

4.0 ECOLOGY AND BIODIVERSITY

4.1 Introduction

This chapter of the remedial Environmental Impact Assessment Report (rEIAR) presents a retrospective assessment of the potential effects that may have occurred on biodiversity as a result of activities at the existing quarry site at Windmillhill, Rathcoole, Co. Dublin ('the Site') between 1990 and the present.

A detailed description of the Site and the activities that have been undertaken ('the development') can be found in Chapter 2 of this rEIAR (Project Description). A remedial Stage 1 screening report for appropriate assessment has also been produced and is included in the application. This report concludes that no significant impacts would have occurred to Natura 2000 sites as a result of the development in a past tense.

4.1.1 Scope

The focus of this assessment, wherever possible, is centred on the establishment of likely baseline ecological conditions (flora, fauna and habitat composition) between 1990 and Spring 2021. This focus enables likely effects attributed to land take, disturbance and habitat loss and transition to be assessed and impacts identified as appropriate. Historical mapping, anecdotal evidence and habitat assessment of neighbouring lands have all been used to predict the Site conditions between 1990 and Spring 2021. In any retrospective assessment uncertainty may be a feature. As such, a conservative approach has been adopted to recognise impacts and the remedial mitigation strategy presented is also weighted in favour of a conservative scenario of mitigation hierarchy adoption. It should be noted that the scale of the development footprint i.e. land take was approximately 10.1 ha in 1990 compared with ca. 28.8 ha in 2021.

4.2 Policy and legislation context

This section addresses the legislation and guidance that has been considered when preparing this chapter, and key policy context relevant to biodiversity.

4.2.1 Legislation

- The Planning & Development Act 2000 & the Planning and Development (Amendment) Act, 2010 (as amended) hereafter referred to as the Planning Acts;
- The Wildlife Act 1976 as amended by the Wildlife (Amendment) Act, 2000 (as amended) hereafter referred to as the Wildlife Acts;
- The EIA Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU), the Planning and Development Acts 2000-2018, and the Planning and Development Regulations, 2001-2018;
- European Communities (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018);
- European Commission (EC) Habitats Directive 92/43/EEC (as amended);
- EC Birds Directive 2009/147/EC;
- European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) hereafter referred to as the Birds and Habitats Regulations;
- Flora (Protection) Order, 2015;
- Environment (Miscellaneous Provisions) Act 2011; and

- The Local Government (Water Pollution) Act, 1977 (as amended by Sections 3 and 24 of the 1990 Act.).

4.2.2 Relevant Policies and Plans

- National Biodiversity Plan, 2017-2021;
- Ireland's National Strategy for Plant Conservation;
- All Ireland Pollinator Plan 2015 – 2020; and
- Draft Biodiversity Action Plan for South Dublin County - Connecting with Nature 2020 – 2026.

4.2.3 Relevant Guidance

- Invasive Species in Ireland (NPWS, 2004);
- Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater and Coastal Environments (CIEEM, 3rd Edition 2018);
- Circular Letter PL 1/2017 - Implementation of Directive 2014/52/EU on the Effects of Certain Public and Private Projects on the Environment (EIA Directive), 15 May 2017;
- Key Issues Consultation Paper - Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems, 2 May 2017;
- Environmental Impact Assessment of Projects - Guidance on the Preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU). European Commission of the European Union 2017;
- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002);
- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Draft, Environmental Protection Agency, 2017);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Environment, Community and Local Government, 2018);
- Environmental Impact Assessment of National Road Schemes – A Practical Guide (NRA, 2008);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009);
- NRA Environmental Assessment and Construction Series Guidelines (NRA, 2006- 2009);
- A Guide to Habitats in Ireland. (Fossitt, 2000);
- Bat Surveys: Good Practice Guidelines (Collins, 2016);
- Bat Mitigation Guidelines for Ireland, Irish Wildlife Manuals No. 25 (Kelleher & Marnell, 2006); and
- Bats & Lighting Guidance Notes for Planners, engineers, architects and developers (Bat Conservation Ireland, December 2010).

4.3 Assessment methodology and significance criteria

4.3.1 Desktop survey

A desktop review was conducted of available published and unpublished information, including a review of data available on the National Parks and Wildlife Services (NPWS) and National Biodiversity web-based databases, to identify key habitats and species that may have been present, in particular those protected by legislation.

To assess the likely historical and current status of species in the vicinity of the Site, the search included a radius of 5 km around the Site boundary and was limited to records returned from within the last 31 years. Furthermore, a comprehensive examination and comparison of historic aerial imagery, which is publicly available on the online resources of ordnance survey IE and GeoHive (<http://map.geohive.ie/>), was undertaken as a means of evaluating the expansion of the Site as regularly as possible between 1990 and 2020. Publicly available documents from the following agencies and bodies were also accessed as part of the desktop review as follows:

- Environmental Protection Agency (EPA);
- South Dublin Council (SDC);
- Inland Fisheries Ireland (IFI);
- Inland Waterways Association of Ireland (IWAI);
- National Parks and Wildlife Service (NPWS);
- Water Framework Directive (WFD);
- National Biodiversity Data Centre (NBDC);
- Bird Watch Ireland (BWI); and
- Bat Conservation Ireland (BCI).

4.3.2 Designated nature conservation site assessment

Sites of international importance, including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are collectively known as Natura 2000 sites. These sites contain examples of some of the most important natural and semi-natural ecosystems in Europe. Designated sites, which also include Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) were also searched for. The designated search area was 15 km from the site boundary for Natura 2000 sites, and 5 km from the site boundary for NHA and pNHA sites.

In the subsequent analysis of designated sites, particular attention was given to potential for the historic works to influence a designated site. In other words, potential ecological pathways were identified; these pathways can be hydrological, physically overlapping, in the past, or exhibiting habitat and species synergies that could result in temporary or residual effects being afforded to a designated site.

4.3.3 Ecological survey

Habitats

The Site was surveyed by Tom O'Donnell BSc (Hons) MSc CEnv MCIEEM on the 25th and 26th January 2021 and 23rd February 2021 (O'Donnell, 2021) and an ecological walkover survey incorporating a Phase 1 habitat and flora assessment was carried out in accordance with the Heritage Council's guidelines (Smith *et al.* 2011). The dominant habitats present were classified according to Fossitt (2000) and key botanical species were identified. Any other records of interest (e.g. invasive plant species) were also marked on field maps and/or locations were recorded.

The Site based habitat appraisal was supplemented in a desk-based context and via information sharing between Golder colleagues who had attended the Site in early 2020. Satellite imagery and historic mapping was also used to formulate the predicted baseline in a past tense context as previously indicated. This work was used to appraise the likely habitats and flora in the area within and adjacent to the development Site, and to detect the presence or likely presence of protected species, and the presence of suitable habitat for those species in a historical context. As previously described, the Site footprint measured ca. 10.1 ha by 1990 with expansion amounting to ca. 18.7 ha of outward (non-vertical) growth between 1990 and 2020. Ecological Survey methods were in general accordance with those outlined in the following documents:

- Heritage Council (2011). Best Practice Guidance for Habitat Survey and Mapping;
- Phase 1 Habitat Survey methodology (Joint Nature Conservation Committee (JNCC), 1990, revised 2010); and
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009).

As previously indicated, aerial photographs and Site maps assisted the habitat survey. Habitats have been named and described following Fossitt (2000).

Fauna

The primary considerations for all protected and notable species at the Site are based upon the availability of suitable habitat to support the species between 1990 and 2021. In all cases the likelihood of presence or indeed absence was addressed in congruence with an assessment of habitat availability to maintain a species at a favourable conservation status at the Site level. Where doubt over presence is perceived owing to the retrospective nature of the assessment a conservative prediction is made in favour of likely presence. It is noteworthy that some species may have colonised the Site as a consequence of the transition from pastoral flat habitat toward the availability of cliff faces as a consequence of quarrying activities, for example peregrine falcon, which is discussed later in the report.

Bats

The potential presence of bats in a roosting and foraging context between 1990 and 2021 was considered with due regard to 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).

Avifauna

An assessment of the Site's ability to host breeding and foraging birds was undertaken. The likely bird assemblages were predicted by considering historical and satellite mapping and likely habitat composition over the previous three decades.

