local Importance (Higher Value)	Disturbance during breeding season	Noise and dust emissions are predicted to be comparable to previous levels, indicating no change in circumstance in this regard.	Permanent, negative impact.

Ecological Feature	Evaluation	Potential Impacts	Impact Assessment	Conclusion
		Destruction of nests and/or direct kills.	It can be reasonably assumed that hedgerows, treelines, scrub and woodland are at least partially utilised by breeding birds. Ground-nesting species are generally less common than arboreal-nesting species, but they are assumed to be present in this context in the absence of survey data, and given that desktop records of ground-nesting species have been found. The existing sand martin nesting site will be removed to facilitate the expansion of the quarry pit. The unmitigated removal of suitable nesting habitat poses the following risks to breeding birds: ▪ Disturbance of active nests; ▪ Destruction of active nests; and ▪ Direct mortality of individuals. **Peregrine Falcon** There are no proposals to interfere with the existing peregrine falcon nesting site (i.e. this entire area of wall will be retained). There is potential for disturbance during the quarrying of nearby walls, but according to Moore *et al.* (1997) peregrines are often found nesting on a wall that is actively being quarried. In the case of the Proposed Development, the wall in question is ca. 60 m high, and the birds that frequently return to the Site to nest have been doing so whilst the quarry has been in operation. It is therefore considered that the existing nesting site will not be disturbed so as to result in reduced breeding efficiency or abandonment of the nest. Over the lifetime of the Proposed Development, a new breeding population may take up residence in another location at the Site. Without the appropriate monitoring, these new nests will not be detected and will be at risk of disturbance, destruction and the occupants at risk of direct mortality, if the nests are in or near areas where expansion of the quarry pit is proposed.	**Significant at a local scale.**
		Loss of breeding habitat	The loss of hedgerows, treelines, scrub and grassland represents the loss of suitable nesting habitat for a variety of birds.	Permanent, negative impact.

Ecological Feature	Evaluation	Potential Impacts	Impact Assessment	Conclusion
			The abundance of agricultural grassland in the wider environment diminishes the significance of the loss of this habitat, but in the absence of site-specific data on ground-nesting birds, it is assumed that it is an important resource for notable species.	**Significant at a local scale.**
Overwintering birds (large waterfowl)	Local Importance (Higher Value)	Disturbance and deterrence from foraging.	Noise and dust emissions are predicted to be comparable to previous levels, indicating no change in circumstance in this regard. Visual disturbance is a possibility when works begin to extend laterally into adjacent grassland. The abundance of agricultural grassland in the wider environment diminishes the significance of this impact.	Temporary, negative impact. **Not significant.**
		Loss of foraging habitat	The loss of 28 ha of improved agricultural grassland represents a loss of suitable foraging habitat for some species of goose and swan, which are most likely associated with populations roosting in Poulaphouca Reservoir. However, in the context of the surrounding environment as a whole, in particular the abundance of this habitat in all directions, the footprint of the area in question is small. With this in mind, the likelihood of grassland at the Site being frequented by foraging waterfowl is considered to be very low. Furthermore, the abundance of this habitat as mentioned, means that the removal of this quantity of habitat does not represent a substantial loss, such that foraging resources are depleted in any meaningful way. The loss of habitat is a permanent, negative impact, but considering this in the context of the wider landscape, as described above, this impact is not considered significant.	Permanent, negative impact. **Not significant.**
Bats	Local Importance (Higher Value)	Disturbance/destruction of roosts and/or direct mortality.	13 potential tree roosts have been recorded within the S.37L boundary. 12 of these are proposed for removal, with one proposed to be retained along the site periphery. 4 of the trees proposed for removal are deemed to have the potential to accommodate multiple bats. Destruction of roosts is a permanent impact, and given that all bats and their breeding/resting sites are protected under the WA, this impact is considered significant.	Permanent, negative impact. **Significant at a local scale.**

