



6. Biodiversity

6.1 Introduction

Ecology Ireland was commissioned by Tom Phillips and Associates on behalf of Milford Quarries Ltd. to prepare the Biodiversity Chapter in relation to identifying, quantifying and evaluating the residual direct and indirect effects of historic quarrying activities at Redrock Quarry, Clogrennane, Co. Carlow, comprising an area of 41.86ha. This assessment is required as part of the Environmental Impact Assessment Report (EIAR) process, with the remedial EIAR (rEIAR) accompanying a planning application under Section 177E of the Planning and Development Act 2000, as amended.

This Biodiversity assessment has been prepared using 'Draft Guidelines on the Information to be contained in Environmental Impact Assessment Report (EIAR)' (EPA 2022).

The main objectives of this study were to:

- Undertake a desktop review of available ecological data for the Redrock quarry site and surrounding area, including a review of designated nature conservation sites potentially within the zone of influence of this project
- Describe the baseline ecological field assessment of the Substitute Consent site in order to describe existing flora and fauna
- Evaluate the ecological significance of the Substitute Consent site
- Assess potential impacts on the existing ecology that arose from the development of a quarry at this location.
- Consider remedial mitigation measures to eliminate or reduce potential negative impact(s) on the existing ecology that arose from the historic quarrying activities, where relevant, at Redrock Quarry, Clogrennane, Co. Carlow.

6.1.1 Statement of Authority

The survey methodology was developed by Dr Gavin Fennessy of Ecology Ireland Wildlife Consultants Ltd. (Ecology Ireland). Bird surveys were carried out by Dr Gavin Fennessy and Dr. Shane Somers. Dr Somers also conducted habitat mapping, assisted with the eDNA sampling and the general baseline ecological assessment. Dr John Conaghan conducted a botanical and habitat survey. Terrestrial mammal surveys, including trail camera deployment and passive bat surveys were carried out by Dr Gavin Fennessy. This report has been prepared by Dr Gavin Fennessy and Dr Karen Mullen. Short biographies of the ecological project team are provided below.

Dr Gavin Fennessy

Dr Gavin Fennessy (BSc PhD MCIEEM) is the Director & Principal Ecologist of Ecology Ireland Wildlife Consultants, a consultant ecologist with over 25 years of experience in environmental consultancy. Dr Fennessy has contributed to and Project Managed numerous ecological impact assessment projects including EcIA, EIA, AA, SEA etc. Gavin is also an experienced Expert Witness having presented expert testimony at several An Bord Pleanála Oral Hearings.



He is also an experienced lecturer and has regularly contributed to B.Sc. Env. Sc. courses at UCC.

Dr Shane Somers

Dr Shane Somers is a professional ecologist, operating on a range of projects across Ireland. Shane has a PhD in ornithology with extensive experience in a variety of ecological assessments, specialising in bird, bat and habitat surveys and assessments. Shane has experience undertaking fieldwork and technical assessments for developments such as largescale windfarms, solar farms, recreation facilities, greenways, residential and parks projects. Shane is a skilled botanist and competent in most general ecological walkover survey skills. He is familiar with the key legislations and directives in Ireland such as the Habitats and Birds Directives, Irish Wildlife Act, Floral Protection Order, Schedule III invasive species etc.

Dr Karen Mullen

Dr Karen Mullen has over 12 years of professional experience in focused wildlife surveys and habitat assessments, bat surveys and analysis, and habitat mapping. She has worked on numerous projects related to renewable energy, infrastructure, housing, and various other development projects. She is an experienced field ecologist with extensive ecological survey experience, including habitats, terrestrial mammals, and birds.

Dr John Conaghan

Dr John Conaghan is a botanical/environmental consultant with 25 years of consultancy experience, specialising in the survey and assessment of vegetation and habitats. He has undertaken survey work in a wide range of habitats throughout Ireland including fens, grasslands, bogs, woodland and coastal habitats. Over the past 25 years Dr. Conaghan has carried out a large number of vegetation/ecology surveys with the vegetation ecology of bogs/fens and the distribution of Irish rare plants, particular fields of interest.

6.1.2 Description of the Subject Site and Existing Quarry

The proposed development site consists of an area of c. 41.86ha with the area of historic excavation measuring approximately 8.66ha. The former quarry was used to extract sandstone bedrock with commercial quarrying activity ceasing in 2014 with some minor extraction activity taking place following this. There is limited vegetative cover present within the worked areas of the existing quarry with areas of spoil and bare ground, recolonising bare ground, and some artificial lakes and ponds. The remainder of the proposed application site is predominantly comprised of improved agricultural grassland, hedgerows, treelines and scrub. The overall landholding has a total area of 45.68ha.

The development consisted of quarrying including rock extraction by mechanical means including extraction areas, stockpiling areas, surface water management and ancillary works. The quarry included an extraction area of c. 8.66 hectares within a wider landholding of c. 45.68 ha and involved extraction of up to 650,000 m³ of material.



It should be noted that no significant extraction activities began at the site until the period between 2000 and 2005, as evidenced by historic aerial imagery and based on discussions between the applicants and the previous operators of the site. Further assessment of historic aerial imagery of the site, confirms that the bulk of extraction at the site took place between 2005 and 2010-2012 timeframe. This is consistent with economic activity at the time.

The Aerial imagery further suggests that there was a small level of extraction from the lands following the S261A proceedings. Information on this is limited but we understand that relatively modest quantities of material were removed in both 2018 and 2021. This material would most likely have been used locally for agricultural purposes, given the nature of the material removed and the quantities removed.

The Substitute Consent application includes a restoration plan to return worked areas to agricultural grassland using excavated materials from an existing infill area at the western portion of the site.

The site is surrounded by agricultural lands and one-off rural housing to the north, south, east and west. There is an area of forestry immediately adjacent to the west of Substitute Consent site, with forest areas are also located to the northwest and south of the Substitute Consent site. Clogrennane Woods, a Coillte property with a long-established woodland (circa 1800's) is located 0.5km to the east. The quarry site is accessed from the L7130 and L7134 public road to the east. An access road to the quarry branches off this local road and runs along the northern boundary of the existing quarry void.

This general area has a long association with extraction activities. The Substitute Consent site is 1.5km east of the Bilboa, Co. Laois which is historically a coal-mining settlement while an active quarry, Clogrennane Lime Ltd. is located approximately 1.5km to the southeast of the site.

The majority of the Substitute Consent site is located within the River Barrow surface water catchment and Hydrometric Area 14 of the Southeastern River Basin District. Part of the southwest of the Substitute Consent site is located within the River Nore surface water catchment and Hydrometric Area 15 of the Southeastern River Basin District. EPA mapping indicates a stream (identified as Raheendoran Stream) flowing through the site before ultimately discharging into the River Barrow. However, walkover surveys and drainage mapping indicate that the course of this stream has been altered by the historic quarrying activities and no watercourses cross the existing quarry void. Water gathers in the floor of the existing quarry and drains out from an existing pond in the north of the quarry. From here the stream/quarry discharge flows to the southeast along the existing quarry access road. The drain is culverted under the access road and flows to the east where it joins the Mortarstown Stream to the east. This stream flows east and discharges into the Fushoge River just upstream of its confluence with the River Barrow.

There is no existing discharge from the quarry within the River Nore catchment. However, there is an unnamed stream c. 1.3km west of the site which connects to the Dinin River that



ultimately discharges into the River Nore. It is possible that runoff from some areas in the west of the site may currently flow to the west towards the Dinin River.

6.1.3 Substitute Consent

The proposed development site consists of an area of c. 41.86ha with the area of historic excavation measuring approximately 8.66ha. The former quarry was used to extract sandstone bedrock with commercial quarrying activity ceasing in 2014 with some minor extraction activity taking place following this. There is limited vegetative cover present within the worked areas of the existing quarry with areas of spoil and bare ground, recolonising bare ground, and some artificial lakes and ponds. The remainder of the proposed application site is predominantly comprised of improved agricultural grassland, hedgerows, treelines and scrub. The overall landholding has a total area of 45.68ha.

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The Aerial imagery further suggests that there was a small level of extraction from the lands following the S261A proceedings. Information on this is limited but we understand that relatively modest quantities of material were removed in both 2018 and 2021. This material would most likely have been used locally for agricultural purposes, given the nature of the material removed and the quantities removed.

The Substitute Consent application includes a restoration plan to return worked areas to agricultural grassland using excavated materials from an existing infill area at the western portion of the site.

Ordnance Survey Ireland (OSI) maps for the Substitute Consent site were reviewed to establish the primary habitat types prior to quarrying activities. A small gravel pit is indicated on historic maps dated 1913, and evidence of a quarry is shown on a map dated 1906 which accompanied the registration application. Prior to 2000, the Substitute Consent area was primarily a mosaic of improved grassland bounded by hedgerows, characteristic of the area that currently surrounds the Substitute Consent site. Significant changes to the site took place from 2005 onwards with the intensification and expansion of quarrying activities.

The quarry was registered by the previous owner in 2005 over an area of 25.7 hectares. In 2012, Carlow County Council measured the current extraction area as 16.17 hectares and reasoned that the pit appeared to have been abandoned from 1913 (0.16 hectares) until 2000,



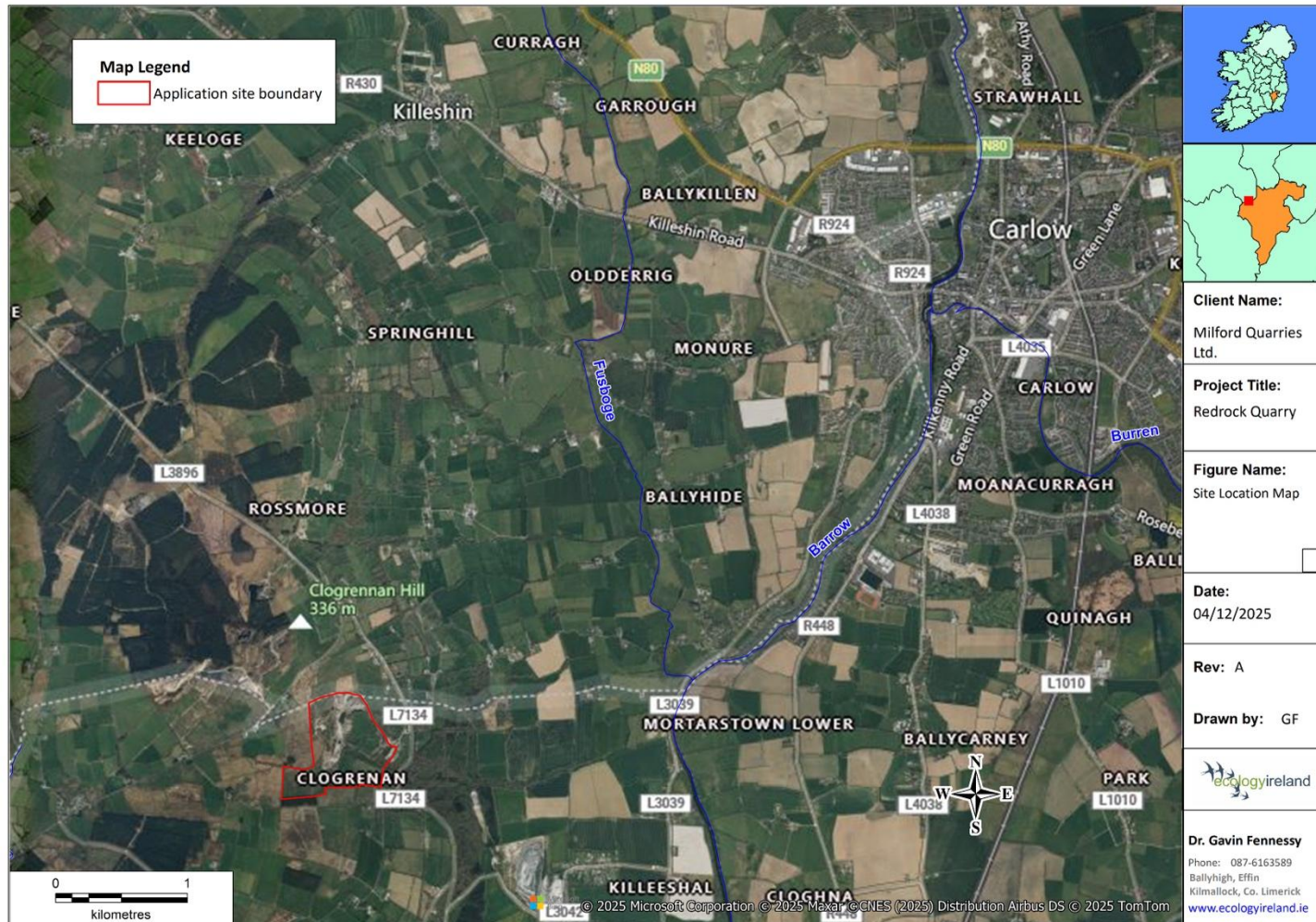
when works recommenced and intensified in the period 2005-2010. In August 2012, Carlow County Council determined under section 261A(2)(a)(i) that quarry development was carried out after 1st February 1990, which development would have required, having regard to the EIA Directive, an environmental impact assessment but that such an assessment was not carried out. The reason given was that the site exceeded the mandatory threshold of 5 hectares for an EIA. The Planning Authority also determined under section 261A(2)(a)(ii) that development was carried out after 26 February 1997, which development would have required, having regard to the Habitats Directive, an Appropriate Assessment but that such an assessment was not carried out.