Mammals

An assessment of the Site's ability to host mammals was undertaken. The likely mammal assemblages were predicted by considering historical and satellite mapping and likely habitat composition over the previous three decades. Species assessed as part of this process and in accordance with Site habitats included:

- Badger (*Meles meles*);

- Red fox (*Vulpes vulpes*);
- European rabbit (*Oryctolagus cuniculus*);
- Red squirrel (*Sciurus vulgaris*);
- Bank vole (*Clethrionomys glareolus*); and
- Wood mouse (*Apodemus sylvaticus*).

Terrestrial mammal surveys were carried out during the course of ecological walkover surveys in 2021. Walkover surveys were carried out within the Site boundary, and also extending to a distance of 150 meters of the Site boundary in areas with potential to support underground mammal dwellings. Surveys involved a walkover of the Site to identify any mammal species present or signs of mammal activity such as droppings, tracks, burrows etc. Observations were recorded using field notes and/or handheld GPS units. Techniques used to identify mammal activity followed recognised guidelines (e.g. Clark 1988, Sutherland 1996, Bang & Dahlstrom 2004 and JNCC 2004).

Camera traps were deployed at five locations throughout the Site and recording was carried out for 28 days and nights from 25th January to 23rd February 2021. The cameras were infra-red equipped to allow monitoring of activity by night as well as by day. The cameras were triggered by movement, at which point a photo was recorded and a 10 second recording delay was applied. The aim of the camera trap survey was to record evidence of terrestrial mammal activity in order to inform the retrospective ecological impact assessment.

Daytime visual assessments were carried out to identify any bat roosting potential which may exist within the Site boundary. Treelines within the Site contain mature trees which were considered to have potential as bat roosts. Winter is the optimal time for 'preliminary ground roost assessments' of trees (Collins, 2016), due to greater visibility as a result of leaf fall and die back of ground level vegetation. The assessment was carried out on 25th and 26th January 2021 and 23rd February 2021 and followed guidance set out in Collins (2016). The survey was non-destructive, and relevant Potential Roost Features (PRFs) were visually inspected from ground level to identify any evidence of bat roosting. Where accessible, potential roosting features were investigated using an endoscope. Signs of bat use include bat droppings, feeding remains, potential bat access points identified by characteristic staining and scratches, noise made by bats etc.

Herpetofauna and Invertebrates

An assessment of the Sites ability to host herpetofauna (reptiles and amphibians) and invertebrates was undertaken. The likely assemblages were predicted by considering historical and satellite mapping and likely habitat composition over the previous three decades.

Aquatic ecology

The assessment considers the potential for hydrological connectivity between the Site and surface water features, and also considered what effects could be afforded to aquatic fauna and habitat receptors. It is important to note that no ditches or streams cross the Site. The Site is located within the River Giffen catchment which is part of the River Liffey system. The Highdown Hill stream leading to the River Giffen is located approximately 1km to the north of the Site. The Tootenhill Stream flows in a north-easterly direction about 0.75 km to the east of the Site.

4.3.4 Survey constraints or limitations

A retrospective assessment based upon secondary data provides some limitations in terms of characterising a baseline that was likely to have been present during the 1990s. Nonetheless, every effort has been used to make conservative predictions on likely habitat composition and species assemblages to predict the nature of any effects. As previously indicated, any uncertainty in predictive assumptions given the nature of the assessment has been balanced by adopting a conservative approach to presence or likely absence.

Invasive Species

This assessment has not been designed to consider the presence of any invasive or non-native species. Accordingly, absence of invasive non-native species should not be assumed, and invasive or non-native species surveys should be undertaken as part of the on-going operation of the Site outside of this rEIAR application.

4.3.5 Impact assessment method

Habitats and species were assessed in accordance with the guidance contained in the document *Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland* (CIEEM, 2018) which recommends that the value of an ecological resource be determined within a defined geographical context (Figure 4.1).

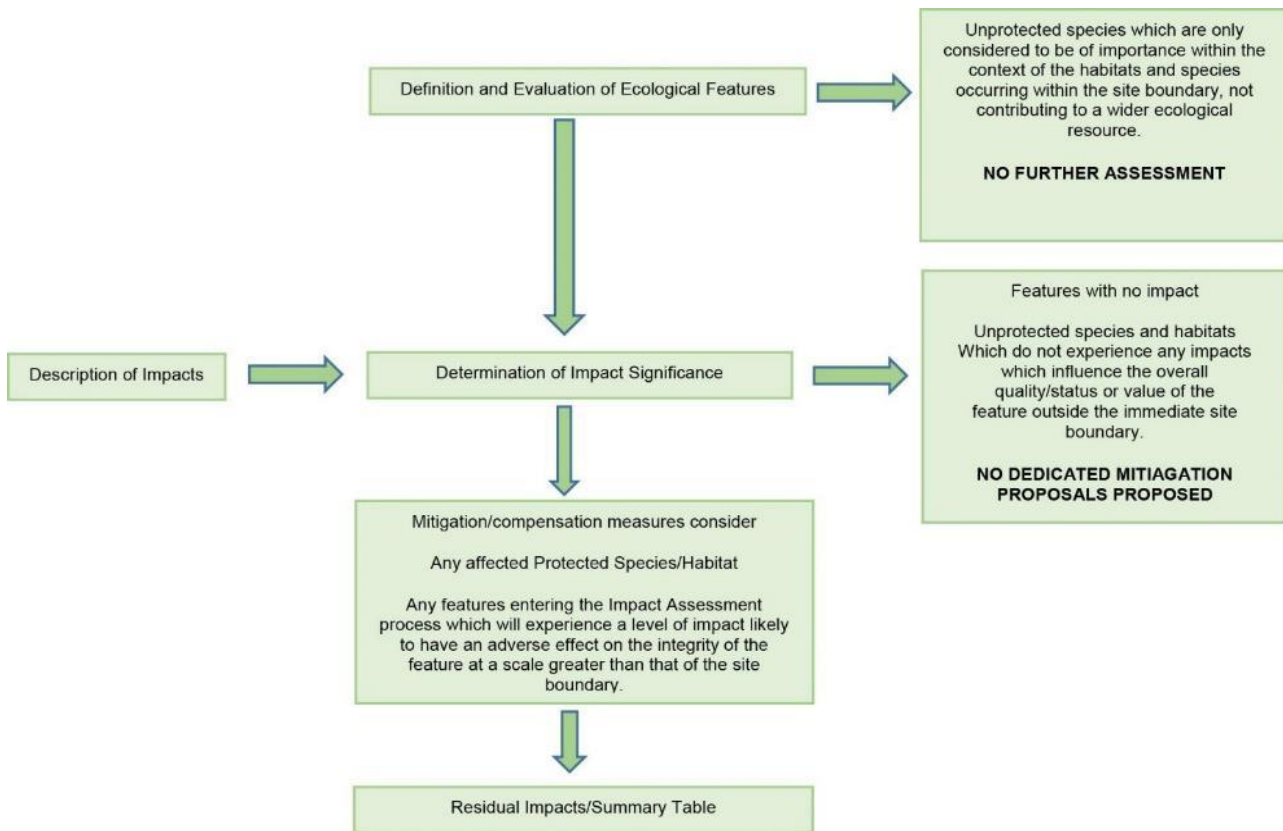


Figure 4.1: Impact Assessment Method

Defining Importance

The relative importance of each ecological feature has been defined on a geographical scale, from international importance, to having relevance only in the context of the site boundary. The definitions employed for the basis of the evaluation are presented in Table 4.3. It should be noted that professional judgement has been employed in

the allocation of a level of importance to each feature **as it occurs on the site**. In other words, the value of the feature is presented in the context of its actual status within the site. **Therefore, a single individual of a species which is protected under the European Union (EU) Habitats Directive would not automatically be considered to be of European (international) Importance, but would be evaluated in the context of its relationship to the overall population and conservation status.**

Defining Impact

The impacts to ecological features are defined by their geographical significance in terms of the likely effect and the defined importance of the feature being affected. It is not possible in this system to have an impact greater than the overall geographical importance of the feature (e.g. the maximum possible impact to a feature of a regional importance would be one which is of regional significance). Impacts which do not have significance beyond the immediate area (the site) will be managed through the implementation of construction and habitat management plans. One exception to this is the case of impacts on Protected Species, where **any** impact would result in the implementation of mitigation measures.

Defining Magnitude of Change

Considering the potential for impacts as defined above, an assessment of the magnitude of change is arrived at. This is based on the table below, and relies on professional subjective judgement in deciding the level of magnitude of change.