Ecological Feature	Evaluation	Potential Impacts	Impact Assessment	Conclusion
Badger	Local Importance (Higher Value)	Disturbance and/or destruction of setts.	3 potential setts are within the S.37L boundary and will need to be removed to facilitate the Proposed Development. Two additional setts are within 150 m of the proposed new edge of the quarry pit (53 m and 93 m). According to NRA (2005), blasting or pile driving can cause disturbance to badger setts within 150 m. The remaining sett, to the north of the S.37L boundary, is not at risk of disturbance or destruction. Destruction of setts is a permanent impact, and given that badgers and their breeding/resting sites are protected under the WA, this impact is considered significant.	Permanent, negative impact. **Significant at a local scale.**
Amphibians	Local Importance (Higher Value)	Loss/damage of breeding habitat and hibernacula.	Suitable breeding sites (mesotrophic lakes – FL4) identified during surveys are not proposed for removal. The proposed earthworks have the potential to cause temporary deterioration of habitat condition, due to pollution (e.g. ingress of petrochemicals) or sedimentation. This has the potential to temporarily affect breeding success of amphibians, which are protected under the WA. This impact is considered significant.	Temporary, negative impact. **Significant at a local scale.**
Reptiles	Local Importance (Higher Value)	Loss of suitable habitat, including hibernacula. Direct mortality.	The proposed expansion of the quarry pit will not result in the net loss of suitable habitat. The fringing habitat at the upper reaches of quarry walls will be disturbed and lost temporarily, but it will ultimately re-establish itself at the new periphery of the quarry pit. The most notable risk is the disturbance and potential mortality of individuals during the winter, which may occur in the event of hibernacula being inadvertently excavated. This is a permanent impact, and is considered significant due to the species' protection under the WA.	Permanent, negative impact. **Significant at a local scale.**
Terrestrial invertebrates	Local Importance (Higher Value)	Loss of suitable habitat.	The peripheral habitats that will be lost in the expansion of the existing quarry pit are of limited value to terrestrial invertebrates. The notable species found in the desk study are mostly generalists, except for the small sallow mining bee, which favours willow, but the presence of willow was not noted during the surveys.	No Impact.

Ecological Feature	Evaluation	Potential Impacts	Impact Assessment	Conclusion
Other protected mammals	Local Importance (Higher Value)	Loss of suitable habitat, Disturbance and/or destruction of burrows or other breeding/resting places. Direct kills of individuals.	A site suitable for a pine marten den was identified within the S.37L boundary, and would need to be destroyed to facilitate the Proposed Development. Hedgerows, treelines, scrub and woodland represent suitable commuting and foraging habitat for pygmy shrew, hedgehog, Irish hare, red squirrel and pine marten. Squirrel dreys were not noted, but they could be formed in advance of the commencement of works. The destruction of a den, drey or resting place of any of these species is a permanent impact, and is considered significant due to the species' protection under the WA.	Permanent, negative impact. **Significant at a local scale.**
Invasive species	Local Importance (Higher Value)	Deterioration of habitat condition Spread of invasive species	Invasive flora were not recorded in any of the surveys, but their introduction to the site is considered possible, given the nature of the proposed works. Grey squirrel and sika deer were observed onsite, which are legally-designated invasive species. Feral goats were also observed. The do-nothing approach in relation to plant/animal species listed in Schedule 3 of S.I. 477/2011 is considered an offence under Regulation 49 of the same S.I. The spread of invasive species is considered a permanent impact, and considering the legal weight associated with such an eventuality (as well as the ecological consequences), this impact is considered significant.	Permanent, negative impact. **Significant at a local scale.**

4.7 MITIGATION, COMPENSATION AND ENHANCEMENT MEASURES REQUIRED

The objective of this section is to explore potential mitigation options, to any significant impacts deemed to have the potential to occur as a result of the Proposed Development. For each significant impact identified in Table 4-13, mitigation, compensation and/or enhancement is proposed.

Proposed measures have been considered with reference to the mitigation hierarchy (see Table 4-3). Following the implementation of mitigation, compensation and/or enhancement, each impact is re-assessed to ascertain whether residual impacts remain, and to what extent these are significant. The results of this exercise are presented in Table 4-14, and additional detail is provided in the following subsections.