Milford Quarries Limited acquired the abandoned quarry in 2023 and applied for leave to seek Substitute Consent in May 2023 (ABP Ref: LS01.317194). Following the enactment of the Planning and Development Amendment Act 2023, the need to apply for Leave for Substitute Consent was removed from the legislation with effect from 16th December 2023. This application was therefore considered withdrawn by An Bord Pleanála.

Milford Quarries Limited are currently preparing a planning application under Section 37L of the Planning and Development Act 2000, as amended, for a Substitute Consent for a 41.86ha portion of the 45.68ha landholding. This proposed project will consist of further quarry extraction over an area of 16.17ha and will overlap the site entirely that is the subject of this Substitute Consent planning application. The projected lifespan of this Substitute Consent is c. 20 years.



Figure 6.1 Redrock Quarry site, southwest of Carlow town



6.2 Methodology

This study involved undertaking a desktop review and site surveys of the Substitute Consent site and receiving environment, including the upstream and downstream watercourses. The relevant 10km and 2km grid square that overlaps the site was identified and the following databases were reviewed for relevant information for that grid square:

- Department of Housing, Planning, Community and Local Government (DHPCLG) online land-use mapping (www.myplan.ie/en/index.html);
- Environmental Protection Agency (EPA) geoportal mapping tool (<https://gis.epa.ie/EPAMaps/>);
- National Parks and Wildlife Service protected site and species information and data (<https://www.npws.ie/protected-sites>);
- Botanical Society of Britain and Ireland (BSBI) plant distribution maps (<https://bsbi.org/recording/maps-data/distribution>)
- Bat Conservation Ireland data on bat roosts and activity;
- National Biodiversity Data Centre (www.biodiversityireland.ie); and
- Ordnance Survey of Ireland mapping and aerial photography (www.osi.maps.arcgis.com).

Field surveys of the Substitute Consent site and surrounding areas were carried out between July 2025 and August 2025. The schedule of these field surveys is presented in Table 6.1.

This ecological assessment uses a 'greenfield' baseline derived from historical maps and related information. The greenfield baseline was determined to be the site pre-1995, when the most the most widespread and most recent quarrying activities commenced.

Table 6.1 Field Survey Schedule

Date	Time	Survey	Weather	Ecologist
07/07/2025	10:00 – 15:45	Transect bird surveys, VP surveys, trail cameras and passive bat detector deployment, general walkover survey	Sunny spells, Dry, becoming more overcast Cloud 3-6/8, Wind F2, Good visibility	Gavin Fennessy
07/08/2025	09:20 – 15:00	Transect bird surveys, VP surveys, general walkover	Dry, sunny, Cloud 2/8, Wind F2-3, Good visibility	Gavin Fennessy
09/08/2025	11:15-17:00	General walkover, habitat mapping, mammal survey, bat roost survey	Dry, overcast, Temp 16°C	Shane Somers
10/08/2025	10:55-18:00	General walkover, habitat mapping, mammal survey, bat	Mostly dry, overcast, Temp 17°C	Shane Somers/Gavin Fennessy



Date	Time	Survey	Weather	Ecologist
		roost survey, eDNA sampling		
11/08/2025	11:00 -14:45	Habitat and botanical survey	Mostly dry, brief shower, Cloud 4-7/8, Wind F1-2	John Conaghan
14/08/2025	11:45 – 15:00	Retrieve trail cameras and passive bat detectors, general walkover survey	Dry and sunny spells, Cloud 2/8, Wind F1, Good visibility	Gavin Fennessy

6.3 Desktop study

A desktop review of relevant data available for the Substitute Consent site was undertaken reviewing previous ecological surveys from the quarry site as well as other relevant information (e.g. online ecology and environmental databases).

The National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC) and Botanical Society of Britain and Ireland (BSBI) online databases were consulted to identify any rare, protected and non-native invasive species located within the relevant national 10km and 2km grid squares encompassing the site.

The model of Bat Landscapes (Lundy *et al.* 2011), available on the NBDC website was consulted. This model is based on the relative importance of landscape and habitat associations for bat species in Ireland and the index ranges from 0 to 100, where 100 is the most suitable for bats.

6.4 Designated sites

European (Natura 2000) sites include Special Areas of Conservation (SAC's) and Special Protection Areas (SPA's) for birds, nationally designated sites include Natural Heritage Areas (NHA's) and proposed Natural Heritage Areas (pNHA's). Designated nature conservation sites in the vicinity of the quarry site were considered in detail as part of the terrestrial ecological assessment. Geographical Information Systems (GIS) software was used to map and measure the distance from the site boundary to nationally and European designated conservation sites. The boundary shapefiles were downloaded from NPWS in November 2025.

The potential for likely significant effects on European designated Natura 2000 sites arising from the development of the quarry is considered as part of a Screening for Appropriate Assessment and consequently the potential for adverse effects of the proposed project (in combination with other plans or projects) on Special Areas of Conservation and Special Protection Areas is assessed in the Natura Impact Statement that accompanies the EIAR. A nominal 15km hinterland area has been used in this assessment with reference, where appropriate, to more distant sites which may be ecologically linked with the development area. In keeping with current guidance, we consider the likely Zone of Influence (or Impact) for a development and do not only consider sites out to this



nominal distance of 15km. Where consideration of the Source-Pathway-Receptor (S-P-R) model indicates that there are likely significant effects which in the absence of mitigation will occur in relation to more distant sites, these are considered as part of the screening process.

6.5 Habitat and Botanical Assessment

A desktop review of botanical data available for the Substitute Consent site was undertaken by consulting online databases to identify botanical species of interest (e.g. rare, protected) previously recorded within the relevant national grid squares that overlap the Substitute Consent site; in this case a review was undertaken of S67, the 10km national grid square and S67R, the 2km national grid square that encompasses the site from the National Biodiversity Data Centre (NBDC) online database. A review of the Flora Protection Order (FPO) Map Viewer – Bryophytes database as held by the NPWS was also reviewed (November 2025).

As summarised in Table 6.1, the initial habitat mapping and botanical survey was undertaken on 8th, 9th and 10th August 2025. The habitat and flora site assessment was carried out in accordance with current Irish habitat survey guidelines.

Habitats were described and mapped following the standard scheme for classifying habitats in Ireland (Fossitt, 2000). The dominant plant species were recorded, and habitats were classified according to their vegetation types. Where appropriate consideration was given to whether habitats qualify, or could qualify, as corresponding Annex 1 habitats. Relative abundance of plant species was estimated using the DAFOR scale. The scientific names for plant species use nomenclature given in An Irish Flora (Parnell & Curtis 2012). Incidental sightings of other taxonomic groups were also recorded.

To identify historical habitats within the Substitute Consent area, OSI imagery from 1995 to present day was reviewed. The mapping shows progressive habitat change corresponding to the commencement, expansion and intensification of quarrying activities over time.

The conservation status of habitats and flora was considered in respect of the following: Irish Red Data Book for Vascular Plants (Wyse Jackson *et al.* 2016); Red List of Bryophytes (Lockhart *et al.* 2012); Flora Protection Order (2022); the EU Habitats Directive (92/43/EEC). Evaluation of the habitats present in terms of their ecological value was assessed using criteria amended from NRA (2009) and Nairn and Fossitt (2004).

6.6 Environmental DNA (eDNA)

To further validate site surveys and to detect any cryptically-low populations of protected and or rare aquatic species within the survey area, a composite water sample was collected from survey site at three pond locations within the quarry site (see Figure 6.2). This sample was analysed for white-clawed crayfish (*Austropotamobius pallipes*), Common frog (*Rana temporaria*), European eel (*Anguilla anguilla*) and Smooth Newt (*Lissotriton vulgaris*) environmental DNA (eDNA).

In accordance with laboratory guidance, a composite (500ml) water sample was collected from the sampling point, maximising the geographic spread of the sample (20 x 25ml samples at each site), thus increasing the chance of detecting the target species' DNA. The composite sample was filtered



and fixed on site using a sterile proprietary eDNA sampling kit. The sample was stored at room temperature and sent to the laboratory for analysis within 48 hours of collection. A total of n=12 qPCR replicates were analysed for each sample. Given the high sensitivity of eDNA analysis, a single positive qPCR replicate is considered as proof of the species' presence (termed qPCR No Threshold, or qPCR NT). Whilst an eDNA approach is not currently quantitative, the detection of the target species' DNA indicates the presence of the species at and/or upstream of the sampling point.



Figure 6.2 Sampling locations for eDNA





6.7 Terrestrial Fauna

6.7.1 Non-volant Mammals

Records of sightings and signs of non-volant mammals were recorded during the baseline ecological walkovers and dedicated mammal walkover surveys at the site. Surveys included a walkover of the Substitute Consent site, identifying mammal species or signs of mammal activity seen (e.g. droppings, tracks, burrows etc.) and recording observations using field notes and/or handheld GPS units. All parts of the site were walked with particular focus on the field boundaries and areas with soft ground and/or vegetative cover. Techniques used to identify mammal activity followed recognised guidelines (e.g. Clark 1988, Sutherland 1996, Bang & Dahlstrom 2004 and JNCC 2004).

In addition, five digital trail cameras which take photographs and/or video when triggered by heat or motion, were also deployed at five locations to record mammal activity within the Substitute Consent site during July and August 2025 (as summarised in Table 6.1). The locations at which trail cameras were deployed at and adjacent to the Substitute Consent site are shown in Figure 6.3.

A desktop study of non-volant mammal data was also undertaken by consulting the NBDC online mapping database to identify species historically recorded within the relevant 10km and 2km national grid squares overlapping the site. The conservation status of mammals was considered in respect of the following: EU Habitats Directive; Irish Wildlife Acts (1976 - 2012 as amended); and Red List of Terrestrial Mammals (Marnell *et al.* 2019).

6.7.2 Bat survey

There is a general lack of vegetative cover or suitable roost features for bats within the existing quarry site. Elsewhere with the extension area the field boundaries are of variable quality but are typically intensively managed and unattractive for roosting bats. However, there are areas of suitable foraging habitat within the quarry site. To assess the occurrence of bats within the site and adjoining areas five full-spectrum passive bat detectors (Wildlife Acoustics SM4BAT) were deployed within the Substitute Consent site in July and August 2025 (Table 2.1 and Figure 6.3).

The purpose of this survey was to record bat activity in the area from which information on species composition, relative abundance and landscape usage could be derived. Species identification was aided by post hoc sonogram analysis using Wildlife Acoustics' Kaleidoscope Professional software (v. 5.6.3).