Table 4.1: Criteria for Assessing Magnitude of Change

Impact Level	Description
Severe Impact	Ecological effects of a scale or magnitude which would result in permanent, total loss of an irreplaceable species or habitat of international or national importance (occasionally of local importance), or which would result in the substantial loss of a protected/rare habitat or a population of a protected/rare species. They represent key factors in the decision-making process. Typically, mitigation measures would be unlikely to remove such effects.
Major Impact	These effects are likely to relate to permanent impacts at a regional or local level, or temporary impacts at an international or national level, and could be potential concerns to the project depending upon the relative importance attached to the issue during the decision making process. The effects are likely to be large in scale or magnitude, and result in substantial medium term loss of protected/rare species or habitats. Mitigation and detailed design work are unlikely to entirely eliminate all ecological effects.
Moderate Impact	These effects are usually only at local or regional level, and may be short or medium term only, or temporary impacts on a small part of an international site. However, the cumulative effects of such issues may lead to an increase in the overall effect on ecological features. They represent issues where effects will be experienced, but mitigation measures and detailed design work may ameliorate/enhance some of the consequences upon affected interests, but some residual effects will still arise.
Minor Impact	These effects are likely to be local issues only; or small magnitude impacts at the regional and national level, they are usually temporary, and are unlikely to be of importance in the decision making process. However, they are of relevance in enhancing the subsequent design of the development and consideration of mitigation measures.

Impact Level	Description
Not Significant / No Impact	No perceivable impacts on ecological features (habitat or species). Impacts may be beneath levels of perception, within normal bounds of variation, within the margin of forecasting error, or impacting on exceptionally poor baseline conditions.
Beneficial / Positive Impact	These effects are those, which through implementation, would be anticipated to benefit the ecology of the site. They may advance the objectives of local, national or international species or habitats.

Outlining mitigation, compensation, and enhancement measures

Receptors subject to significant impacts (those which have the potential to affect the ecological resource outside of the immediate site boundary) are the focus of provision of mitigation measures which have been formulated according to the mitigation hierarchy (avoid, reduce / minimise, compensate). All mitigation measures follow industry best practice. Those for protected species follow the prescribed regulatory protocols.

Defining residual impact

Following the application of mitigation measures, impacts to each ecological feature are reassessed, and any residual remedial impacts are reported.

As stated by Chartered Institute of Ecology and Environmental Management CIEEM guidance (2018), '*The importance of an ecological feature should be considered within a defined geographical context*'. Accordingly, each feature has been assessed based on the scale described in Table 4.4.

Table 4.2: Criteria for Establishing Receptor Sensitivity/Importance

Importance	Ecological Valuation
International	Sites, habitats or species protected under international legislation e.g. Habitats and Species Directive. These include, amongst others: SAC's, SPA's, Ramsar sites, Biosphere Reserves, including sites proposed for designation, plus undesignated sites that support populations of internationally important species.
National	Sites, habitats or species protected under national legislation e.g. Wildlife Act 1976 and amendments. Sites include designated and proposed NHAs, Statutory Nature Reserves, National Parks, plus areas supporting resident or regularly occurring populations of species of national importance (e.g. 1% national population) protected under the Wildlife Acts, and rare (Red Data List) species.
Regional	Sites, habitats or species which may have regional importance, but which are not protected under legislation (although Local Plans may specifically identify them) e.g. viable areas or populations of Regional Biodiversity Action Plan habitats or species.
Local/County	Areas supporting resident or regularly occurring populations of protected and red data listed-species of county importance (e.g. 1% of county population), Areas containing Annex I habitats not of international/national importance, County important populations of species of habitats identified in county plans, Areas of special amenity or subject to tree protection constraints.

Importance	Ecological Valuation
Local (Higher and Lower, NRA 2009)	Areas supporting resident or regularly occurring populations of protected and red data listed-species of local importance (e.g. 1% of local population), Undesignated sites or features which enhance or enrich the local area, sites containing viable area or populations of local Biodiversity Plan habitats or species, local Red Data List species etc. This may be split into higher and lower categories as per NRA, 2009.
Site	Very low importance and rarity. Ecological feature of no significant value beyond the Site boundary.

4.4 Baseline results

4.4.1 Desk study

Designated Nature Conservation Sites

The internationally statutory designated nature conservation sites in the vicinity of the Site are shown at Figure 4.2 below.

International Designations (Natura 2000 sites)

Natura 2000 sites are a European network of important ecological sites. The EU Habitats Directive (92/43/EEC) placed an obligation on Member States of the EU to establish the Natura 2000 network. The network is made up of Special Protection Areas (SPAs), established under the EU Birds Directive (79/409/EEC), and SACs, established under the Habitats Directive itself. Ireland's contribution to Natura 2000 is being created under the European Communities (Natural Habitats) Regulations, 1997 (S.I. 94 of 1997 as amended by S.I. 233 of 1998 and S.I. 378 of 2005). These regulations transpose the EU directives into Irish national Law. As such, the following Natura sites would not have been designated in 1990 but would have been realised in 1997.

There are six Natura 2000 sites located within 15 km of the development, as listed below:

- Red Bog, Kildare SAC – (c. 7.5 km south of the Site);
- Poulaphouca Reservoir SPA – (c. 10 km south of the Site);
- Wicklow Mountains SAC (c. 12 km south east of the Site);
- Wicklow Mountains SPA (c. 12 km south east of the Site);
- Glensamole Valley SAC (c. 7.5 km east of the Site); and
- Rye Water Carton SAC (c. 10 km north of the Site).

A remedial stage 1 screening for appropriate assessment has been prepared for this Project which evaluates the potential for significant retrospective effects on the integrity of these EU sites. Given that no element of the Substitute Consent development was undertaken within or directly adjacent to any Natura 2000 site, there was no potential for direct effects on the qualifying interests of any designated site as a consequence of the development.