4.7.1 STANDARD OPERATIONAL EMISSIONS MITIGATION

Standard operational emission mitigation measures in relation to the protection of water have been identified in Chapter 6 (Water). These measures are implemented as a matter of routine at the Site, and the Applicant will continue to ensure that this arrangement continues. The implementation of these measures will curtail the ingress of contaminants into areas of FL4, which will concurrently safeguard their condition for amphibians that potentially use these areas for breeding.

4.7.2 HABITATS

4.7.2.1 Restoration Plan

A Restoration Plan (see Chapter 11 Landscape and Visual) has been prepared, which proposes the creation of new habitats following the cessation of the Proposed Development. The Restoration Plan includes for the creation of habitats within the existing quarry pit, which means that substantially larger areas will be created than what is required to be removed. The Restoration Plan also includes for the diversification of species assemblages (i.e. a range of native species will be selected to be added to the Site). Losses of hedgerow/treeline, scrub and grassland will be compensated beyond existing area coverage.

4.7.3 BREEDING BIRDS

4.7.3.1 Survey

A breeding bird survey should be carried out during the breeding season (1 March to 31 August, inclusive), and the results submitted as further information. The report will include detailed proposals for the management of nesting peregrine falcon and sand martin. Recommendations in relation to other species will also be included as necessary, based on the survey findings.

4.7.3.2 Mitigation and Compensation

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, an 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.

The Restoration Plan (see Chapter 11 Landscape and Visual) includes proposals to replace at least an equivalent quantity of woody habitat, such that there will be no net loss of breeding habitat.

4.7.4 BATS

4.7.4.1 Survey

It will be necessary to confirm whether the PRFs identified during the walkover survey are in fact utilised by roosting bats. In line with guidance from Collins (2023), PRF-M features should be subject to a total of 3 'inspection' surveys (explained below) between May and September, with at least two in the period May to August. These should be carried out as close as possible to the proposed works commencement time. PRF-I features should be subject to one inspection survey.

A **PRF inspection survey** involves the use of tree-climbing or access equipment such as ladders, MEWPs or scaffold towers to gain access to PRFs. This will allow a more detailed assessment of their likely suitability for bats and to look for more conclusive evidence of bats such as live or dead bats and droppings (staining or odour may also be present).

The Applicant will engage a suitably qualified and experienced ecologist to scope and carry out bat survey works.

These surveys will lead to one of two possible conclusions – a bat roost is present or it is not. The following subsection provides broad suggestions on appropriate actions in either case.

4.7.4.2 Mitigation and Compensation

If roosting bats are confirmed, then the destruction or disturbance of the roosts would be considered an offence under Section 23 (5)(d) of the Wildlife Acts. In this scenario, a derogation licence would be required via application to the National Parks and Wildlife Service.

An experienced bat ecologist may suggest the following measures, or a combination thereof.

- During inspection surveys, if PRFs are found not to be in use, these can be sealed off in order to prevent bats re-entering.
- Restrict clearance works to September/October, in order to avoid the maternity and hibernation seasons, when bats are most vulnerable.
- Carry out 'soft felling', such that tree limbs are cut, lowered gently to the ground and left grounded overnight to allow any bats to make their way out;
- After bats have evacuated the roost, affix limbs that contain roosting features to existing trees (with ratchet straps or similar), so that PRFs are retained within the Site boundary;
- Affix bat roosting boxes to existing trees that are proposed for retention. This will result in a positive net gain in PRFs within the Site; and
- Appoint a suitably-experienced bat ecologist to supervise the above works.

If, after sufficient surveys have been undertaken, roosting bats are not found onsite, then a derogation licence will not be required to facilitate clearance works. However, in order to offset the loss of potential roosting habitat, it is suggested that steps 4-6 above be implemented, so that PRFs are retained and supplemented within the Site boundary.

4.7.5 BADGER

4.7.5.1 Survey

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 in the vicinity of the Proposed Development.

4.7.5.2 Mitigation and Compensation

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, 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. Blasting will not be permitted within 150 m of an active sett.