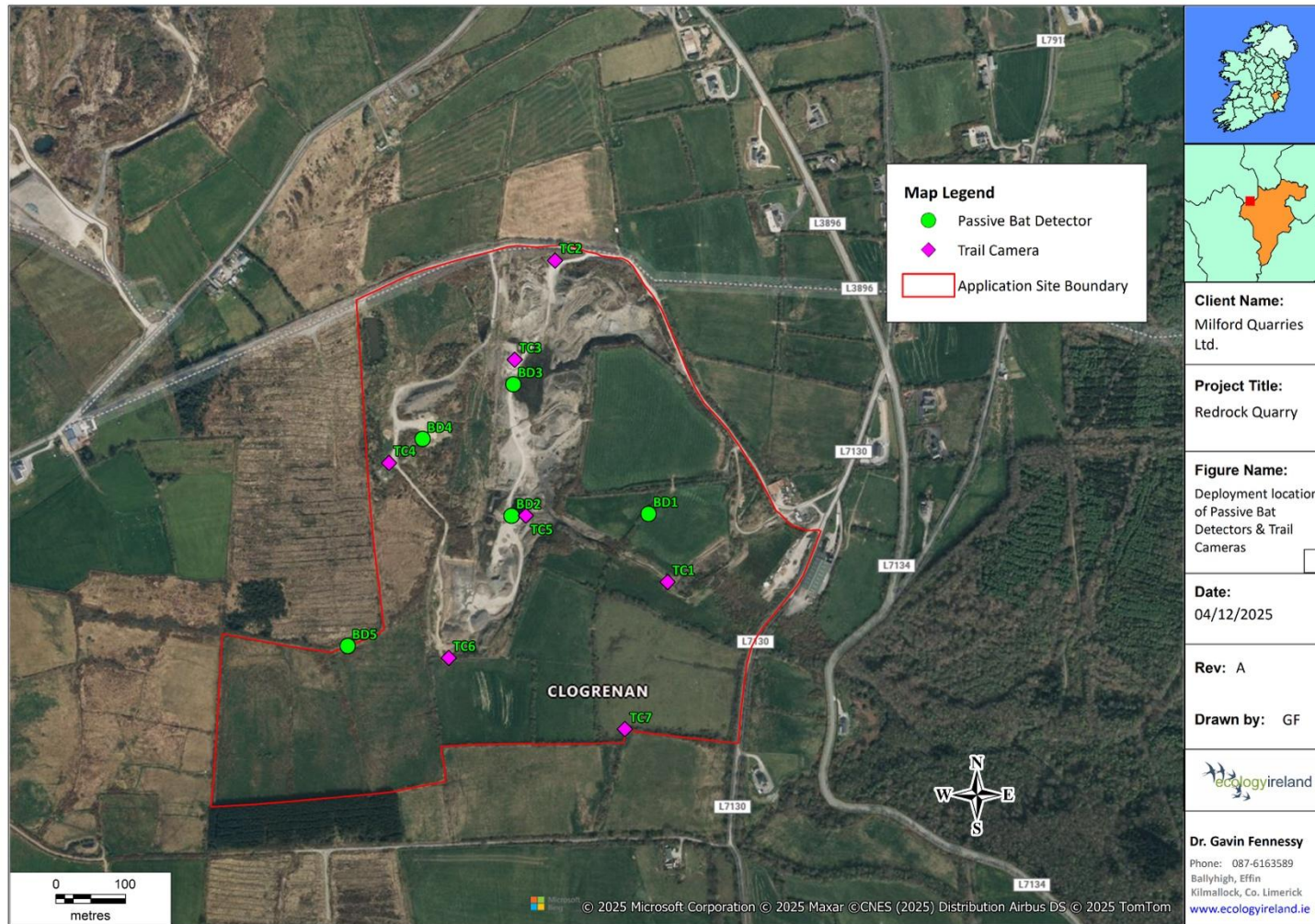
A desktop survey of the bat species recorded historically within the 2km and 10km grid squares which overlaps the Substitute Consent site was carried out. A review of The Model of Bat Landscapes (Lundy *et al.* 2011) identifies a habitat suitability index for bat species in Ireland and the site is encompassed in one 10km grid square. In addition, data on the known bat roosts from the local area and species identified in other studies in this area were sourced from Bat Conservation Ireland. The conservation of Bat species was considered. All Irish bat species and their breeding, roosting and resting locations are legally protected under both the



Irish Wildlife Acts (1976-2010) and as Annex IV species in the EU Habitats Directive (92/43/EEC).



Figure 6.3 Deployment location of trail cameras and passive bat detectors.



6.7.3 Avian assessment

There is a general paucity of vegetative cover within the worked areas of the quarry within the Substitute Consent site which limits the attractiveness of many of the habitats present for bird species. The habitats present include those within the inactive quarry and areas of agriculture with field boundaries of variable quality

However, quarrying also creates habitats that are known to be attractive to certain species that use rock-faces to roost and nest. During each of the site visits a record was maintained of all avian species seen or heard in this area, including species observed in flight, commuting across the existing quarry. Field surveys were undertaken using appropriate survey equipment as required (e.g. GPS units, binoculars, telescope, notebooks etc.) and during suitable weather conditions.

Six dedicated bird transects, each of c. 500m in length were each surveyed in July and August 2025 (Figure 6.4). The number of each species seen/heard within 100m of the transect line were recorded. If a bird was only recorded more than 100m from the transect line, the bird was recorded as (P) present. Transect surveys were conducted within the Substitute Consent site. Care was taken to minimise double-counting individuals in general, with counts focused on adult birds only, where possible, in line with standard transect survey practices (e.g., Countryside Bird Survey). Notes were also made of any observations of particular interest made during the transect and point count surveys.

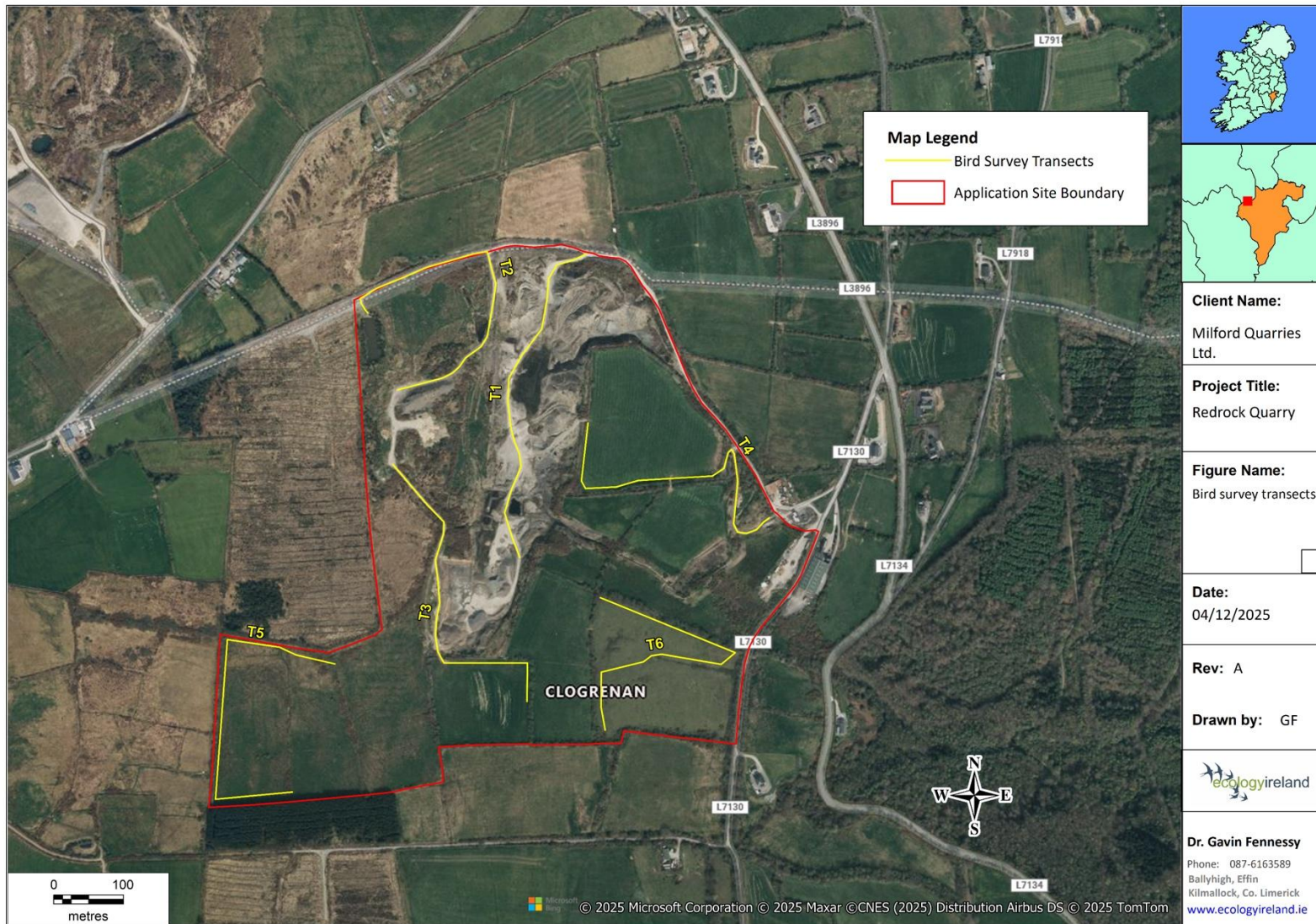
A number of dedicated short Vantage Point watches (each c. 30minutes in duration) were used to scan the quarry faces within the existing quarry and to record the potential presence and use of the development area by Peregrine Falcon (*Falco peregrinus*) and also to record the general bird community present.

The primary purpose of these watches was to record the presence and activity of birds that appeared to be roosting or breeding within the quarry itself. A key focus of these summer surveys was to identify any raptor species using the quarry. In the event that a nest of a target species was located, this nest was watched from a safe distance using a high-magnification telescope to record the activity and confirm the status of the nesting attempt. All bird species seen or heard at the site during the site walkover and short VP surveys were noted. Any behaviours indicative of breeding or roosting on or in the vicinity of the site were recorded. The observations made during these VP watches was supplemented by the record made of all bird species seen or heard during the baseline ecological walkovers and from the analysis of the trail cameras deployed at the site.

In addition to the field surveys, a desktop study was also undertaken by consulting the National Biodiversity Data Centre (NBDC) online mapping database to identify additional avian species historically recorded within the relevant 2km and 10km national grid squares overlapping the Substitute Consent site. The conservation status of bird species was considered in respect of the following: Irish Wildlife Acts (1976 – 2012 as amended); Birds of Conservation Concern in Ireland (BoCCI) Red, Amber and Green lists (see Gilbert *et al.* 2021); EU Birds Directive (2009/147/EC) Annex I list.



Figure 6.4 Location of bird survey transects.





6.7.4 Other taxa

Observations of other terrestrial taxa casually noted during other biodiversity surveys were also included as part of this assessment. A desktop study of other terrestrial taxa was also undertaken by consulting the NBDC online database to identify additional other taxa species that are legally protected previously recorded within the relevant 2km and 10km national grid squares overlapping the site.

The conservation status of other taxa was considered in respect of the following: Irish Wildlife Acts (1976 - 2012 as amended); Irish Red List for Butterflies (Regan *et al.* 2010); Irish Red List for Damselflies & Dragonflies (Nelson *et al.* 2011); Irish Red List for Amphibians, Reptiles & Freshwater Fish (King *et al.* 2011); Irish Red List for Non-Marine Molluscs (Byrne *et al.* 2009) and Regional Red List of Irish Bees (Fitzpatrick *et al.* 2006); EU Habitats Directive.

6.8 Results

6.8.1 Designated Conservation Sites

The Substitute Consent site does not lie within any EU Natura 2000 site or nationally designated site. The closest European designated site is the River Barrow & River Nore SAC (002162), located a minimum of 2.1km from the Substitute Consent site (Figure 6.5). This is the only Natura 2000 site located within 15km of the Substitute Consent site. The minimum distance overland from the application site boundary to European and Nationally designated sites in the wider area is presented in Table 6.2.

A total of 8 nationally designated conservation sites are located within 15km of the Substitute Consent site (Table 6.2; Figure 6.6). The closest of the nationally designated sites is Coan Bogs NHA (002382) located 5.0km from the application site. Seven pNHA's occur within 15km of the Substitute Consent site, the closest of these being Cloghristick Wood pNHA (000806) 3.4km from the application site boundary. A summary of the qualifying interests of the River Barrow & River Nore SAC is provided in Table 6.3.

All potential pathways for impact on designated sites have been evaluated in the impact assessment both within and outside of the nominal 15km buffer area around the Substitute Consent site. This buffer area is an arbitrary distance used to display the sites most proximate to the Substitute Consent site. However, all sites within and outside of this 15km area are considered when assessing the potential for ecological impacts arising from the development of the quarry at this location. The potential for ecological effects on sites at all distance from the Substitute Consent is evaluated using the Source-Pathway-Receptor (S-P-R) model.

Table 6.2. Designated conservation sites within 15km of the Substitute Consent boundary.

Designated Conservation Site	Site Code	Minimum Distance (km)
<i>Natura 2000 Sites</i>		
River Barrow & River Nore SAC	002162	2.1
<i>Nationally Designated Sites</i>		
Cloghristick Wood pNHA	000806	3.4
Coan Bogs NHA	002382	5.0
Mothel Church, Coolcullen pNHA	000408	8.0
Oakpark pNHA	000810	8.8
Whitehall Quarries pNHA	000855	10.8
Ballymoon Esker pNHA	000797	11.0
Ballylynan pNHA	000857	13.9



Designated Conservation Site	Site Code	Minimum Distance (km)
River Barrow Valley at Tankardstown Bridge pNHA	000858	14.1

Table 6.3 Qualifying interests of the River Barrow & River Nore SAC.