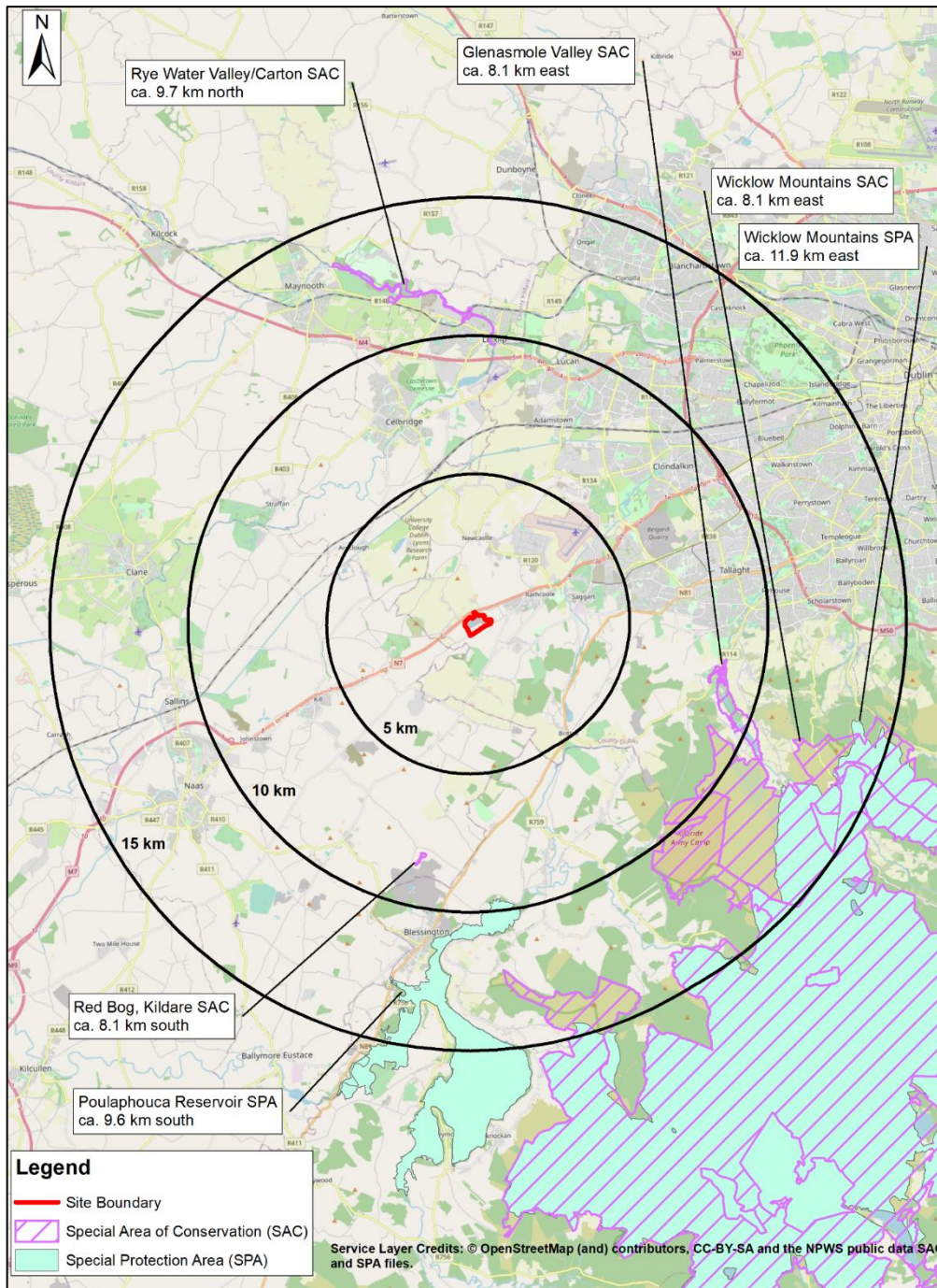


Figure 4.2: International Statutory Designations surrounding the site, including 5, 10, and 15 km buffers.

National Designations (NHAs) and pNHA

No Natural Heritage Areas (NHAs) were identified within 5 km of the Site. However, three proposed NHA (pNHA) as shown on Figure 4.3 below. Their exact designation is not known but their presence is considered in undertaking this assessment.

- Kiltel Wood pNHA (c. 4 km South of the Site);

- Slade of Saggart And Crooksling Glen (c. 3 km south-east of the Site); and
- Grand canal (c. 4 km north-west of the Site).

All pNHA sites are on the relative periphery of the search area. The pNHA sites are unanimously separated from the Site either by the N7 roadway, other smaller roads and open agricultural land limiting any ecological connectivity. Accordingly, it is not anticipated that these pNHA will have been subject to any direct effects as a result of historic development (e.g as a result of land take). Equally, given the distance and separation from the Site, it is considered unlikely that the development will have resulted in any indirect effects on the pNHAs, such as from an increase in noise levels or dust deposition. Accordingly, it is considered highly unlikely that the historic development has resulted in any negative effects on the qualifying features of the pNHAs.

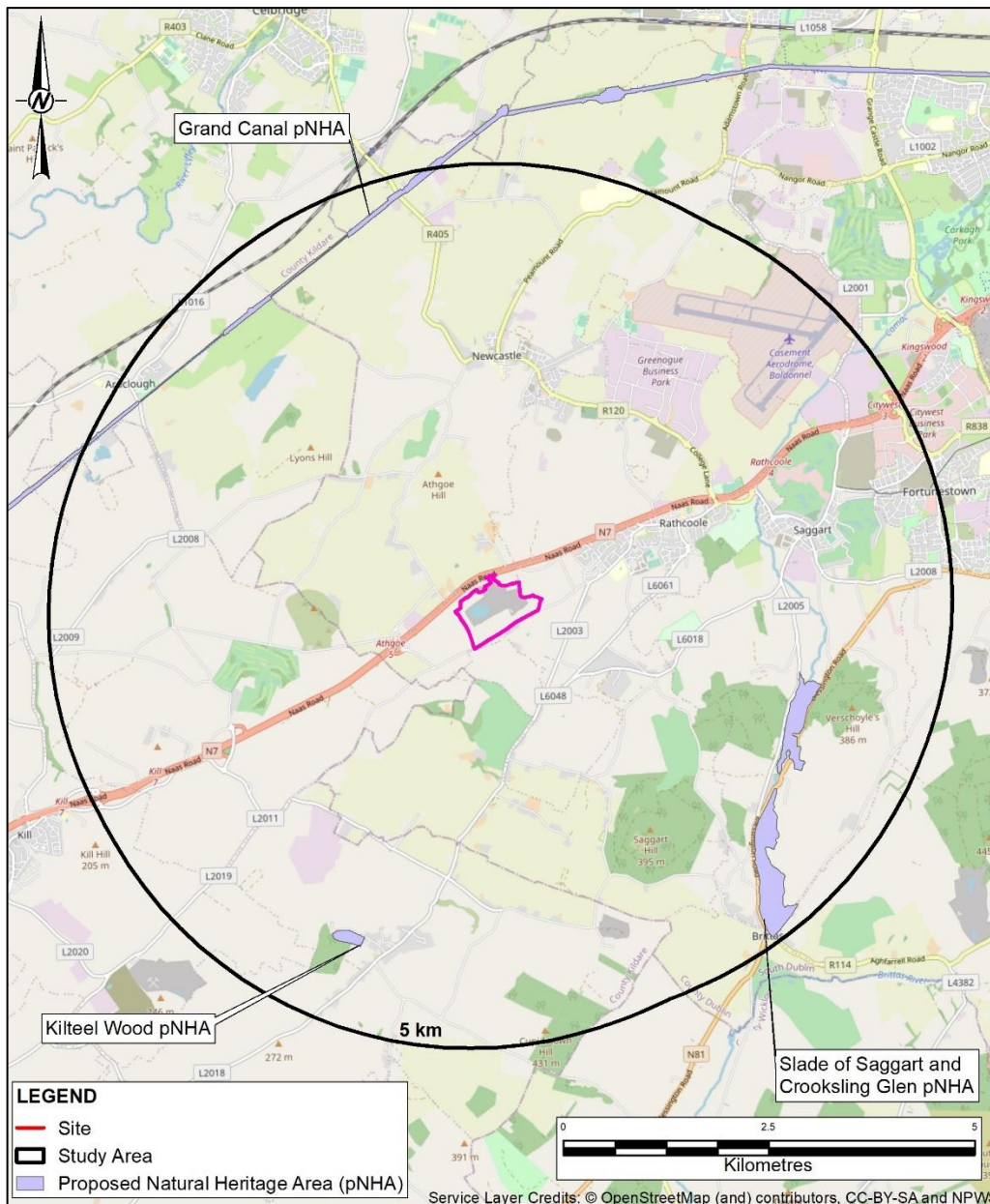


Figure 4.3: pNHA within the Desk Study Area

Fauna

The National Parks and Wildlife Service (NPWS)¹ and the National Biodiversity Data Centre (NBDC) databases were searched for records of protected species within the most appropriate 2 km grid square for the Site. The results are presented in Table 4.3 below.

Table 4.3: Desk Study Fauna Results

Species Group	Species Name	Count	Most recent record
Bird	Eurasian Jay (<i>Garrulus glandarius</i>)	1	31/12/2011
Flowering plant	Winter Heliotrope (<i>Petasites fragrans</i>)	3	26/01/2018
Insect - butterfly	Green-veined White (<i>Pieris napi</i>)	1	05/08/2013
Insect - butterfly	Large White (<i>Pieris brassicae</i>)	2	05/08/2013
Terrestrial mammal	Eastern Grey Squirrel (<i>Sciurus carolinensis</i>)	1	31/12/2011
Terrestrial mammal	European Rabbit (<i>Oryctolagus cuniculus</i>)	1	05/08/2013
Terrestrial mammal	Red Fox (<i>Vulpes vulpes</i>)	1	11/10/2016

It is noted that location information for a number of species is confidential and not provided on the database, including for golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus*), merlin (*Falco columbarius*), hen harrier (*Circus cyaneus*), marsh harrier (*Circus aeruginosus*), and white-tailed eagle (*Haliaeetus albicilla*).

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 dictate that a site is absent of notable flora or fauna in a historical or current context.

Habitats

The NPWS database did not return any records for protected habitats or flora from within or adjacent to the Site within grid square N92X.

4.4.2 Habitat Assessment

The habitat assessment provides a likely baseline scenario from 1990 at the Site. This assessment should not be confused with attempts to understand the pre-quarrying historical greenfield nature of the Site and any changes that occurred thereafter. By 1990 the quarry Site footprint was largely developed to an extent that would be recognised today. Between 1990 and 2020 the footprint of the quarry increased by ca. 18.7 ha from ca. 10.1 ha to 28.8 ha, as shown in Table 4.4 and Figure 4.4, Figure 4.5 and Figure 4.6 below.