4.7.6 REPTILES – COMMON LIZARD

4.7.6.1 Survey

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.

4.7.6.2 Mitigation and Compensation

If individuals are found and destruction of hibernacula is unavoidable, bespoke mitigation must be designed and agreed with 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.

4.7.7 PINE MARTEN, RED SQUIRREL AND OTHER PROTECTED MAMMALS

4.7.7.1 Survey

As a precaution, at least one month prior to the commencement of works, all woody habitat proposed for removal will be searched for evidence of pine marten dens (up to 100 m from proposed works where access allows) and squirrel dreys (up to 50 m from proposed works where access allows). During this survey, evidence of the presence of hedgehog, Irish hare and pygmy shrew will also be noted.

4.7.7.2 Mitigation and Compensation

Where a den, drey, burrow or other breeding/resting place is considered a likelihood, an infrared camera trap should also be installed at a suitable location to enable confirmation of the occupancy of a protected mammal.

If an active den/drey/burrow is confirmed, and it needs to be removed to facilitate the Proposed Development, a derogation licence will be required from NPWS. This assessment assumes that if a licence is granted then appropriate mitigation and compensation will be provided, such as:

- the exclusion of a pine marten from its den in advance of works (achieved by blocking entrances to the den when the pine marten is not inside, in line with the steps as set out by the Vincent Wildlife Trust (2014)), and subsequently;
- the provision of an alternative den site (such as a man-made den box) in an undisturbed wooded habitat as near as possible to the original den site.

If removal is not necessary, an ecologist will advise on suitable exclusion zones and/or other measures to minimise disturbance of the den/drey/burrow whilst works are underway.

4.7.8 INVASIVE SPECIES (FLORA)

4.7.8.1 Monitoring for New Growth

The magnitude of soil disturbance during quarrying operations is such that botanical surveys are considered unnecessary in active areas. However, considering the proposed phased approach to quarrying and restoration, certain areas of the Site will be undisturbed whilst others are active. The Applicant may also choose to begin operations in a certain area, move somewhere else and then come back again. For this reason, it is proposed that whilst the Site is operational an ecologist (or other suitably-experienced professional with good floral ID skills) should carry out a survey at the Site every 3 years.

Once operations have ceased and restoration has been completed as per the Restoration Plan, the Site should be surveyed annually for a period of 5 years.

In the event of emergence of invasive species within the Site, an invasive species specialist should be consulted with a view to determining the most practical and effective method for eradicating the plant(s) from the Site. The approach will be species-specific and will be informed by their location onsite.

If, after 5 years, no further growth has occurred, follow-up surveys may conclude.

4.7.9 INVASIVE SPECIES (FAUNA)

Regulation 49 (1) of S.I. 477/2011 states:

"*Any person who breeds, reproduces or releases or allows or causes to disperse or escape from confinement, any animal which […] is included in Part 2A or the Third Schedule […] or […] Part 2B or the Third Schedule […] shall be guilty of an offence*".

The Regulations therefore make it mandatory for a landowner to take action against the spread of scheduled invasive fauna, because failure to act can be interpreted as "allowing to disperse". 'Scheduled species' in the context of this site refers to Sika deer and grey squirrel.

An invasive species specialist shall be consulted to determine the most effective way to deal with feral goats, Sika deer and grey squirrel. The NPWS should also be consulted.

Table 4-14 – Mitigation, Compensation, Enhancement and Residual Impacts

Important Ecological Feature	Potential Effects Identified	Potential Impact and scale	Mitigation, Compensation and Enhancement	Residual Impacts
Habitats				
Mesotrophic Lakes FL4	Deterioration of condition, through pollution.	Temporary, negative impact. **Significant at a local scale.**	Standard operational emissions mitigation (pollution control)	No impact
Dry Meadows and Grassy Verges GS2 Wet Grassland GS4 Mosaic habitat	Habitat loss	Permanent, negative impact. **Significant at a local scale.**	Habitat compensation and enhancement, as per Restoration Plan.	Temporary, negative impact. Not significant.
Scrub WS1	Habitat loss	Permanent, negative impact. **Significant at a local scale.**	Habitat compensation and enhancement, as per Restoration Plan.	Temporary, negative impact. Not significant.
Hedgerows WL1 and Treelines WL2	Habitat loss	Permanent, negative impact. **Significant at a local scale.**	Habitat compensation and enhancement, as per Restoration Plan.	Temporary, negative impact. Not significant.
Species				
Breeding birds	Disturbance during breeding season Destruction of nests and/or direct kills.	Permanent, negative impact. **Significant at a local scale.**	Breeding surveys and management plan, to be submitted as FI. Avoidance of suitable breeding habitat during breeding season.	No impact