Site Name & Code	Summary Details	Minimum Distance (km)
River Barrow & River Nore (002162)	The conservation objectives of this site are to maintain the favourable conservation condition of the Annex I habitats and fauna listed as Special Conservation Interests for this SAC: • Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Reefs [1170] • <i>Salicornia</i> and other annuals colonising mud and sand [1310] • Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>) [1330] • Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] • Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] • European dry heaths [4030] • Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] • Petrifying springs with tufa formation (<i>Cratoneurion</i>) [7220] • Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] • Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] • <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016] • <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] • <i>Austropotamobius pallipes</i> (White-clawed Crayfish) [1092] • <i>Petromyzon marinus</i> (Sea Lamprey) [1095] • <i>Lampetra planeri</i> (Brook Lamprey) [1096] • <i>Lampetra fluviatilis</i> (River Lamprey) [1099] • <i>Alosa fallax fallax</i> (Twaite Shad) [1103] • <i>Salmo salar</i> (Salmon) [1106] • <i>Lutra lutra</i> (Otter) [1355] • <i>Vandenboschia speciosa</i> (Killarney Fern) [6985]	2.1 km

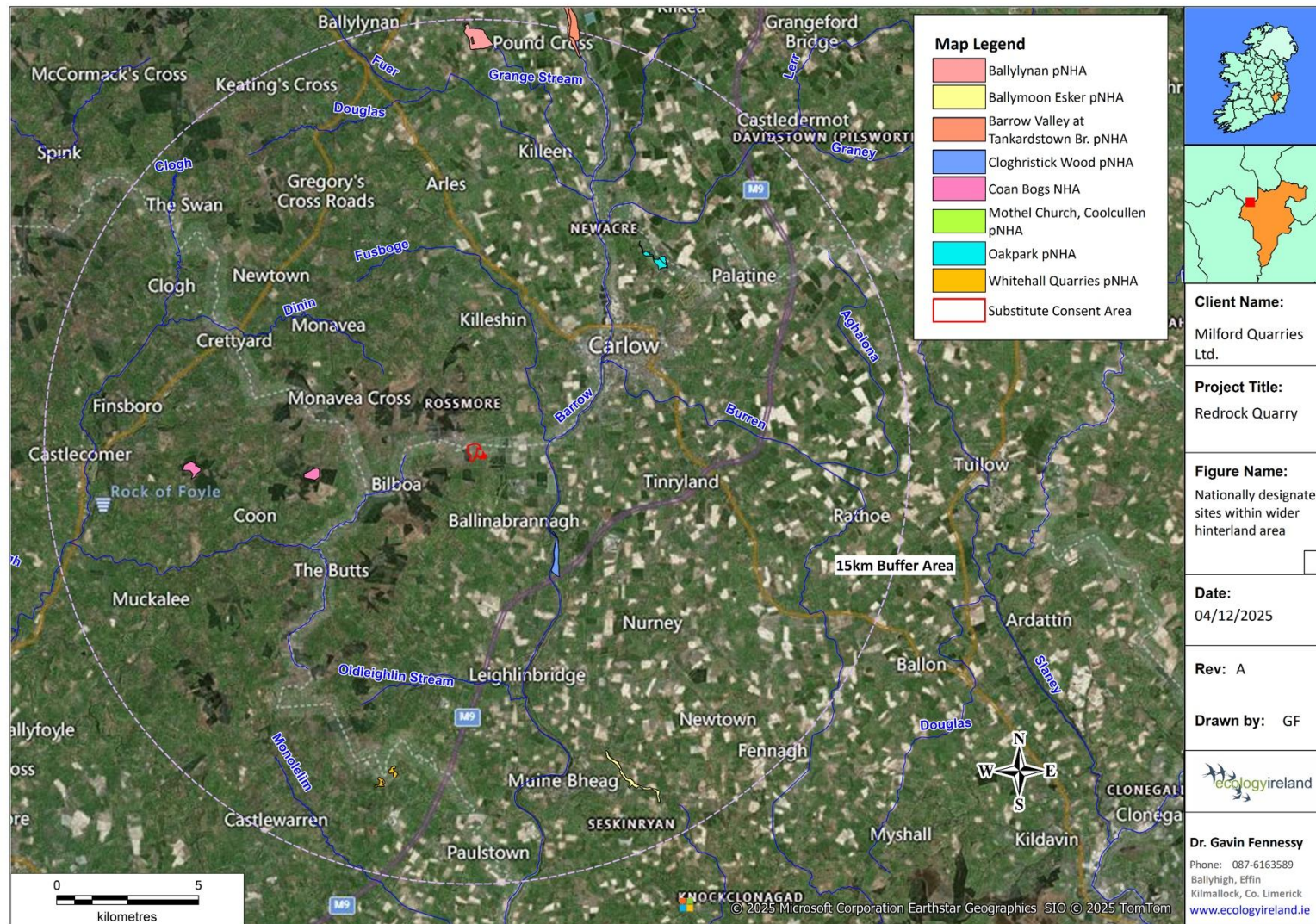


Figure 6.5 European designated sites in the wider hinterland area.





Figure 6.6 Nationally designated sites in the wider hinterland area





6.8.2 Habitats and Flora

Desktop study

No legally protected plant species listed on the Flora (Protection) Order, 2022 or Red-listed (Wyse-Jackson *et al.* 2016) plant species have previously been recorded on the NBDC databases for the 2km grid square within which the Substitute Consent site is located. The NPWS FPO vascular plant and bryophyte map viewer online maps do not hold any previous records for plant species listed on the Flora Protection Order 2022 for the 10km grid square, S67. The NBDC database for the 10km grid square, S67 holds records for Fragrant Agrimony (*Agrimonia procera*), and Green Field-speedwell (*Veronica agrestis*). These species have been evaluated as 'near threatened' by Wyse-Jackson *et al.* (2016).

One invasive plant species has been recorded in the 2km grid square in which the Substitute Consent site is located: Cherry Laurel (*Prunus laurocerasus*). This species was not present at the Substitute Consent site. This non-native invasive species is considered a 'risk of high impact' species (Kelly *et al.* 2013) but is not listed on the Third Schedule of the 2011 European Communities (Birds and Natural Habitats) Regulations or the First Schedule of the European Union (Invasive Alien Species) Regulations, 2024. Sycamore (*Acer pseudoplatanus*) which is considered a 'risk of medium impact' species (Kelly *et al.* 2013) has also been previously recorded in the 10km grid square overlapping the quarry site.

With regard to other non-native invasive species, no previous records of species listed on the Third Schedule of the 2011 European Communities (Birds and Natural Habitats) Regulations (i.e. species of which it is an offense to disperse, spread or otherwise cause to grow in any place) exist on the NBDC databases for the 2km grid square (S67R) within which the Substitute Consent site is located. However, several invasive Third Schedule species have historically been recorded in the 10km grid square that overlaps the Development Site (Table 6.4).

Table 6.4 Third schedule invasive plant species recorded within the wider area (S67, 10km Grid Square).

Common Name	Scientific Name
Water Fern	<i>Azolla filiculoides</i>
Canadian Waterweed	<i>Elodea canadensis</i>
Giant Hogweed*	<i>Heracleum mantegazzianum</i>
Himalayan Balsam*	<i>Impatiens glandulifera</i>
Japanese Knotweed	<i>Fallopia japonica</i>
Nuttall's Waterweed*	<i>Elodea nuttallii</i>

*Plant species listed as an alien invasive species European Union concern (IAS Regulation 1143/2014)

No invasive alien plant species of European Union concern (IAS Regulation 1143/2014) have historically been recorded in the 2km grid square that overlaps the Substitute Consent site, but three species have been recorded in the 10km grid square (Table 6.4). Giant Hogweed



(*Heracleum mantegazzianum*), Himalayan Balsam (*Impatiens glandulifera*) and Nuttall's Waterweed (*Elodea nuttalli*) are also considered as 'high risk of impact' invasive species (NBDC website species profile, accessed 24th November 2025).

Plate 6.1 (a-f) presents aerial views of the site conditions in 1995, 1996, 2001, 2006 and 2013 and a recent image post-abandonment and helps illustrate the transformation of habitats within the Substitute Consent area as quarry activities expand. Prior to c. 2000, the dominant habitat appears to primarily consist of Improved Agricultural Grassland (GS4) bounded by Hedgerows (WL1) and Treelines (WL2). OSI imagery demonstrates the development of the excavation process from a small area of active quarry (Active Quarries and Mines; ED4) in the northeast corner of the Substitute Consent area. In 2005, the active quarry area was estimated to be approximately 3.61ha and measured approximately 6.29ha in 2010. OSI imagery from post-2013 to closure shows expansion of quarrying activities to its present footprint within the Substitute Consent site.

On that basis, between 1995 and closure of the quarry the substitute consent lands are calculated to have lost c. 2km of internal field boundaries, mostly hedgerows and treelines that subdivided the larger landholding and approximately a further 0.2 to 0.3km of external field boundary, where quarry faces or access have been cut directly through the historic perimeter. This equates to a loss of roughly 35 percent of the original field boundary network within the overall Substitute Consent site.

In 1995, essentially 100 percent of the subject lands consisted of enclosed agricultural land and associated field boundaries. The aerial images document the progressive loss of agricultural land and field boundaries and development of settlement ponds, stored spoil and rock faces.

The pre-quarry landscape supported a relatively fine-grained field pattern, providing hedgerow connectivity from north to south and west to east across the site. The current pattern within the worked area is dominated by a single large open void, with only short marginal hedgerow links remaining, so the structural connectivity for farmland birds, small mammals and bats is substantially reduced inside the application boundary. The development of multiple settlement ponds and deep cut voids visible by 2013 represents a significant change from the original shallow field drains visible in 1995. This has replaced diffuse overland flow and altered the flow of the EPA mapped Raheendoran stream.

Prior to quarrying, the Raheendoran Stream was a small natural watercourse flowing east to west across the lands, with its headwaters located within what is now the extraction area. Within the site it would have comprised a narrow channel with associated riparian vegetation, corresponding to Fossitt Eroding / Depositing River (FW2 or at least FW1 Drainage Ditch with a naturalised bed and banks). As an EPA mapped stream and a natural headwater feature providing aquatic habitat, local drainage and a movement corridor, this watercourse is considered to have been of Local Importance (Higher Value).

The hydrological assessment (Chapter 8) confirms that historic quarrying has removed the headwaters of the Raheendoran Stream within the extraction area and that the original channel is no longer present within the quarry void. Water that formerly flowed along the

Raheendoran now accumulates on the quarry floor in flooded areas and settlement ponds. These artificial waterbodies discharge via two separate outfalls: one to a small drain along the northern access track and one via a narrow deeply incised gully and larger settlement pond to the east of the landholding. The combined discharge then flows east along the access track for approximately 630 m before entering the EPA mapped Mortarstown Stream, a tributary of the Fushoge River, which in turn flows to the River Barrow. As a result, the upper reach of the Raheendoran Stream within the Substitute Consent site, together with its riparian corridor, has been permanently removed and the natural drainage that formerly contributed to this watercourse has been intercepted, ponded and redirected to the Mortarstown Stream via a series of artificial channels and ponds. Longitudinal connectivity within the Raheendoran has therefore been severed within the site and the local catchment boundary has been modified.



Plate 6.1a 1995 aerial view



Plate 6.1b 1996 aerial view



Plate 6.1c 2001 aerial view



Plate 6.1d 2003 aerial view



Plate 6.1e 2013 aerial view



Plate 6.1f Recent aerial view (Digital Globe; All images from Osi Geohive)

Field Survey

No habitats listed on Annex I of the EU Habitats Directive (92/43/EEC) were recorded within the proposed development site boundary. The primary habitat within the development site is Spoil and Bare Ground (ED2) which is located primarily within the quarry void. The quarry floor features a number of artificial lakes and pools (FL8). Adjacent to the areas of historic quarrying are areas of scrub (WS1) and recolonizing bare ground (ED3). Hedgerows (WL1) and treelines (WL2) are found delineating areas of improved agricultural grassland (GA1) and wet grassland (GS4) in the south and east parts of the Subsite Consent site. Scrub (WS1) areas are found in the west and north areas of the development site. Buildings and Artificial Surfaces



(BL3) primarily consist of access roads within the development site. A map of the principal habitats present is shown in Figure 6.7.

The following habitats (with Fossitt codes; Fossitt 2000) were recorded within the proposed development site.

- Spoil and Bare Ground (ED2)
- Recolonising bare ground (ED3)
- Scrub (WS1)
- Improved Agricultural Grassland (GA1)
- Wet Grassland (GS4)
- Other artificial lakes and ponds (FL8)
- Drainage ditch (FW4)
- Hedgerow (WL1)
- Treelines (WL2)
- Buildings and artificial surfaces (BL3)
- Cutover Bog (PB4)
- Eroding/Upland Rivers (FW1)
- Marsh (GM1)
- Stone walls (BL1)
- Mixed Woodland (WD2)



Figure 6.7 Habitat map of Substitute Consent site.