Table 4.4: Land Take between 1990 and 2020

Year	Area of Site Including plant & ancillary areas (roads, etc.) Hectares (ha)
1991 (earliest satellite data)	10.07

¹ www.npws.ie mapviewer [accessed 30/10/2020]

Year	Area of Site Including plant & ancillary areas (roads, etc.) Hectares (ha)
1994	11.35
2000	15.6
2004	17.07
2012	20.48
2016	20.49
2020	28.8

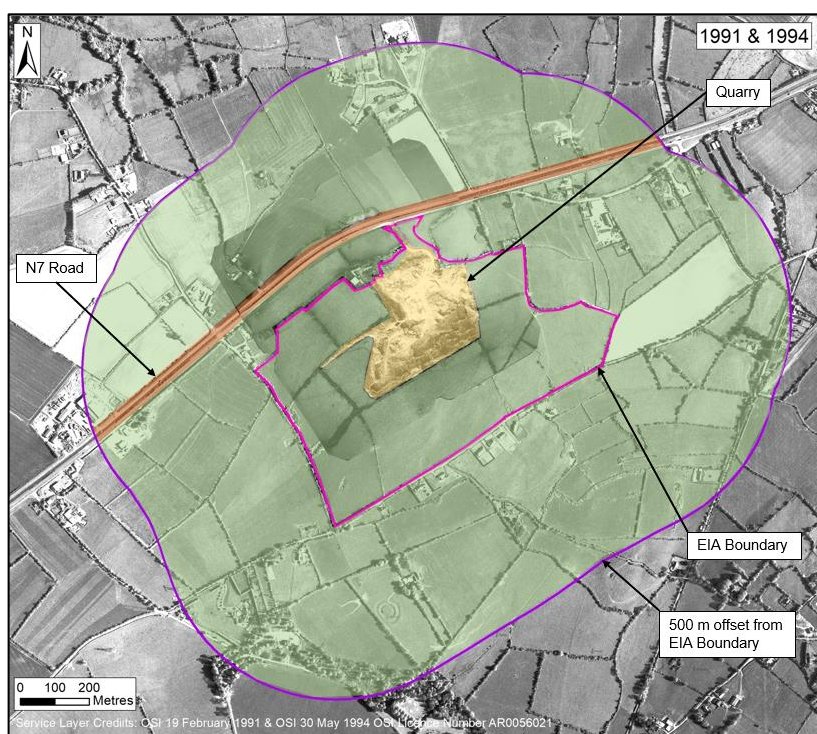


Figure 4.4: The Site during 1991

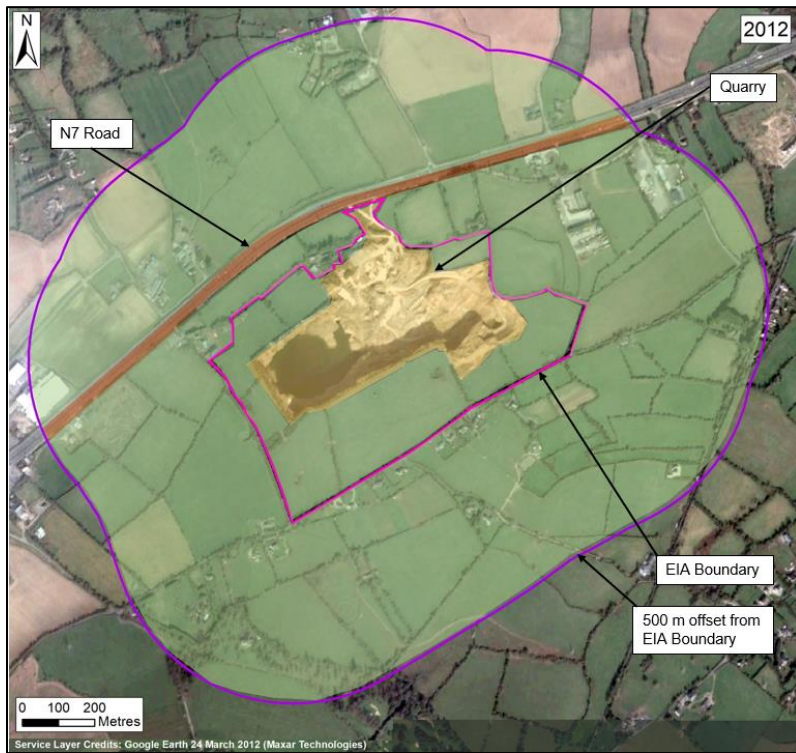


Figure 4.5: The Site During 2012



Figure 4.6: The Site During 2020

For the purposes of this assessment a baseline retrospective position to reflect habitat lost includes all habitat that it is considered would have been within the Site footprint is detailed below.

Table 4.5: Predicted Habitats on Site in 1990 (Fossitt, 2000)

Habitat	Habitat Code
Grassland (Certain to be present)	GA1
Trees and Treelines (likely to be present within hedge lines)	WD5 & WL2
Scrub (likely to be present as encroachment from field boundaries)	WS1
Hedgerows (Certain to be present)	WL1

Losses of habitat are certain to have occurred. It has been calculated that the footprint expansion of the Site between 1990 and 2020 amounts to ca. 18.7 ha. This loss is representative of grassland habitat with some hedgerow and scrub loss also certain.

4.4.3 Fauna assessment

The presence, or potential presence, of species on the Site in a retrospective context was identified from the desk study, habitat classification work using historic and satellite mapping and also walkover surveys (O'Donnell, 2021). In all cases, conclusions regarding the potential presence or indeed absence of protected or notable species was cognisant of the likely ubiquitous terrestrial habitats found within the Site. Where any uncertainty remains a precautionary presumption of presence was made. The walkover surveys and camera trapping were carried out to identify mammal species utilising the Site in the present context and this allows confident assumptions to be made concerning likely historic presence, or indeed absence, of species.

Bats

Bat species would have potentially used the hedgerows and treelines along the boundaries of the Site as foraging and commuting habitat. There is no evidence to suggest that any trees removed from the Site would have had the relative age or complexity of growth to accommodate significant roosting features e.g. tracts of ancient woodland. Given the habitats present prior to quarrying works at the Site, it is considered that the Site periphery would have been of Site Importance in relation to common and widespread species of bats such as the common pipistrelle (*Pipistrellus pipistrellus*).

Avifauna

Given the habitats present on Site post 1990 the avifauna within the Site would have been impoverished with the sterile habitat of the quarry floor and operational disturbance offering detrimental Site conditions for all bird species. The Site periphery, including boundary features would be limited primarily to general passerine species using the hedgerows surrounding the Site for nesting and foraging. The hedgerows surrounding the Site have remained intact throughout operations and as such, birds using these would not have been affected by the historical operations. It is possible that Site operations have created habitat for some bird species. In many cases species such as sand martins which often colonise quarry sites will benefit from the availability of stockpiled sand and aggregates.

In addition, Peregrine falcon (*Falco peregrinus*) are known to make use of cliffs that would have otherwise not existed at quarrying sites. The Peregrine falcon *Falco peregrinus* is listed on Annex I of the Birds Directive. As described in the ecology chapter within an EIAR for the Site in 2015 (Byrne Environmental, 2015) a single Peregrine was seen flying above the quarry Site to the west. It was subsequently seen to roost on the cliff face above the standing water. Due to the timing of this observation it cannot be concluded that breeding/nesting is occurring however, it strongly indicates that this may be the case. During the survey of 2010 documented by Byrne Environmental, 2015 (which also took place in November) Peregrine was not recorded although confirmation of its presence was made during both breeding and winter seasons as part of the 2007- 2011 Bird Atlas project (Balmer *et al.*, 2013). The presence of common and widespread bird species on the Site periphery is of Site importance. The potential presence of breeding peregrine at the Site is of Local/County importance.

Mammals

The Site footprint from the period 1990 to 2020 would generally exhibit a hostile environment for mammal species. The combination of vegetation absence and operational quarry noise sterilises the Site in terms of mammal use. The Site periphery including field boundaries may have hosted some habitat for mammal species in a foraging and commuting context. Small common mammals such as wood mouse (*Apodemus sylvaticus*), pygmy shrew (*Sorex minutus*) and European hedgehog (*Erinaceus europaeus*) would have used this peripheral habitat for foraging.

Larger mammals such as European rabbit (*Oryctolagus cuniculus*), Irish hare (*Lepus timidus hibernicus*) and red fox (*Vulpes vulpes*) may have also used the area for commuting and foraging. The baseline surveys of 2021 indicated the presence of rabbit and fox (Figure 4.7 and Figure 4.8) and a badger main sett was also identified on the Site boundary (Figure 4.9).