Important Ecological Feature	Potential Effects Identified	Potential Impact and scale	Mitigation, Compensation and Enhancement	Residual Impacts
Breeding birds	Loss of breeding habitat	Permanent, negative impact. **Significant at a local scale.**	Creation of excess habitat suitable for breeding birds, as per Restoration Plan.	Temporary, negative impact. Not significant.
Bats	Disturbance/destruction of roosts and/or direct mortality.	Permanent, negative impact. **Significant at a local scale.**	Pre-works roost surveys. If present, exclusion from roost, temporal felling restrictions, soft felling.	Temporary, negative impact. Not significant.
Bats	Loss of roosting habitat	Permanent, negative impact. **Significant at a local scale.**	Creation of new roosting features and retention of felled PRFs.	No impact
Badger	Disturbance and/or destruction of setts. Direct mortality.	Permanent, negative 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.	Temporary, negative impact. Not significant.
Amphibians	Loss/damage of breeding habitat.	Temporary, negative impact. **Significant at a local scale.**	Standard operational emissions mitigation (pollution control)	No impact
Reptiles	Loss of suitable habitat, including hibernacula. Direct mortality.	Permanent, negative impact. **Significant at a local scale.**	Pre-works surveys. If present, avoidance if possible. Otherwise, creation of alternative hibernacula and translocation of specimens under licence.	Temporary, negative impact. Not significant.

Important Ecological Feature	Potential Effects Identified	Potential Impact and scale	Mitigation, Compensation and Enhancement	Residual Impacts
Other protected mammals	Loss of suitable habitat, Disturbance and/or destruction of burrows or other breeding/resting places. Direct kills of individuals.	Permanent, negative impact. **Significant at a local scale.**	Pre-works surveys. If present, avoidance if possible. If not, sensitive management under licence.	Temporary, negative impact. Not significant.
Invasive species	Deterioration of habitat condition Spread of invasive species	Permanent, negative impact. **Significant at a local scale.**	Biosecurity measures. Surveys for invasive flora and consultation with invasive species specialist. Consultation with specialist and NPWS regarding appropriate response to invasive fauna.	Temporary, negative impact. Not significant.

4.8 CUMULATIVE EFFECTS

As well as considering the potential significant impacts from the Site in isolation, the assessment must also consider those effects in combination with those associated with other plans or projects. Whilst a project in isolation may not result in significant impacts, non-significant impacts from one project could act in combination with non-significant impacts of another project, resulting in significant impacts overall.

In this context, an important distinction to make is whether a project in isolation may result in effects that are not significant, or whether they will not result in any effects at all.

Groundwater

Considering the lack of groundwater connectivity between the Site and Red Bog, Kildare SAC/pNHA as described, it is considered that there is no potential for any impacts to occur as a result of the Proposed Development. Groundwater cumulative effects are therefore screened out from further assessment.

Noise and Dust

Given that there is connectivity for noise (Poulaphouca Reservoir SPA/pNHA) and dust emissions (Red Bog, Kildare SAC/pNHA), the potential for these to act in combination with other projects must be considered. The scope of this in-combination assessment has therefore considered other plans and projects with a radius of 500 m of the Site. A distance of 500 m was chosen based on the distance of noise monitoring station N1 from the edge of the existing quarry pit. N1 is the furthest monitoring station from the existing quarry pit, and noise impacts from the quarry at this location have been deemed to be insignificant (see Section 4.6.1.3). As such, 500 m has been chosen as a representative distance beyond which noise impacts did not occur. In addition, in accordance with Table 4-11, dust impacts are considered up to a distance of 50 m from the boundary of Red Bog, Kildare SAC.