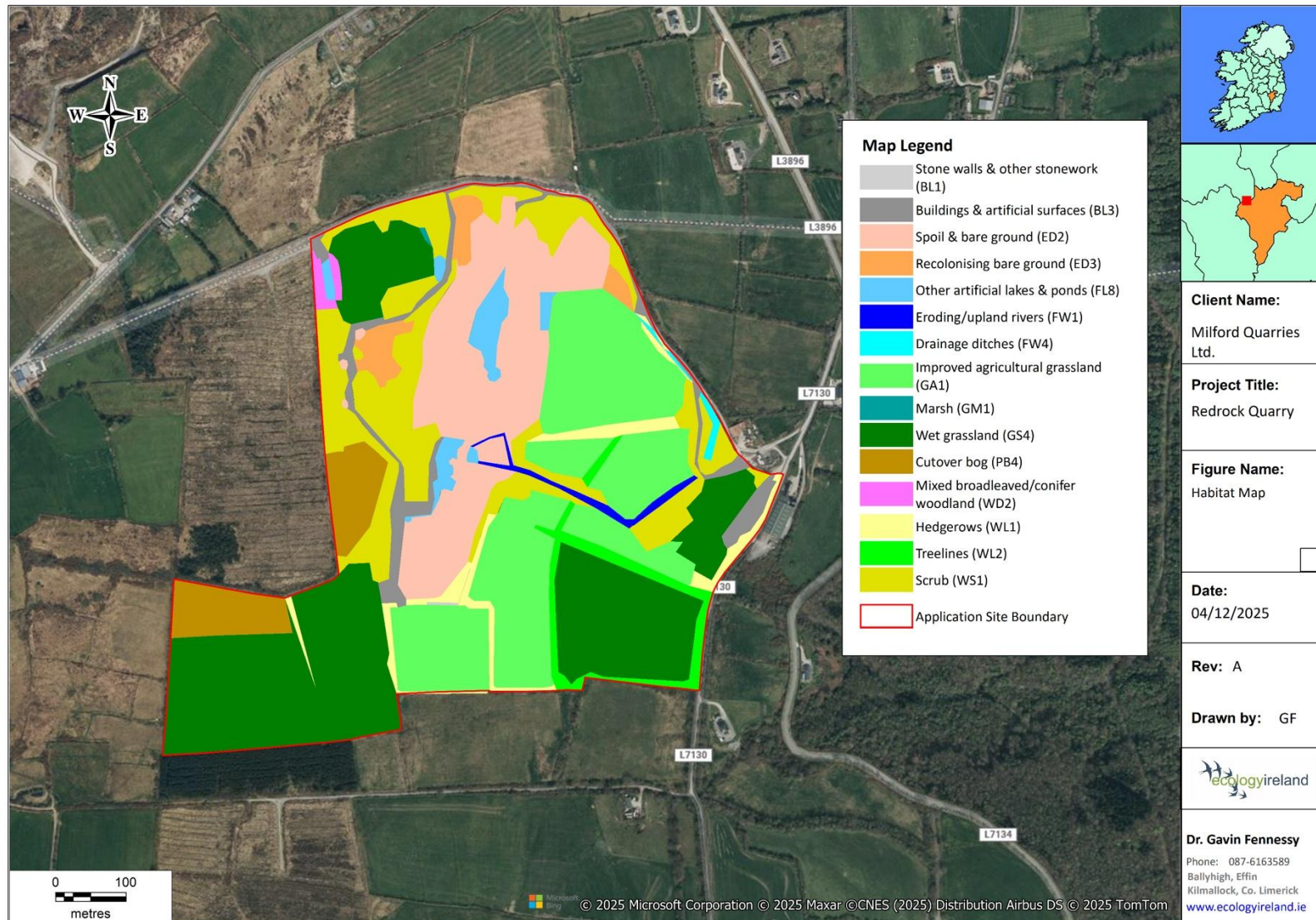


Figure 6.7 shows the inactive quarry itself is now primarily classified as ‘Spoil and bare ground’ (ED2; Plate 6.2). This area features many heaps of spoil, including sand, gravel and cobbles of different consistencies, particularly at the northeastern section and southern end of the quarry. While the quarry floor is gradually being colonised by shrubs, grasses and rushes, these areas are below the 50% threshold for ‘Recolonising bare ground’ (ED3).



Plate 6.2 Quarry floor (ED2)

Around the edges of the quarry floor, the habitat ED2 grades into ED3 with Sitka spruce, *Salix* sp. and gorse (*Ulex europaeus*) invading from the margins (Plate 6.3).



Plate 6.3 Quarry edges (ED3)

The quarry floor features a number of 'artificial lakes and ponds' (FL8) (Plate 6.4: Ponds 1-5 see Figure 6.8) colonised by bulrush (*Typha latifolia*), soft rush (*Juncus effusus*) and water horsetail (*Equisetum fluviatile*), as well as broad-leaved pondweed (*Potamogeton natans*) which dominates in the deeper waterbodies.



Plate 6.4 Ponds.

A seep in the southwestern wall of the site may be a subterranean stream or rainfed groundwater (Plate 6.5). This seep feeds a small marshy area in the southwest corner of the quarry floor which drains into one of the larger ponds (Figure 6.8: Pond 3).



Plate 6.5 Seep and stream.

A small stream with a very low flow rate at the time of surveying (Figure 6.8: Stream), drains the deepest pond (Figure 6.8: Pond 4) and exits the quarry through a narrow-overgrown gorge in the east wall of the quarry and continues flowing east downhill towards the River Barrow. This is likely the Raheendoran watercourse.



Plate 6.6 Gorge and stream.

This watercourse appears to be bunded about 170m east of its exit from the quarry (Figure 6.8: Bunded area). An area of scrub has formed on and around the bund. Below the bund is a heavily waterlogged 'wet grassland' (GS4) dominated by *Juncus effusus* possibly formed due to water seeping through the bund (Plate 6.8).



Plate 6.7 Scrub on bund.



Plate 6.8 Wet grassland below bund.

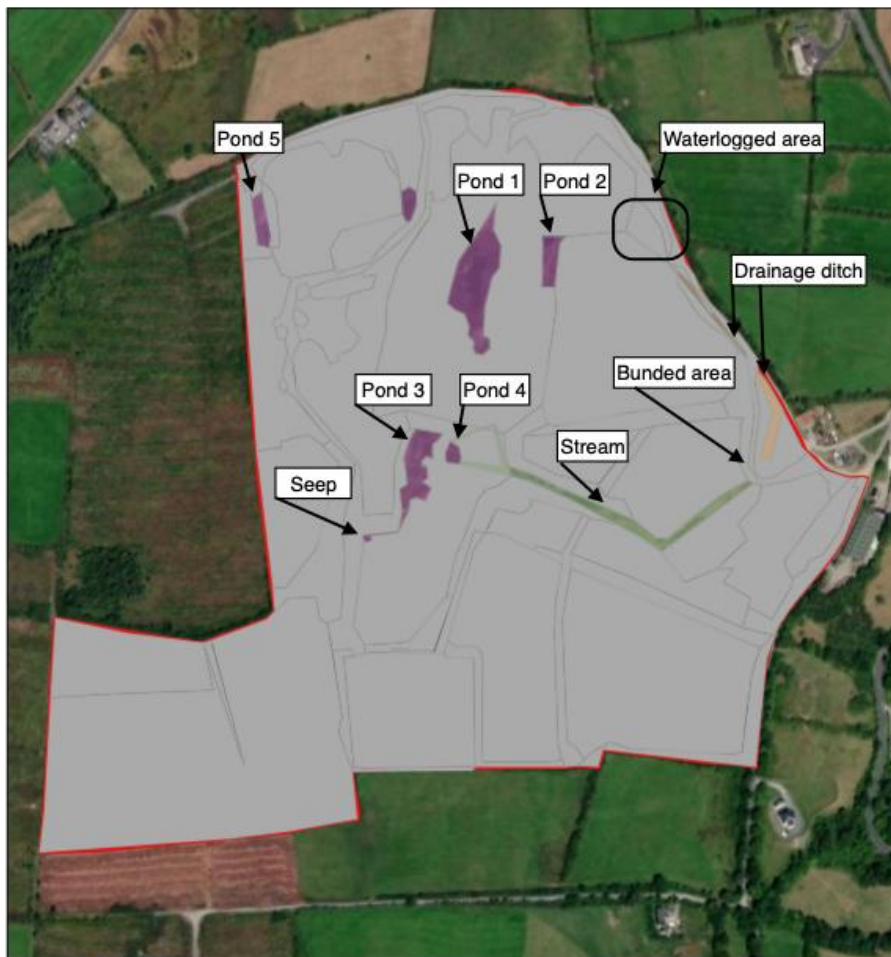


Figure 6.8 Map of labelled watercourses and water features on site.

The south and east of the site, outside of the quarry itself, consists of farmland, and is a mixture of GS4 and 'improved grassland' (GA1) separated by hedgerows and treelines of hawthorn (*Crataegus monogyna*), sessile oak (*Quercus petraea*), *Salix sp.*, and holly (*Ilex aquifolium*). This grassland was being grazed by cattle during the survey.



Plate 6.9 Grazed grassland with areas of GS4 and GA1.

A small area of BL1, all that remains of a drystone wall field boundary, separating the grassland at the southern end of the site from the quarry (Plate 6.10).



Plate 6.10 Drystone wall (BL1) at field boundary.

A drainage ditch (FW4, Figure 6.8, Drainage ditch) flows south along the external access track into a culvert and ultimately into the bunded area. Though it was not apparent during the survey due to the dry conditions and overgrown nature of the particular area, aerial imagery indicates that the large flooded area in the northern section of the quarry (Figure 6.8, Pond 1)

connects to the smaller pond directly east of it (Figure 6.8, Pond 2) and the waterlogged area of ED3 further east (Figure 6.8, Waterlogged area). These waterbodies may then drain via the drainage ditch which flows down to the bunded area. These waterbodies are likely only hydrologically connected during wet periods. This drainage ditch is heavily overgrown with brambles and scrub, but water was audibly flowing in it. Given the volume of water that appeared to be flowing through it, it is suspected that there is an additional contributory source of water other than the waterlogged area of ED3.

The northwest of the site contains an artificial pond (FL8, Figure 6.8, Pond 5), dominated by pondweed, that appears very anoxic (Plate 6.11). This pond appears to be rainfed and unconnected to any other watercourse. This pond is surrounded by a small area of mixed woodland (WD2), featuring frequent Sitka spruce and *Salix sp.*



Plate 6.11 Pond 5.

To the east of the pond is a large area of GS4 with frequent Yorkshire fog (*Holcus lanatus*), and abundant soft rush and creeping buttercup (*Ranunculus repens*; Plate 6.12).



Plate 6.12 Wet Grassland (GS4).

This area also contains a small marshy area (GM1) with abundant Bulrush, occasional Soft-rush and frequent Water Horsetail (Plate 6.13).



Plate 6.13 Marsh (GM1).

The wet grassland is surrounded by gorse, Sitka spruce and *Salix sp.* scrub. There is an area of revegetated 'cutover bog' (PB4) which has developed into a heath-like or wet grassland type habitat. This area is largely Purple moor grass (*Molinia caerulea*) dominated with patches of

soft rush on peaty soil. This area also has frequent ling heather (*Calluna vulgaris*) and tormentil (*Potentilla erecta*), as well as abundant tufted hairgrass (*Deschampia flexuosa*).



Plate 6.14 PB4 developing as heath/wet grassland habitat.

The southwest of the site appears to be revegetated cutover bog that has largely developed into a wet grassland dominated by soft rush with scattered shrubs of gorse and hawthorn. This area features abundant creeping buttercup (*Ranunculus repens*), creeping bent (*Agrostis stolonifera*), common bent (*Agrostis capillaris*) and sharp-flowered rush (*Juncus acutifloris*). The northwest corner of this grassland retains more heath-like or bog-like features, this area contains *Sphagnum* and *Polytrichum* moss, as well as ling heather, purple moor grass and tormentil which indicates a peaty character to the soil. This area contains some occasional patches of Devils-bit scabious (*Succisa pratensis*).



Plate 6.15 Southwest corner, wet grassland and bog.



6.8.3 Aquatic ecology

Desktop study

A comprehensive desktop review of available data from the National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC), Inland Fisheries Ireland (IFI), National Crayfish Plague Surveillance Programme (NCPSP), and Environmental Protection Agency (EPA) for the 10km grid square containing the quarry site identified a low number of records for rare and or protected aquatic species (Table 6.5).