Figure 4.7: Rabbit on Site during 2021. (O'Donnell Environmental, 2021).



Figure 4.8: Fox on Site during 2021. (O'Donnell Environmental, 2021).



Figure 4.9: Badger Sett on Site during 2021. (O'Donnell Environmental, 2021).

The badger sett is likely to have remained in-situ for many years and it is possible that disturbance may have been afforded to the Sett from operational activities. However, the sett is situated some distance from the operational quarry on a hedge line boundary so this risk is considered to be fairly low.

The potential presence of mammals on the Site periphery indicates that minor impacts in an operational disturbance context could have occurred between 1990 and 2020. The presence of common mammal species is of Site value.

Herpetofauna and Invertebrates

The Site from the period 1990 to 2020 would generally exhibit a hostile environment for the herpetofauna and invertebrate groups. The Common Frog (*Rana temporaria*) and the Smooth Newt (*Lissotriton vulgaris*) are afforded protection under the Wildlife Act (1976) and Wildlife (Amendment) Act, 2000. The Common lizard (*Zootoca vivipara*) is also afforded protection under the Wildlife Act (1976) and Wildlife (Amendment) Act, 2000. As described by (Byrne Environmental, 2015) the lack of semi-natural habitat and in particular the absence of wet areas or standing water, precludes the presence of any amphibian species along the margins of the quarry Site. An area of standing water is present on the quarry floor however, it is unlikely that amphibians use this habitat for breeding due to the level of disturbance and the absence of any aquatic or marginal vegetation. Similarly, there is an absence of suitable semi-natural habitat for common lizard.

The relatively sterile habitats of the quarry floor at the Site extend upward toward peripheral boundary hedges, grassland and scrub habitat. This habitat is ubiquitous and not species-rich (Byrne Environmental, 2015) as such it is not considered to be optimal habitat for invertebrate species. The collective value of herpetofauna and invertebrates is of Site value only and impacts from operational disturbance are considered to be not significant e.g. no perceivable impacts on ecological features. Impacts may be beneath levels of perception, within normal bounds of variation, within the margin of forecasting error, or impacting on poor baseline conditions.

Aquatic ecology

As described by Byrne Environmental, 2015 there are no water courses running through the Site or directly adjacent to it. Ordnance Survey maps show that the nearest stream lies to the east and drains into the Griffeen river, which itself joins the river Liffey in the centre of Lucan. The Tootenhill Stream flows in a north-easterly direction about 0.75 km to the east of the Site. An area of open pooled water is noted on the quarry floor. This water has evidently collected from decades of precipitation and the absence of aquatic or marginal plants indicates that there is little or no residual biodiversity value in this feature. Given the absence of aquatic flora and fauna on Site and compounded by the fact that the Site has no hydrological connectivity with surface water features aquatic receptors are scoped out of this assessment as described in the following sections.

Summary

The presence, or potential presence, of species in a retrospective context on the Site was identified from the desk study which included an extensive review of secondary data gleaned from previous ecological assessments undertaken at the Site and also from baseline surveys undertaken in 2021 (O'Donnell, 2021).

Summary Table 4.6 lists the species which were considered likely to occur within the Site, on the basis of the presence of suitable habitat and/or the occurrence of recent records in the vicinity. The species, together with its legislative designation is listed.

The source(s) of information relating to each species could include:

- Existing records from desk study;
- Presence of suitable habitat identified during habitat survey;
- Results of specific survey work as applicable (i.e. relating to badger and bats); and / or

- Direct observation.

For each species with the potential to occur on Site, the final column of Table 4.6 presents a brief summary of the status of the species in relation to the Site itself. If the survey fails to record the species and the habitats are unsuitable, then it is concluded that the species is unlikely to occur, and it is not considered further within the assessment. If a species is confirmed as present, an indication of the likely population size/status within the Site is provided. This information is used in the evaluation presented in Table 4.7.

Table 4.6: Assessment of the potential for faunal species to occur within the site between 1990 and 2021.

Species/Group	Status	Summary of likely status on site
Bats	Wildlife Acts (1976 – 2010) – EU Habitat Directive.	The Site supported some suitable foraging and commuting habitat for bat species. Trees within the Site would have been considered to have some potential for bats, possibly in a roosting context.
Avifauna	Wildlife Acts (1976 – 2010), EU Birds Directive, Birds of Conservation Concern (BoCC ² , Ireland).	The peripheral Site supports some opportunities for foraging and nesting bird species. Common and widespread species were recorded on Site (Byrne Environmental, 2015). In addition, Peregrine falcon which is listed as an Annex 1 (EU Birds Directive) species was recorded possibly nesting on Site (Byrne Environmental, 2015). These species and groups of avifauna are likely to have been present throughout 1990 and 2021.
Mammals	Wildlife Acts (1976 – 2010)	A possible badger sett was identified on Site but no evidence of current presence was detected by the camera trapping survey. Some limited potential for common and widespread mammals such as rabbit and fox to use the Site periphery. The badger sett is likely to have existed for some time and mammal species may have used the Site periphery over some years.
Herpetofauna and Invertebrates	Wildlife Acts (1976 – 2010)	Limited available resources on the Site. Some limited potential to occur within the Site periphery in relation to scrub and hedgerows. Scoped out of the assessment.
Aquatic Fauna	Salmonids, Wildlife Acts (1976 – 2010) – EU Habitat Directive.	No available resource within Site. Scoped out of the assessment.

4.5 Evaluation

The evaluation of ecological features (sites, habitats and species) which could be affected by the operational Project between 1990 and 2020 is presented in Table 4.7. The table includes:

- Any statutory designated areas, with the exception of Natura 2000 sites, which are situated within 5 km of the project site that have potential ecological connection(s) with the Site;

² Colhoun, K. & Cummins, S. (2013) Birds of Conservation Concern in Ireland 2014–2019. Irish Birds 9: 523–544.

- Any surface or groundwater bodies that have hydrological connectivity with the Site;
- Any habitat type recorded within the Site; and
- Any species of conservation importance which has been confirmed as occurring / has potential to occur within the Site.

The value of the feature is based upon how important the feature is in relation to its geographical context. In other words, at what level of geographical resolution would the feature contained within the Site (habitat or species) be recognised as contribution to biodiversity to a significant degree. The evaluation takes into account extent (or population size) within the Site compared to the resource elsewhere and whether it has characteristics which either elevate or depress its importance in comparison with a 'typical' example (for example, whether a habitat is particularly species rich, or depleted in species).

Common and widespread species or habitat, therefore, only have a level of importance in respect of the biodiversity of their immediate area (taken in this case to be represented by the boundary of the Site). Such features are not considered further within the Impact Assessment. Some protected species may, under certain circumstances (such as a single example occurring within the Site, as part of a much larger local population) be considered to only be of importance within the Site itself. Such species, on the basis of legal and planning regulation compliance, are included within the Impact Assessment and, (if necessary) dedicated impact mitigation measures are provided. Table 4.7 presents each feature occurring, together with the rationale for its evaluation.

Table 4-7: Classifying the geographical Importance of Key Ecological Features

Key Ecological Features	Importance	Rationale
Habitats		
Active Quarry and Hardstanding	Negligible	This habitat offers negligible biodiversity value. Not considered further in this assessment.
Grassland (Site Periphery)	Site	This habitat represents a valuable resource in terms of farmland, but not in terms of biodiversity given the Site is in an area with abundant farmland, and this type of habitat is considered to be ubiquitous and not inherently biodiverse or rare in accordance with ecological value based upon the criteria defined by Ratcliffe (1977), namely: naturalness, size, rarity and diversity. This resource offers negligible biodiversity value in terms of the predicted losses between 1990 and 2020 (ca. 18.7 ha) and is not considered further in this assessment.
Colonising Ground	Site	This type of habitat is considered to be ubiquitous and not inherently biodiverse or rare in accordance with ecological value based upon the criteria defined by Ratcliffe (1977), namely: naturalness, size, rarity and diversity. Not considered further in this assessment.
Scrub (Site periphery)	Site	This habitat is not extensive within the Site and losses since 1990 are part of the ca 18.7 ha of Site expansion (land take) that has occurred, this habitat is considered to be ubiquitous and not inherently biodiverse or rare in accordance with ecological value based upon the criteria defined by Ratcliffe (1977), namely: naturalness, size, rarity and diversity. Not considered further in this assessment.