Habitat Loss

Given that habitat loss has been considered significant from the Proposed Development in isolation, and compensation is already proposed, cumulative assessment of this impact has been scoped out.

The cumulative assessment considered planning applications for which permission was granted within the last 5 years; 2019-2024 inclusive[35]. Refused applications and applications for retention were not included for consideration. Retention applications refer to unauthorised works that were already complete and therefore did not interact with the operations at the Site. Similarly, applications for which a decision has yet to be made have also been excluded. Please see Table 4-15. Sources for the search of planning applications included:

- Planning Enquiry System – Kildare County Council (https://webgeo.kildarecoco.ie/planningenquiry - Accessed 04 December 2023);

[35] Five years is the standard duration of planning permission, from the date that permission is granted (OPR, 2022).

- Planning Enquiry System – Wicklow County Council (https://www.eplanning.ie/WicklowCC - Accessed 04 December 2023); and
- EIA Portal (https://www.housing.gov.ie/planning/environmental-assessment/environmental-impact-assessment-eia/eia-portal - Accessed 04 December 2023).

Kildare County Development Plan 2023-2029[36] and Wicklow County Development Plan 2022-2028[37] were also consulted.

Table 4-15 - Planning Applications

Planning Reference	Year Consented/Status	Location	Description of the proposal, and conclusion in respect of significant impacts in combination with the Proposed Development
23503 (Kildare)	Granted 12/09/2023	Red Bog, Blessington, Co. Kildare. North side of L6038-1. Property entrance is ca. 50m from the boundary of Red Bog, Kildare SAC.	The construction of a detached domestic shed (ca. 60 m^2) and all associated site works. Given the recent grant of planning permission, it is not clear whether works have commenced. For the purpose of this assessment, it is assumed that they have. The proposed works area is at the rear (north) of an existing dwelling and is screened by hedging on all other sides. Whilst the property boundary is ca. 50 m from the SAC boundary, the proposed works area is ca. 290 m from the qualifying habitat (transition mire). Kildare County Council did not raise any objections on the grounds of potential adverse dust emissions. Considering all of the above circumstances, it is therefore considered that there is no credible possibility for this project to interact with the Proposed Development so as to result in significant impacts. **No Significant Impacts**

4.8.1 CONCLUSION – CUMULATIVE EFFECTS

Considering the information contained in this section, it is considered that the Proposed Development will not act in combination with other plans or projects so as to result in significant impacts to any of the IEFs identified.

[36] https://kildarecoco.ie/AllServices/Planning/DevelopmentPlans/KildareCountyDevelopmentPlan2023-2029/ - Accessed 04 December 2023

[37] https://www.wicklow.ie/Living/CDP2021 - Accessed 04 December 2023

4.9 SUMMARY AND CONCLUSIONS

The Proposed Development has been assessed for its potential to result in significant impacts to important ecological features (IEFs). The impact assessment has examined survey data gathered in 2019/2020, and compared it with survey data gathered recently (November 2023). It has also used aerial imagery and environmental emissions monitoring data to inform conclusions as to the types of impacts likely to occur.

It was found that significant impacts can potentially occur from unmitigated surface water emissions, habitat loss and the spread of invasive species. Dust and noise monitoring data indicates that these emissions will not result in significant impacts. Groundwater monitoring has indicated that there is no groundwater connectivity with the nearby Red Bog, Kildare SAC and pNHA. There is no surface water connectivity between the Site and anywhere offsite.

Mitigation, compensation and enhancement measures have been proposed in the form of pollution control, supplementary surveys, timed avoidance of sensitive areas where possible and the reinstatement of habitats in the form of a Restoration Plan. The implementation of these measures will result in the identified impacts being negated or reduced to an insignificant impact.

No other impacts were identified, from the Proposed Development alone, nor cumulatively with other plans or projects.