Smooth Newt, *Lissotriton vulgaris* is a protected species under Schedule 5 of the Wildlife Act and under Appendix III of the Convention on the Conservation of European Wildlife and Natural Habitats (The Bern Convention). Common Frog, *Rana temporaria* is a protected species under Schedule 5 of the Wildlife Act and is listed under Annex V of the EU Habitats Directive (92/43/EEC). White-clawed Crayfish, *Austropotamobius pallipes* is listed under Annex II and Annex V of the EU Habitats Directive (92/43/EEC).

Table 6.5. Aquatic species records held by the NBDC database for the 10km grid square overlapping the Redrock quarry site.

Common Name	Scientific Name	Conservation Status
Common Frog	<i>Rana temporaria</i>	Protected under Irish Wildlife Acts; EU Habitats Directive Annex V
Smooth Newt	<i>Lissotriton vulgaris</i>	Protected under Irish Wildlife Acts; Appendix III of the Bern Convention
White-Clawed Crayfish	<i>Austropotamobius pallipes</i>	Protected under Irish Wildlife Acts; EU Habitats Directive Annex II & V (strict protection).

Field Surveys

Samples were taken from the ponds across the existing quarry site (Figure 6.2) and sent for lab analysis for eDNA of cryptic species. Both Smooth Newt and Common Frog were detected via eDNA sampling within the Redrock quarry site (Table 6.6; Appendix 6.1). Smooth Newt was detected at all three sampling locations, while Common Frog was detected at one sampling location. These results are considered as evidence of the presence of Common Frog at Pool 1 sampling location and Smooth Newt being present at all three sampling locations. The results were negative for White-clawed Crayfish (*Austropotamobius pallipes*) and European Eel (*Anguilla anguilla*).



During walkover surveys of the site, Common Frog was also observed at the edge of the large pool within the quarry basin on July 7th, 2025, and in wet grassland habitat, immediately southwest of the quarry site on July 7th and August 7th 2025.

Table 6.6 eDNA results from the quarry site (see also Appendix 6.1).

Common Name	Scientific Name	Pool 1 (FK3416)	Pool 2 (FK317)	Pool 3 (FK3419)
		Positive qPCR Replicates (n=12)		
Common Frog	<i>Rana temporaria</i>	4		
Smooth Newt	<i>Lissotriton vulgaris</i>	8	11	12

6.8.4 Non-volant Mammals

Desktop study

Table 6.7 shows the non-volant mammal species recorded historically in the 10km grid square (S67) and 2km grid square (S67R). The species recorded in the 10km grid square include Badger (*Meles meles*), Irish Stoat (*Mustela erminea* subsp. *hibernica*), Pine Marten (*Martes martes*) and Red Squirrel (*Sciurus vulgaris*), with only Pine Marten recorded in the 2km grid square. Otter (*Lutra lutra*) is the only Annex II/IV non-volant mammal species recorded historically in the overlapping 10km grid square.

Two species listed on the EU Invasive Alien Species (IAS) list have been recorded in this area, American Mink (*Neovison vison*) and Grey Squirrel (*Sciurus carolinensis*). Both of these species are considered high impact invasive species at national level (subject to Regulations 2011 S.I. No. 477/2011 (Ireland)).

Table 6.7 Non-volant mammal species records held by the NBDC database for the 10km [and 2km] grid squares overlapping the Substitute Consent site.

Common Name	Scientific Name	Grid Squares	Conservation Status
American Mink	<i>Neovison vison</i>	S67	EU Invasive Alien Species Union (IAS) List (approved 2025; enters into force 7 Aug 2027). Not protected under Irish Wildlife Acts.
Badger	<i>Meles meles</i>	S67	Protected under Irish Wildlife Acts (Schedule 5). Not listed on EU Habitats Directive Annexes.



Common Name	Scientific Name	Grid Squares	Conservation Status
Greater White-toothed Shrew	<i>Crocidura russula</i>	S67	No specific legal protection under Irish Wildlife Acts or EU Habitats Directive.
Grey Squirrel	<i>Sciurus carolinensis</i>	S67, S67R	EU IAS Union List (since 2016). Not protected under Irish Wildlife Acts.
Hedgehog	<i>Erinaceus europaeus</i>	S67	Protected under Irish Wildlife Acts (Schedule 5). Not listed on EU Habitats Directive Annexes.
Irish Hare	<i>Lepus timidus</i> subsp. <i>hibernicus</i>	S67	Protected under Irish Wildlife Acts (Schedule 5); EU Habitats Directive Annex V (game species; open season under licence).
Irish Stoat	<i>Mustela erminea</i> subsp. <i>hibernica</i>	S67	Protected under Irish Wildlife Acts (Schedule 5). Not listed on EU Habitats Directive Annexes.
Otter	<i>Lutra lutra</i>	S67	Protected under Irish Wildlife Acts (Schedule 5); EU Habitats Directive Annex II & IV (strict protection).
Pine Marten	<i>Martes martes</i>	S67, S67R	Protected under Irish Wildlife Acts (Schedule 5); EU Habitats Directive Annex V.
Pygmy Shrew	<i>Sorex minutus</i>	S67	Protected under Irish Wildlife Acts (Schedule 5); not listed on EU Habitats Directive Annexes.
Rabbit	<i>Oryctolagus cuniculus</i>	S67	No specific legal protection under Irish Wildlife Acts or EU Habitats Directive.
Red Fox	<i>Vulpes vulpes</i>	S67	No specific legal protection under Irish Wildlife Acts or EU Habitats Directive.
Red Squirrel	<i>Sciurus vulgaris</i>	S67	Protected under Irish Wildlife Acts



Common Name	Scientific Name	Grid Squares	Conservation Status
			(Schedule 5); not listed on EU Habitats Directive Annexes.
Wood Mouse	<i>Apodemus sylvaticus</i>	S67	No specific legal protection under Irish Wildlife Acts or EU Habitats Directive.

Field surveys

There were few direct sightings made of non-volant mammals during the site walkovers. Irish Hare was observed on several occasions within the inactive quarry. Hare droppings were widespread and frequent. Occasional Fox scat was recorded along the internal tracks and bare ground.

Analysis of the trail cameras deployed at the site is summarised in Table 6.8. In general, low levels of non-volant mammal activity was detected, with most species infrequently recorded. Unsurprisingly, the most regularly recorded species was Irish Hare, which was noted at each of the deployment locations (Plate 6.14). There were small numbers of records of Brown Rat and Fox (Plate 6.15). There were also a small number of records of a small unidentified mammal, possibly a Wood Mouse, *Apodemus sylvaticus*.

No evidence of Otter was found, and the Redrock quarry site is generally unsuitable for Otter. There is no significant watercourse within or closely adjacent to the Substitute Consent site and the habitats present at the site and adjoining lands are relatively unattractive for this species.

Although no evidence of Badger (*Meles meles*) was recorded in the Substitute Consent site during the suite of surveys conducted for this report, surveys conducted previously within the Substitute Consent site in 2023 and 2024, recorded Badger signs. Badger tracks and scat were recorded at the Substitute Consent site, along with well-developed trails. No sett was identified within the Substitute Consent site (Donovan 2024).

Given the lack of breeding and resting places for non-volant mammal species the Substitute Consent site is assessed of local importance (lower).



Plate 6.14 Irish Hare was the most frequently recorded non-volant mammal at the site.



Plate 6.15 Fox carrying Pheasant recorded on the trail camera.



Table 6.8 Results of the trail camera analysis.

Common Name	Scientific Name	TC1	TC2	TC3	TC4	TC5	TC6	TC7
Irish Hare	<i>Lepus timidus hibernicus</i>	3	5	9	7	4	11	
Fox	<i>Vulpes vulpes</i>		1	5	10	2	4	3
Brown Rat	<i>Rattus norvegicus</i>			2			3	3
Unid. Small Mammal		1		1				2
Blackbird	<i>Turdus merula</i>		2	1			6	
Pheasant	<i>Phasianus colchicus</i>	1			3		2	1
Moorhen	<i>Gallinula chloropus</i>			2				
Wren	<i>Troglodytes troglodytes</i>	2			2			
Chaffinch	<i>Fringilla coelebs</i>				1			
Hooded Crow	<i>Corvus cornix</i>		1	2		1		4
Goldfinch	<i>Carduelis carduelis</i>					2		
Mallard	<i>Anas platyrhynchos</i>			1				

*TC1-TC4 and TC6 were active from 07/07/2025 to 07/08/2025 and TC5 and TC7 were active from 07/08/2025 to 14/08/2025

6.8.5 Bat Assessment

Desktop Study

No species of bats have been recorded in the 2km (S67R) grid square while eight species were recorded in the 10km (S67) grid square in which the quarry site is located. The Model of Bat Landscapes (Lundy *et al.* 2011) recorded a Moderate – High value for All Bats (Index: 22.44 and 35.78) within the two 10km grid squares that overlap with the site. The quarry site is outside of the normal range for Lesser Horseshoe Bat (*Rhinolophus hipposideros*). The landscape also has a low suitability for Nathusius' Pipistrelle (*Pipistrellus nathusii*) (Index: 0 and 4). The habitat suitability index for 'All bats' and for each individual species of bat is presented below (See Table 6.9 below). The index ranges from 0 to 100, with 100 being most suitable for bats. The landscape model indicates that the area is most suitable for Common pipistrelle (*Pipistrellus pipistrellus*), Brown Long-eared Bat (*Plecotus auritus*), Leisler's Bat (*Nyctalus leisleri*) and Soprano Pipistrelle (*Pipistrellus pygmaeus*).

Table 6.9 Bat Landscape Suitability Index for the Substitute Consent site and the surrounding area.

Common Name	Scientific Name	Suitability Score	Suitability Score
Soprano pipistrelle*	<i>Pipistrellus pygmaeus</i>	28	45
Brown long-eared bat*	<i>Plecotus auritus</i>	34	51
Common pipistrelle*	<i>Pipistrellus pipistrellus</i>	38	54
Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>	0	0
Leisler's bat*	<i>Nyctalus leisleri</i>	24	48
Whiskered bat*	<i>Myotis mystacinus</i>	36	32



Common Name	Scientific Name	Suitability Score	Suitability Score
Daubenton's bat*	<i>Myotis daubentonii</i>	14	43
Nathusius' pipistrelle*	<i>Pipistrellus nathusii</i>	0	4
Natterer's bat*	<i>Myotis nattereri</i>	28	45

*Bat Species historically recorded in the S67 grid square (NBDB, accessed November 24 2025)

Field study

None of the structures present on site are attractive for roosting bats. Although there is treeline habitat present within the quarry site, trees were typically scrubby, with a general lack of mature trees within that habitat which could accommodate roosting bats. The quarry faces were observed to have crevices and fissures, but these appeared to be relatively weathered and unsuitable for roosting bats.

The Substitute Consent site contains area of good foraging habitat with multiple flooded areas, pools, wet grassland, boggy areas and areas of scrub which are attractive to feeding bats. The area is also unlit so is likely to be suitable for species that are less tolerant of nighttime illumination such as Brown Long-eared bat, Whiskered bat, Natterer's bat, and Daubenton's bat. Pools are likely to attract Daubenton's bats. The area is well connected to the surrounding area via mature hedgerows and treelines, as well as the Raheendoran watercourse which connects to the mature Clogrennane woodland to the east of the site, which may also contain suitable roosting habitat. The River Barrow lies approximately 2.5km to the east which also likely provides important foraging and commuting habitat for bats in the wider area.

Analysis of the passive bat detectors deployed at the quarry site confirmed the presence of at least 5 species (Table 6.10). The most regularly recorded bat species at the site were Leisler's Bat, Common Pipistrelle and Soprano Pipistrelle. These are the three most common and widespread bat species in Ireland (Roche *et al.* 2014).

There were a small number of records of Daubenton's Bat (*Myotis daubentonii*) and many of the other faint *Myotis* sp. calls detected may also have been of this species. The only other species confirmed to be present was Brown Long-eared Bat, (*Plecotus auritus*) with a small number of registrations.



Table 6.10 Analysis of the analysis of the passive bat detectors deployed at the site.