Key Ecological Features	Importance	Rationale
Hedgerows and occasional trees	Local Importance (lower value) (following NRA, 2009)	Hedgerows on Site have been residually affected in the period 1990 to 2020. Losses since 1990 are part of the ca 18.7 ha of Site expansion (land take) that has occurred. Peripheral boundary hedges have been retained during this time and they are likely to represent a useful resource for fauna such as birds, and breeding birds in particular. This feature is carried forward into the design mitigation and impact assessment sections.
Species		
Bats	Local Importance (higher value) (following NRA, 2009).	The peripheral Site supports some suitable foraging and commuting habitat, some trees have low or moderate bat roosting potential. This species group were likely to have been present and potentially residually affected by the land taken between 1990 and 2020 (ca. 18.7 ha). This feature (species group) is carried forward into the design mitigation and impact assessment sections.
Avifauna	Site and Local/County (Peregrine).	The peripheral Site scrub, hedgerows, and trees are likely to support a number of common and widespread bird species. Evidence of Peregrine on Site has also been recorded and is of Local/County significance. This species group were likely to have been present and potentially residually affected by the land taken between 1990 and 2021 (ca. 18.7 ha). This species group (breeding birds) is carried forward into the design mitigation and impact assessment sections.
Mammal	Local Importance (higher value) (following NRA, 2009).	The peripheral Site scrub, hedgerows, and trees may have supported a number of common and widespread mammal species. A badger sett has also been identified on Site. This species group were likely to have been present and potentially residually affected by the land taken between 1990 and 2020 (ca. 18.7 ha). This species group is carried forward into the design mitigation and impact assessment sections.

4.6 Impact Assessment

Given the nature of the assessment, the operational impacts alone during the period between 1990 and 2020 are assessed. Operational impacts are summarised below:

- Land take (permanent loss) ca. 18.7 ha;
- Habitat modification through anthropogenic effects;
- Disturbance to habitats and species through noise from traffic and blasting;
- Individual species disturbance / mortality; and
- Impacts of dust as a result of extraction activities.

Potential direct and indirect impacts from water quality and quantity are as follows:

- Impacts of dust and Site runoff (sediments, fuel, etc.) as a result of quarrying activities; and

- Impacts on groundwater and surface water from site de-watering (drawdown) and usage.

4.6.1 Hedgerows and Occasional Trees

Characterisation of Unmitigated Impacts

Boundary hedgerows and trees have been largely retained during the assessment timeframe. However, permanent losses of hedgerows and trees will have occurred as part of the Site expansion amounting to ca. 18.7 ha of total land area. Accordingly, the potential for ecological impact to hedgerows and trees, in the absence of mitigation focuses on the following factors:

- Permanent loss of hedgerow and mature trees;
- Potential un-planned encroachment of machinery and quarry footprint (impacts on root protection zones); and
- Dust deposition and subsequent changes in habitat composition.

Permanent loss and damage to hedgerows or modification would afford a negative impact. In the absence of mitigation, this may restrict this availability and resource to fauna during the operational assessment timeframe.

Rationale for Prediction of Effect

Permanent loss and degradation of foraging habitat and potential habitat severance is less likely to cause stress to species associated with hedgerow habitat given the abundance of optimal habitat within the local setting. On a precautionary basis, it is considered certain that this impact will negatively affect the conservation status of these linear landscape features.

Effect without Mitigation

The unmitigated effect of this development would result in a **Moderate** negative impact on habitat of **local (lower)** sensitivity and importance. These effects are usually only at local or regional level, and may be short or medium term only, or temporary impacts on a small part of an international site. However, the cumulative effects of such issues may lead to an increase in the overall effect on ecological features. They represent issues where effects will be experienced, but mitigation measures and detailed design work may ameliorate/enhance some of the consequences upon affected interests, but some residual effects will still arise.

4.6.2 Bats

Characterisation of Unmitigated Impacts

The potential for ecological impacts to bats as a result of the operation of the quarry post 1990 focuses on the following factors:

- Permanent loss of roosting habitat;
- Loss of the bat foraging habitats that may be removed through any outward development of the quarry between 1990 and 2020; and
- Increased noise, lighting and human activity along commuting routes and within foraging habitats on the Site periphery.

The removal of woody vegetation such as trees and scrub would permanently remove roosting, foraging and commuting habitat for bats. Potential effects to bat species include a negative biophysical effect to scrub and peripheral habitat which may inhibit bat commuting value. Linear landscape features, such as hedgerows, are

important habitats for bats, providing flight paths between roosts and foraging sites and as foraging habitats (e.g. Verboom and Huitema 1997, Oakeley and Jones 1998, Russ and Montgomery 2002). It is understood that the hedgerows at the Site periphery have remained unchanged since 1990, thus maintaining the value of this feature to foraging / commuting bats.

Noise effects associated with the operation of the quarry would be temporary during diurnal parts of the day and no nocturnal noise effects are anticipated to have occurred.

Rationale for Prediction of Effect

On a precautionary basis, the rationale for effect on bat species considers that roosting, foraging and commuting habitat has been degraded via direct, sensory and land take during the operational assessment period of the quarry. The Site is considered to be poor and relatively ubiquitous in terms of roosting, foraging and commuting value. Nevertheless, on a precautionary basis, it is considered likely that these impacts could negatively affect the conservation status of the bat population.

Effect without Mitigation

The unmitigated impact of this development would result in **minor negative** effects to species of **Local (higher)** importance. These effects are likely to be local issues only; or small magnitude impacts at the regional and national level, they are usually temporary, and are unlikely to be of importance in the decision-making process. However, they are of relevance in enhancing the subsequent design of the restoration and consideration of mitigation measures.

4.6.3 Breeding Birds

Characterisation of Unmitigated Impacts

The potential for ecological impact to the breeding bird group, in the absence of mitigation focuses on the following factors:

- Losses of scrub, hedgerow and tree nesting habitat;
- Operational noise (blasting and vehicle movements);
- Dust deposition and subsequent changes in habitat composition (changes to structural, foraging, breeding and commuting habitat); and
- Potential effects to bird species include a negative biophysical effect to vegetation availability which may disturb breeding birds and reduce available forage.

Potential losses of available nesting habitat as a result of the quarry operation would be discrete and dependant on habitat type. In the context of the available nesting habitat within the trees, cliffs and scrub vegetation at the Site periphery the impact may be considered minor. Noise effects associated with the operation of the quarry would have been temporary and reversible.

Rationale for Prediction of Effect

The rationale for effect to bird species considers that discrete losses of available nesting habitat may occur and disturbance may occur to species protected at the National and European level (Peregrine falcon). The Site periphery is considered to exhibit some suitable breeding bird habitat for passerines and cliffs within the Site are known to support Peregrine falcon. It is considered that effects to treeline and hedgerow habitat are discrete and wholly reversible. Losses of scrub and trees, used for foraging and breeding, are unlikely to cause stress to this

group given the abundance of habitat (mature trees, hedgerow and pasture) within the local setting. On a precautionary basis, it is considered likely that this temporary impact could have negatively affected the conservation status of the bird populations on and adjacent to Site.

Effect without Mitigation

The unmitigated impact on this feature would result in a **minor** effect to species of **site and Local/County** importance. The majority of bird species are protected under the Wildlife Acts (1976-2012) where it is an offence to hunt, interfere with or destroy their breeding or resting places unless authority is obtained via statutory licence provision. Peregrine Falcon is further protected by the Habitats Directive and listed as an Annex I species. Expansion of the quarry may have also had a positive effect on species such as peregrine falcon as the increase in quarry footprint will have resulted in an increase in nesting opportunities (cliff faces) within the Site via quarry expansion between 1990 and 2021.

4.6.4 Mammals

Characterisation of Unmitigated Impact

The potential for ecological impact to the mammal group focuses on the following factors:

- Losses of hedgerow, scrub, grassland and tree habitat;
- Operational noise disturbance; and
- Dust deposition and subsequent changes in habitat composition (changes to structural, foraging and commuting habitat).

The mammal group includes badger, fox, rabbit, stoat, pygmy shrew, and hedgehog. Although this group of species are generally mobile, operational impacts attributed to noise, vegetation removal and dust deposition must be considered. Dust that settles on plants, can affect the plants' transpiration, respiration and other metabolic activity, by clogging pores and damaging waxy cuticles on the leaves, and by reducing available light. Dust can alter soil and water chemistry, structure and trophic status which may have impacts on the composition of plant and invertebrate communities. Dust can have direct impacts on insect and other invertebrate populations. Impacts on plant and invertebrate communities may result in effects further up the food chain (small mammals).