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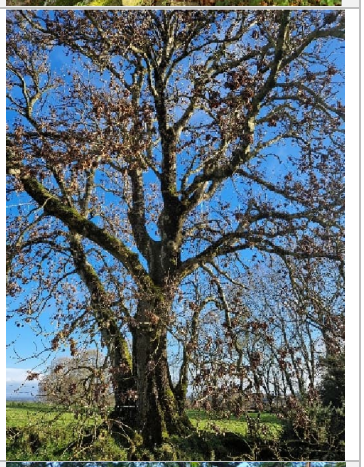
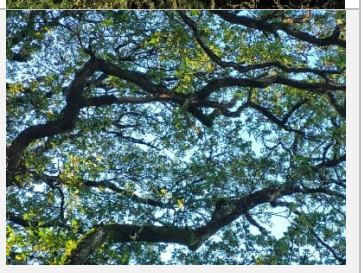
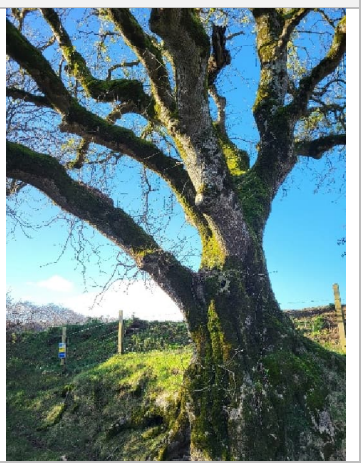
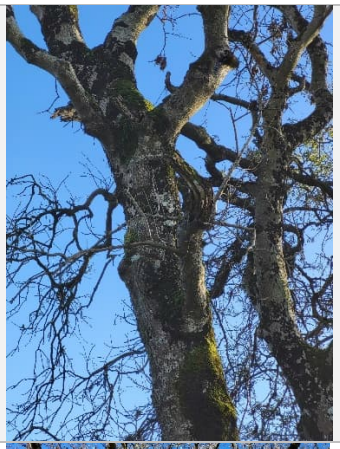
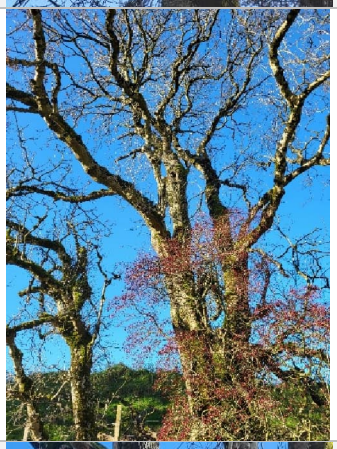
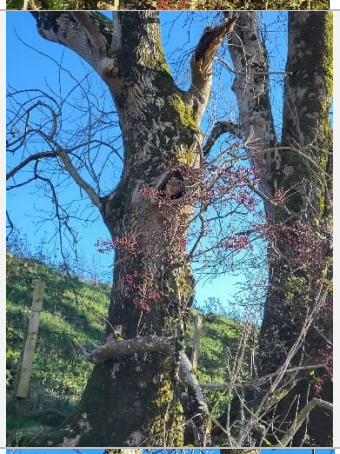
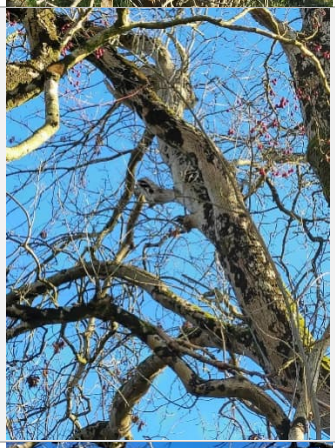
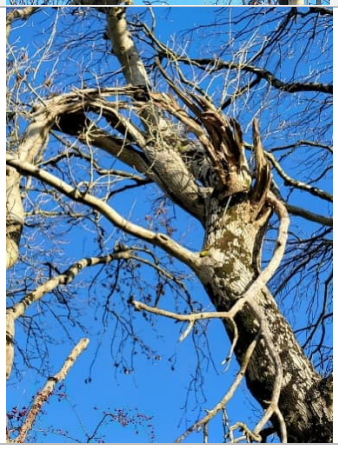
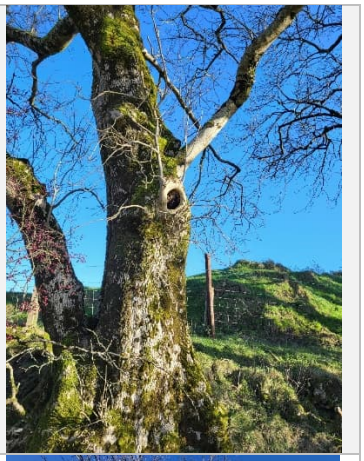
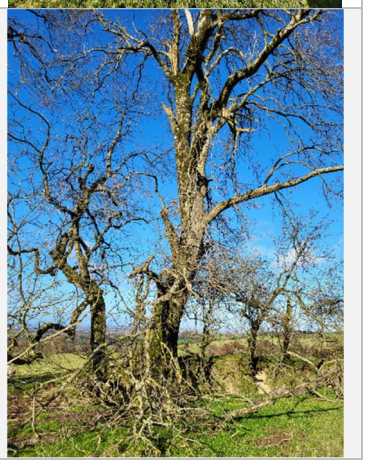
Appendix 4A