Common Name	Scientific Name	BD1	BD2	BD3	BD4	BD5
Dates of Deployment		7-14 Aug	7-25 July	7-31 July	7 July-3 Aug	7-14 Aug
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	346	1205	3762	417	1025
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	153	197	994	266	199
Leisler's Bat	<i>Nyctalus leisleri</i>	70	218	409	328	97
Brown Long-eared Bat	<i>Plecotus auritus</i>	3		8	4	5
Daubenton's Bat	<i>Myotis daubentonii</i>	6	3	26	3	
<i>Myotis</i> sp.		4	9	9	5	7

6.8.6 Avian assessment

Desktop study

Table 6.11 shows the bird species recorded historically in the 2km grid square (S67R) that overlaps the quarry site. A total of 4 avian species has been recorded from this grid square, including one Red-listed species, Kestrel, *Falco tinnunculus* and one Amber-listed species, Woodcock, *Scolopax rusticola* (Gilbert *et al.* 2021). Unsurprisingly, a much larger list of avian species (92 species) has been recorded historically within the overlapping 10km Grid Square (S67) with 19 of the species Red-listed and 24 of the species currently Amber-listed (Table 6.12).

Table 6.11. Summary of bird species recorded in 2km grid square (S67R).

Common Name	Scientific Name
Buzzard	<i>Buteo buteo</i>
Cuckoo	<i>Cuculus canorus</i>
Kestrel^	<i>Falco tinnunculus</i>
Woodcock*	<i>Scolopax rusticola</i>

^ Red-listed species * Amber-listed species (Gilbert *et al.* 2021)

Table 6.12 Red and Amber-listed bird species recorded in the wider 10km Grid Square.

Common name	Scientific name
Barn Owl^	<i>Tyto alba</i>
Black-tailed Godwit^	<i>Limosa limosa</i>
Corncrake^	<i>Crex crex</i>
Curlew^	<i>Numenius arquata</i>
Golden Plover^	<i>Pluvialis apricaria</i>
Goldeneye^	<i>Bucephala clangula</i>



Common name	Scientific name
Grey Partridge^	<i>Perdix perdix</i>
Grey Wagtail^	<i>Motacilla cinerea</i>
Kestrel^	<i>Falco tinnunculus</i>
Lapwing^	<i>Vanellus vanellus</i>
Meadow Pipit^	<i>Anthus pratensis</i>
Red Kite^	<i>Milvus milvus</i>
Redwing^	<i>Turdus iliacus</i>
Shoveler^	<i>Spatula clypeata</i>
Snipe^	<i>Gallinago gallinago</i>
Stock Dove^	<i>Columba oenas</i>
Swift^	<i>Apus apus</i>
Woodcock^	<i>Scolopax rusticola</i>
Yellowhammer^	<i>Emberiza citrinella</i>
Black-headed Gull*	<i>Chroicocephalus ridibundus</i>
Brambling*	<i>Fringilla montifringilla</i>
Coot*	<i>Fulica atra</i>
Cormorant*	<i>Phalacrocorax carbo</i>
Goldcrest*	<i>Regulus regulus</i>
Greenfinch*	<i>Chloris chloris</i>
Hen Harrier*	<i>Circus cyaneus</i>
House Martin*	<i>Delichon urbicum</i>
House Sparrow*	<i>Passer domesticus</i>
Kingfisher*	<i>Alcedo atthis</i>
Lesser Black-backed Gull*	<i>Larus fuscus</i>
Linnet*	<i>Linaria cannabina</i>
Mallard*	<i>Anas platyrhynchos</i>
Merlin*	<i>Falco columbarius</i>
Mute Swan*	<i>Cygnus olor</i>
Sand Martin*	<i>Riparia riparia</i>
Skylark*	<i>Alauda arvensis</i>
Spotted Flycatcher*	<i>Muscicapa striata</i>
Starling*	<i>Sturnus vulgaris</i>
Swallow*	<i>Hirundo rustica</i>
Teal*	<i>Anas crecca</i>
Tree Sparrow*	<i>Passer montanus</i>
Wigeon*	<i>Mareca penelope</i>
Willow Warbler*	<i>Phylloscopus trochilus</i>

^ Red-listed * Amber-listed (Gilbert et al. 2021).



Field study

A total of 44 bird species were either recorded within 100m of the observer during the dedicated transect surveys or additionally recorded outside of 100m or casually noted during other site walkover surveys.

Table 6.13 shows the species recorded during the transect surveys during the summer period. Peak counts were relatively low in general, bar the peak count of 15 for Sand Martin. During the surveys on 8th and 9th of August 2025, active Sand Martin nest burrows were recorded in gravel spoil heaps in the north end of the quarry with at least 10 nest entrances visible.

Five species recorded are Red-listed or Annex I listed of high conservation concern and included Grey Wagtail (*Motacilla cinerea*), Kestrel (*Falco tinnunculus*), Meadow Pipit (*Anthus pratensis*), Swift (*Apus apus*) and Snipe (*Gallinago gallinago*).

Kestrel was recorded during the transect surveys and was also observed in the Redrock quarry site incidentally during other walkover surveys on the following dates: August 9, 10 and 11 2025. Kestrel is currently Red-listed due to significant population declines in Ireland in recent decades. Meadow Pipit, another species on the Red-list was recorded across three of the transects. Meadow Pipit is a common and widespread species whose population has substantially recovered since a significant decline likely to have been caused by a high winter mortality during the severe winter of 2009/2010 and 2010/2011 (www.birdwatchireland.ie). Grey Wagtail, one of the species recorded is Red-listed of high conservation concern in Ireland at present due to a significant decline in its breeding situation (see Gilbert *et al.* 2021). As Grey Wagtail is ecologically associated with watercourses, the study site may contain suitable foraging habitat. Grey Wagtail tend to nest close to the riverbank and fast flowing water. Swift and Snipe are also Red-list species due to severe decline in their breeding populations; however, these two species were recorded in very low numbers within the site.

Ten species Amber-listed (of moderate conservation concern) species in Ireland were recorded within the Redrock quarry site: Coot (*Fulica atra*), Cormorant (*Phalacrocorax carbo*), Goldcrest (*Regulus regulus*) House Martin (*Delichon urbicum*), Lesser Black-backed Gull (*Larus fuscus*), Linnet (*Linaria cannabina*), Sand Martin (*Riparia riparia*), Starling (*Sturnus vulgaris*), Swallow (*Hirundo rustica*) and Willow Warbler (*Phylloscopus trochilus*).

Goldcrest, House Martin, Linnet, Starling and Swallow are of moderate conservation concern as their European conservation status is unfavourable (see Gilbert *et al.* 2021). Hedgerow/treeline features at the site would support feeding opportunities for these species in general, and nesting for Goldcrest and Linnet. Nesting opportunities for House Martin, House Sparrow, Starling and Swallow would typically be associated with buildings within the in the surrounding area. Coot was observed during transect surveys and a juvenile Coot was also observed during walkover surveys within the pond in the quarry basin, on 9 and 10th August 2025, indicating breeding within the Substitute Consent site.



Other bird species observed during walkover surveys include: House Sparrow (*Passer domesticus*) and Mistle Thrush (*Turdus visivorus*). A female Mallard (*Anas platyrhynchos*) with ducklings was observed in the pond above the quarry basin in the northeast corner of the site on 9th and 10th August 2025.

Although not observed during transect surveys, Peregrine Falcon (*Falco peregrinus*), an Annex 1 listed species, was recorded on several occasions during other ecological surveys of the development area. Peregrine Falcon is a species that frequently nests and roosts at quarry sites as the steep rock-faces mimic natural sea-cliffs which are a preferred habitat. Peregrine Falcon was observed on the following dates: July 7, August 8, August 9, and August 14 2025. The Peregrine Falcon recorded during surveys appeared to be an adult male. The presence of whitewash on the cliff within the site indicates a roost might be present that is used regularly by this bird. However, there is no evidence of current or recent historical nesting.

Brian O'Connor (NPWS Conservation Ranger) was contacted and it was confirmed that NPWS staff had visited the quarry in April 2025. Although Peregrine Falcon and signs of previous usage of the site (whitewash) were recorded it was confirmed that nesting was not suspected at the inactive quarry site. The quarry appears to be used as an occasional roosting and prey-handling site.

Most bird species are protected under the Irish Wildlife Act (1976 as amended), where it is an offence to hunt, interfere with or destroy their breeding or resting places (unless under statutory licence/permission).

Table 6.13 Peak counts of birds recorded during transect surveys and VP surveys at the Site. 'P' indicates a record of the species >100m from the site boundary.

Common Name	Scientific Name	T1	T2	T3	T4	T5	T6
Blackbird	<i>Turdus merula</i>	1	2		3	1	3
Blackcap	<i>Sylvia atricapilla</i>		1			1	
Blue Tit	<i>Cyanistes caeruleus</i>		1		1	1	2
Buzzard	<i>Buteo buteo</i>				P		1
Chiffchaff	<i>Phylloscopus collybita</i>		2	2		2	1
Coal Tit	<i>Periparus ater</i>		1			2	
Coot*	<i>Fulica atra</i>	1					
Cormorant*	<i>Phalacrocorax carbo</i>				1		
Duncock	<i>Prunella modularis</i>				1		
Goldcrest*	<i>Regulus regulus</i>		1	1		4	
Goldfinch	<i>Carduelis carduelis</i>	3		2			3
Grasshopper Warbler	<i>Locustella naevia</i>			1		1	
Great Tit	<i>Parus major</i>		1		1		
Grey Wagtail^	<i>Motacilla cinerea</i>	1					
House Martin*	<i>Delichon urbicum</i>	2					
Jackdaw	<i>Corvus monedula</i>	2	1	6	2		3
Kestrel^	<i>Falco tinnunculus</i>	1		1			
Lesser Black-backed Gull*	<i>Larus fuscus</i>	1		1			
Linnet*	<i>Linaria cannabina</i>	4					
Magpie	<i>Pica pica</i>		1	2	3	2	1



Common Name	Scientific Name	T1	T2	T3	T4	T5	T6
Meadow Pipit^	<i>Anthus pratensis</i>		2	2		4	
Moorhen	<i>Gallinula chloropus</i>	2					
Peregrine Falcon	<i>Falco peregrinus</i>	1		1			
Pheasant	<i>Phasianus colchicus</i>			1	P	1	2
Pied Wagtail	<i>Motacilla alba</i>	2	1				
Raven	<i>Corvus corax</i>	1		1		1	
Reed Bunting	<i>Emberiza schoeniclus</i>	1					
Robin	<i>Erithacus rubecula</i>	1	3	2	1	2	2
Rook	<i>Corvus frugilegus</i>	2	1	3	4		5
Sand Martin*	<i>Riparia riparia</i>	15	4				
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>	2					
Snipe^	<i>Gallinago gallinago</i>	1		1		4	1
Song Thrush	<i>Turdus philomelos</i>		1	P	1	1	
Starling	<i>Sturnus vulgaris</i>	2	3		5		8
Stonechat	<i>Saxicola rubicola</i>		1			2	
Swallow*	<i>Hirundo rustica</i>	8	2	1	3		5
Swift^	<i>Apus apus</i>	1					1
Willow Warbler*	<i>Phylloscopus trochilus</i>	1	3	4	2	1	3
Woodpigeon	<i>Columba palumbus</i>	2	4	4	9	2	5
Wren	<i>Troglodytes troglodytes</i>	2	2	1	2	3	2
Snipe	<i>Gallinago gallinago</i>	1		1		4	1

^ Red-listed species

* Amber-listed species

6.8.7 Other taxa

Desktop study

The NBDC database for the 10km grid square that overlaps with the site was queried for records of other rare or protected species that were not included in the preceding sections. Four butterfly species of conservation concern have been recorded from this 10km grid square: Marsh Fritillary (*Euphydryas aurinia*), Dingy Skipper (*Erynnis tages*), Small Heath (*Coenonympha pamphilus*), and Wood White (*Leptidea* sp.; Table 6.14). Marsh Fritillary is listed under Annex II of the EU Habitats Directive (92/43/EEC) and is listed as 'Vulnerable' under the Irish Red-List of Butterflies, indicating a high risk of extinction (Reagan *et al.*, 2010).

Two species of bee, Moss Carder Bee (*Bombus muscorum*) and Red-tailed Bumblebee (*Bombus lapidarius*) were recorded from this 10km grid square and are listed as 'Near Threatened' (Fitzpatrick *et al.* 2006). One species of moth that is listed as 'Near Threatened' was recorded within the 10km grid square: Yellow Shell (*Camptogramma bilineata*) (Allen *et al.* 2016). Common Lizard (*Zootoca vivipara*) has been recorded in the 10km grid square and also four species of snail (Table 6.14).

Medium impact invasive snail species have also been recorded historically from this area: Common Garden Snail (*Cornu aspersum*) and Jenkins' Spire Snail (*Potamopyrgus antipodarum*).