Rationale for Prediction of Effect

The variable effects associated with operational noise and potential habitat severance and loss at different distances from the source of disturbance, are very little understood for small to medium mammals. Habitat loss would be likely to afford a level of perceived stress and possible mortality, dependent on species mobility, though this is not certain. Minor losses of foraging habitat and potential habitat severance is less likely to cause stress to this species group given the availability of other suitable habitat (scrub, grassland) within the local setting. On a precautionary basis, it is considered likely that this impact could have negatively affected the conservation status of the local mammal population including a badger sett.

Effect without Mitigation

The unmitigated effect to this group would result in **minor** impacts to species of **Local (higher)** importance. Small mammals such as stoat and hare are protected under the Wildlife Acts (1976-2010).

4.7 Remedial Mitigation, Compensation and Enhancement Measures

The principal objective of the remedial ecological mitigation is to take measures to reduce negative effects of the Project in a retrospective context. Details of committed remedial mitigation, compensation and enhancement measures including the provision of a concept restoration plan are outlined in this section.

4.7.1 Hydrocarbons/Chemical safeguards & Protection of site water

Proposed remedial mitigation measures are outlined as follows (these are already implemented at the existing quarry Site):

- All soil / overburden stockpiles shall be covered (i.e. vegetated) to minimise the risk of rain / wind erosion;
- Restoration of topsoil and overburden will be carried out on a phased basis to speed up restoration biodiversity value as defined in the concept restoration plan;
- All plant and machinery will continue to be regularly serviced before being used on Site;
- Mobile plant fuelling should take place in a designated area of Site. In addition, spill kits will be maintained on site to deal with all spills and leaks, and spill training will be provided to relevant staff members;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel and oil containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and chemicals will have a holding capacity of 110% of the volume to be stored;
- Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel mobile plant on Site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and,
- An emergency spill kit (including absorbers) will be available for use in the event of an accidental spill on the quarry floor and key personnel trained in their use.

4.7.2 Protection of Retained Habitat

To protect retained hedgerows and trees, such vegetation will be protected with secure fencing prior to the commencement of extractive works on Site. This protection will be designed following NRA guidance (NRA, 2005), in particular, with regard to root protection areas and fencing specifications (unless otherwise advised by a suitably qualified arboriculturalist). Dust suppression will be implemented in accordance with best practice guidance (CIRIA, 2016).

4.7.3 Habitat Compensation

Planting will be required to mitigate for tree and hedge removal that occurred post 1990 and the concept restoration plan will be required to replace any trees and shrub species removed on a “like for like” basis (as a minimum). Consideration will be given towards hawthorn, blackthorn mix with individual alder and birch (to form native tree hedges) and deciduous trees (native tree species include oak, alder, birch).

4.7.4 Birds

A breeding bird (including Peregrine Falcon) survey will be undertaken at the next opportunity commencing in March 2020. The result of this work will form the basis of a Peregrine falcon management and monitoring plan for the Site.

4.7.5 Invasive Species

Measures will be implemented throughout Site works to safeguard against the spread of any invasive non-native species (such as cotoneaster, Japanese knotweed or rhododendron). Indeed, where possible such plants will be removed from the Site (and disposed of appropriately, following an appropriate method statement). As such, an invasive species survey will be undertaken within the appropriate window for this type of work which is likely to be within the growing season (April to September inclusive).

4.7.6 Enhancement

The concept restoration plan for the Site offers opportunities for habitat enhancement over and above the existing situation. Such enhancement measures will be detailed in a formal concept restoration plan, and will be drafted in line with the following principles regarding enhancement measures for habitats and for fauna.

Habitat

New habitat provision under the concept restoration plan will include provisions for trees, hedgerow, and shrub planting over and above the current situation. Where possible, these will be planted in association with other habitats of elevated value, such as wildflower grassland. Planting should comprise native species of local provenance. Where this is not possible, plants will be selected for their fruit, berry, or nectar bearing qualities. All landscape planting within the site will be managed for the benefit of wildlife.

Fauna

To increase opportunities for roosting bats and nesting birds, a number of bat and bird boxes will be incorporated in the concept restoration plan for the Site, placed on trees of a suitable size. In addition, to increase opportunities for invertebrates within the Site, invertebrate boxes will be provided under the concept restoration plan. These boxes will be located in sheltered areas of new and retained vegetation, such as in association with hedgerows.

4.8 Residual effects

For the purposes of robust assessment, residual effects have been considered to be effects that were identified in the impact assessment process prior to the consideration of any additional mitigation, as full details of some of the additional mitigation are yet to be developed. These effects were all identified as being not significant to minor afforded to species of Site and Local (higher and lower) importance in the period 1990 to 2021. In essence, the favorable conservation status of species and habitats on Site between 1990 and 2021 has not been adversely compromised. The on-going operation of the quarry committed delivery of mitigation measures and eventual restoration of the quarry is likely to result in all effects being considered to be not significant. In essence, this can be described as having no perceivable impacts on ecological features (habitat or species). Impacts may be beneath levels of perception, within normal bounds of variation. Depending on the efficacy of the restoration proposals at

eventual closure of the Site, there may be an opportunity to provide a minor positive (net gain) for biodiversity value at the Site level.

4.9 Cumulative impacts and Safeguarding Zones

Golder have reviewed the planning portal websites and South Dublin County Development Plan in addition to being involved in projects where EIAR is required within South Dublin County and the broader region. It is noted that there are no extractive or sizable industries in the surrounds of the Site which may contribute to cumulative effects in a retrospective context. Expansion of the N7 roadway and associated noise and disturbance effects are likely to have dominated environmental impact in the period 1990 to 2020. It is therefore considered that no significant cumulative impacts have occurred.

Casement Aerodrome is ca. 3.5 km away from the Site. As defined in the County Development Plan *'It is the policy of the Council to safeguard the current and future operational, safety and technical requirements of Casement Aerodrome and to facilitate its ongoing development for military and ancillary uses, such as an aviation museum, within a sustainable development framework.*

IE8 Objective 4: To prohibit and restrict development in the environs of Casement Aerodrome in the following ways:

e) By controlling and assessing the locations of any activities which may be an attraction to birds³.

7.8.1 CASEMENT AERODROME Casement Aerodrome is in continuous aviation use and is the only fully equipped military airbase in the State and serves as the main centre of Air Corps operations.

The Concept restoration plan for the Site will be cognisant of the safeguarding policies detailed above with an obligation placed upon avoiding colonisation of the Site by significant bird numbers. This will be implemented via habitat restoration selection and management process to avoid aggregations of birds at the Site.

4.10 Summary and Conclusions

This chapter has evaluated the importance of the ecological resources present and defined the degree of significance of potential impacts resulting from the operational quarry between 1990 and 2020. The assessment approach has followed CIEEM (2018) and taken account of national planning policy and Local Plan policies in respect of nature conservation and protected species legislation in identifying impacts that may have occurred in a retrospective context. It has also identified and proposed any appropriate remedial avoidance, mitigation and compensation measures.

The assessment has concluded that no nature conservation sites have been directly or indirectly affected by the Project.

The habitat survey of the Site identified the presence of some habitat of elevated ecological value; namely trees within the Site, and hedgerows at Site boundaries.

Specific faunal survey work carried out identified the use of the Site by a number of common and widespread species, whilst potential for the use of the Site by species protected under both national and European legislation

³ <https://www.sdcc.ie/en/download-it/publications/south-dublin-county-council-development-plan-2016-2022-written-statement.pdf>

was also identified. Accordingly, suitable mitigation and compensation measures have been outlined in this Chapter, to safeguard these species as remedial measures.

In addition to mitigation for any potential impacts of the development on local flora and fauna, the opportunity has been taken to incorporate a number of enhancement measures within the assessment, to improve habitat quality over and above the current situation, together with creating new opportunities for fauna within the Site. These enhancements focus on the concept restoration of the quarry. Habitat enhancements at minerals sites have the potential to enhance biodiversity and to provide a public benefit at the end of their working lives through restoration⁴.

⁴ <https://service-rspb.boldlight.co.uk/app/uploads/sites/3/2016/03/Nature-After-Minerals-report.pdf>

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