BAT POTENTIAL ROOST FEATURES

PRF ID	Suitability (Collins, 2023)	**Description**	Photo
PRF01	PRF-I	Broken horizontal limb with hollow - side entrance, Northen aspect. There is also a crack up the trunk of main tree, entrance at Southern aspect. Low potential, minimal drop zone	
PRF02	PRF-I	PRF located on a broken limb facing southwest 1 m from the main tree trunk approximately 10 m high. PRF facing the sky so unlikely to provide much shelter but could possibly be used as a day roost during the summer	
PRF03	PRF-I	Single large oak. PRF is located on a broken limb with a hollow extending towards trunk. It has a northern aspect and is 5 m high. A second PRF is located 4 m high in a knot hole with an eastern aspect. The PRF appears to extend into limb.	
PRF04	PRF-M	An ash tree with a vertical line of 3 knot holes facing west. The lowest PRF is 2 m high. However, it is unclear how deep the hole goes. A fourth knot hole was recorded to have a southeasterly aspect, 5 m high. It is located on a limb 1 m from the trunk.	

PRF05	PRF-I	An ash tree with two broken limbs with a northerly aspect, 4 and 5 m high. The upper PRF is opens to the top so unlikely to be suitable however, a clear view was not possible from the ground.	
PRF06	PRF-I	An ash tree with a knot hole located 6m high with a westerly aspect.	
PRF07	PRF-I	An ash tree with a broken limb 2.5 m high with a northerly aspect. There is a large opening left behind the broken limb however, it is unclear how deep it goes.	
PRF08	PRF-I	Two ash trees with one opening each located 2.5m high with a westerly aspect.	

PRF09	PRF-I	An ash tree with a knot hole situated 2 m high with a westerly aspect.	
PRF10	PRF-I	An ash tree with 3 knot holes situated 3m high with a westerly aspect.	
PRF11	PRF-I	An ash tree with a broken limb situated 2.5 m high with a northeasterly aspect. The PRF is located 3m from trunk where there is a hollow at the very end of the limb. A second PRF is found in a long knot hole situated 5 m high and 30 cm from the trunk with a northeasterly aspect.	
PRF12	PRF-I	An ash tree with a fracture from a limb break situated 8 m high with a north westerly aspect. There is a knot hole adjacent to this PRF. A third and fourth PRF is found at two openings in the trunk situated 3 m high with a westerly aspect.	

PRF13	PRF-M	An ash tree with a large obvious opening and a south-westerly aspect.	
PRF14	PRF-M	An ash tree with a hollow trunk. Light passes through from the top to the bottom. However, numerous crevices are present in the cavity with potential to accommodate numerous bats.	
PRF15	PRF-M	An ash tree with a hollow trunk. There are two visible access points from the bottom with a south-westerly aspect. There seemed to be a large cavity inside with the potential to accommodate numerous bats.	

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