Table 6.14 Other taxa of note recorded historically in 10km grid square S67

Common Name	Scientific Name	Designation
Marsh Fritillary	<i>Euphydryas aurinia</i>	Red-list Vulnerable; EU Habitats Directive Annex II (strict protection).
Dingy Skipper	<i>Erynnis tages</i>	Red-list Near Threatened
Small Heath	<i>Coenonympha pamphilus</i>	Red-list Near Threatened
Wood White	<i>Leptidea</i> sp.	Red-list Near Threatened
Moss Carder Bee	<i>Bombus muscorum</i>	Red-list Near Threatened
Red-tailed Bumblebee	<i>Bombus lapidarius</i>	Red-list Near Threatened
Yellow Shell	<i>Camptogramma bilineata</i>	Red-list Near Threatened
Common Lizard	<i>Zootoca vivipara</i>	Protected under Irish Wildlife Acts; EU Habitats Directive Annex IV; Appendix III of the Bern Convention
English Chrysalis Snail	<i>Leiostryla (Leiostryla) anglica</i>	Red-list Vulnerable
Lesser Bulin	<i>Merdigera obscura</i>	Red-list Endangered
Prickly Snail	<i>Acanthinula aculeata</i>	Red-list Near Threatened
Tree Snail	<i>Balea perversa</i>	Red-list Vulnerable

Field study

Table 6.15 summarises invertebrate species that were recorded during field visits to the Redrock quarry site. None of the invertebrate species recorded are rare or protected. Areas with Devil's Bit Scabious were inspected for signs of eggs or larvae of Marsh Fritillary – no evidence of the presence of Marsh Fritillary was recorded at the Substitute Consent site or surrounding area.

Table 6.15 Casual observations of butterflies/moths, damselflies and dragonflies during walkover surveys.

Common Name	Scientific Name	7 July 2025	7 Aug 2025	11 Aug 2025	14 Aug 2025
Cinnabar	<i>Tyria jacobaeae</i>	X	X		X
Common Blue Butterfly	<i>Polyommatus icarus</i>	X	X	X	X
Common Blue Damselfly	<i>Enallagma cyathigerum</i>	X	X		X
Four-spotted Chaser	<i>Libellula quadrimaculata</i>	X			
Fox Moth	<i>Macrothylacia rubi</i>	X			



Common Name	Scientific Name	7 July 2025	7 Aug 2025	11 Aug 2025	14 Aug 2025
Meadow Brown	<i>Maniola jurtina</i>	X	X		X
Painted Lady	<i>Vanessa cardui</i>	X	X		X
Peacock	<i>Aglais io</i>	X	X		X
Red Admiral	<i>Vanessa atalanta</i>	X	X		X
Small Tortoiseshell	<i>Aglais urticae</i>	X	X		X
Small White	<i>Pieris rapae</i>	X	X		X
Speckled Wood	<i>Pararge aegeria</i>	X	X		X

6.9 Potential Impacts

Potential ecological impacts of the Substitute Consent on the receiving environment are discussed below. For the purposes of legislative compliance with Substitute Consent, impacts to biodiversity are considered with reference to impacts that have occurred from c. 1995 to present day, using c. 1995 as the baseline conditions. The potential impacts are assessed based on the desktop and field surveys carried out as part of this assessment and the descriptions provided of the proposed construction-phase and operation-phase of the Substitute Consent.

6.9.1 Potential impacts on Designated Sites

Designated conservation sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Nature Reserves and other Refuges for Fauna. SACs and SPAs are European designated nature conservation sites that have been designated under the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (2009/147/EC) respectively. SACs and SPAs are collectively known as Natura 2000 sites and are legally protected by Irish law. NHAs are legally protected by the Irish Wildlife Acts (1976 as amended), but pNHAs are not and only have limited protection through recognition by planning/licensing/forestry authorities and agri-environmental schemes. Nature Reserves and Refuges for Fauna are protected under the Irish Wildlife Acts (1976-2012). Many designated sites overlap, e.g. a site can be designated as both a pNHA and SAC.

The Substitute Consent site is not located proximate to any designated wildlife conservation site. Consideration of direct effects considers the location of the Substitute Consent site relative to the designated sites and the likelihood for elements of the development to result in significant effects within these conservation areas. In addition, the nature of the proposed works (construction, operation and site restoration) and the likelihood of these activities



resulting in significant effects on the designated sites are fully considered. The Source-Pathway-Receptor model is used to evaluate the potential for effects to be conveyed to sites in the wider hinterland area.

The only Natura 2000 site hydrologically connected to the Substitute Consent site is the River Barrow & River Nore SAC (002162), located a minimum of 2.1km overland (>2.5km downstream) to the east of the Substitute Consent site. The site is hydrologically connected to this SAC via the Mortarstown Stream which receives the discharge from the Substitute Consent site. The lower reaches of this stream and the Fushoge River form part of the SAC. There is no direct hydrogeological connection between the site and the SAC due to the poor permeability of the underlying bedrock aquifer.

The Screening stage assessment is summarised in Table 6.16. The River Barrow & River Nore SAC is designated for a range of habitats and species (see Table 6.3) including a number of fish species, Otter and White-clawed Crayfish. A credible hydrological pathway exists from the quarry lands to the River Barrow.

Dust, noise or visual disturbance originating from the quarry is not a plausible pathway to this SAC due to the distances involved and intervening topography/land use. The only pathway identified with any potential to result in likely significant effects is via hydrological links to the River Barrow and River Nore SAC.

Targeted field surveys did not record regular usage of the site by any River Barrow & River Nore SAC qualifying interest species. No habitats listed as qualifying interests for the River Barrow & River Nore Special Area of Conservation (SAC) are present within the site.

The River Nore SPA (004233) is located 22km southwest of the Substitute Consent site. The River Nore SPA is located downgradient of the Substitute Consent site via the Dinin River within the River Nore catchment, with only a very small area of the site located in this catchment. The length of any potential hydrological flowpath would be in excess of 30km. Additionally, there is no surface water discharge from the site to any tributary of the Dinin River. Furthermore, the Substitute Consent site is not connected hydrogeologically with this SPA as the ground water is expected to flow to the east of the site.

The only nationally protected site hydrologically connected to the Substitute Consent site is the Cloghrick Wood pNHA (000806), located a minimum of 3.4km overland to the southeast of the site. The flowpath between the Substitute Consent site and Cloghrick Wood pNHA is approximately 6km. The Cloghrick Wood pNHA is located on the eastern banks of the River Barrow downstream of the site. This pNHA includes some wet woodland adjacent to the river. No direct hydrogeological connection exists between the Substitute Consent site and the pNHA due to the short groundwater flowpaths in the underlying aquifer.

The relevant threats and pressures that have been identified in relation to this SAC sites are summarised in Table 6.17.



Construction/Enabling works

Enabling works involved vegetation and soil stripping, temporary haul routes and stockpiles, building of offices, weighbridges and welfare buildings, installation of the surface-water management and treatment system, and installation of the washing plant. In the absence of adequate environmental controls, these activities had potential to mobilise suspended solids and fines during rainfall. Run-off had the potential to generate short-lived turbidity and to introduce small amounts of hydrocarbons associated with plant and refuelling. Handling of concrete during removal of the separately permitted recovery facility could also, if unmanaged, have released alkaline residues. The hydrological pathway forms a potential connection from on-site drainage to local watercourses and then onwards to the River Barrow. The concern at screening stage is a temporary reduction in water clarity and quality. The effects could have reduced habitat suitability for species listed as protected under the River Barrow and Nore SAC. At these distances there is no credible disturbance or displacement pathway to SAC species from construction noise or visual activity at the quarry.

Operational phase

During operation, the quarry performed extraction within the permitted depth, with mechanical extraction of rock (no blasting), crushing and screening, washing, vehicle movements and stockpiling. Offices and weighbridges were in daily use, and the discharge and treatment system were in operation. In the absence of controls, the principal risks were chronic suspended-solid and turbidity loading in process and yard run-off, intermittent hydrocarbon inputs from plant and storage areas, and potential alkaline particulates from handling of concrete where any residual recovery operations overlap with the Substitute Consent. The pathway remains the potential hydrological connectivity with River Barrow. The mechanism of effect is a sustained or repeated deterioration in water quality that could influence negatively SAC habitats and species.

For instance, in the absence of appropriate controls, rain-driven pulses of silt could have slightly depressed prey availability for Otters occurring downstream, if significant volumes of washings discharged to the local watercourses, causing an elevation in pH that could affect fish and invertebrate prey. Any such effects were likely to be local and short-lived. The predicted impact magnitude is low-to-medium in extent, localised to watercourses downstream and proximate to the Substitute Consent and likely to be short-term/temporary, minor adverse (Local).

Restoration & Post Closure

Once the extraction of bedrock ceased within the proposed extraction area, a thin layer of crushed rock was spread over the floor of the extraction area followed by the spoil material stored in the spoil storage area and in the boundary berm. Other parts of the Substitute Consent area reverted to grassland/scrubland via natural regeneration.

Once quarrying operations ceased, all site infrastructure and plant were disassembled and removed off-site for disposal/recycling and/or resale.



No negative effects on designated sites in Zone of Influence were expected during the restoration phase or post restoration. The local drainage controls were in place during the restoration phase and minimised the risk of significant mobilisation of pollutants to watercourses downstream of the site. As the landscaped features mature they had a positive effect on local biodiversity in medium to longer term.

Requirement for NIS

Across the enabling, operational and restoration stages, the only credible pathway to the screened-in European site is hydrological. Potential effects are related to suspended solids, turbidity and trace contaminants, including hydrocarbons and alkaline residues associated with construction, quarry operations, and washing. There is no credible noise or visual disturbance pathway to the SAC, and field surveys indicate that the Substitute Consent area is not regularly used by any QI species. On a precautionary basis, the River Barrow and River Nore SAC is 'screened-in' for further consideration in the Natura Impact Statement. An NIS accompanies the EIAR for the Substitute Consent.



Table 6.16 Summary screening matrix.

Designated Conservation Site	Site Code	Qualifying/Special Conservation Interest - Habitat	Qualifying/Special Conservation Interest - Species	Minimum Distance (km)	Pathway (at screening)	Screening Conclusion
River Barrow and Nore SAC	002162	• Estuaries (1130) • Mudflats and sandflats not covered by seawater at low tide (1140) • Reefs (1170) • Salicornia and other annuals colonising mud and sand (1310) • Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) (1330) • Mediterranean salt meadows (<i>Juncetalia maritimi</i>) (1410) • Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation (3260) • European dry heaths (4030) • Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430) • Petrifying springs with tufa formation (Cratoneurion) (7220) • Old sessile oak woods with Ilex and Blechnum in the British Isles (91A0) • Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) (91E0)	• <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) (1016) • <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) (1029) • <i>Austropotamobius pallipes</i> (White-clawed Crayfish) (1092) • <i>Petromyzon marinus</i> (Sea Lamprey) (1095) • <i>Lampetra planeri</i> (Brook Lamprey) (1096) • <i>Lampetra fluviatilis</i> (River Lamprey) (1099) • <i>Alosa fallax fallax</i> (Twaite Shad) (1103) • <i>Salmo salar</i> (Salmon) (1106) • <i>Lutra lutra</i> (Otter) (1355) • <i>Vandenboschia speciosa</i> (Killarney Fern) (6985)	Overland - 2.1. Hydrological flowpath - >2.5	Yes – hydrological pathway	Screen-in
River Nore SPA	004233		• Kingfisher (<i>Alcedo atthis</i>) [A229]	Overland- 22 Hydrological flowpath - > 30	No	Screen-out



Table 6.17 Summary of known threats and pressures of relevance to the hydrologically connected SAC site.

Designated Conservation Site Name	Site Code	Qualifying/Special Interest s	Conservation	Qualifying/Special Interest - Species	Conservation	Key threats and pressures to consider
River Barrow and Nore SAC	002162	Estuaries (1130)		<i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) (1016)		- High inputs of nutrients into the river system from agricultural run-off and several sewage plants - Over-grazing within the woodland areas - Invasion of non-native species including Cherry Laurel (<i>Prunus laurocerasus</i>) and Rhododendron (<i>Rhododendron ponticum</i>) - Dredging within the lower reaches of the system - Land reclamations are a threat to salt meadows and associated protected species
		Mudflats and sandflats not covered by seawater at low tide (1140)		<i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) (1029)		
		Reefs (1170)		<i>Austropotamobius pallipes</i> (White-clawed Crayfish) (1092)		
		Salicornia and other annuals colonising mud and sand (1310)		<i>Petromyzon marinus</i> (Sea Lamprey) (1095)		
		Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>) (1330)		<i>Lampetra planeri</i> (Brook Lamprey) (1096)		
		Mediterranean salt meadows (<i>Juncetalia maritimi</i>) (1410)		<i>Lampetra fluviatilis</i> (River Lamprey) (1099)		
		Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation (3260)		<i>Alosa fallax fallax</i> (Twaites Shad) (1103)		
		European dry heaths (4030)		<i>Salmo salar</i> (Salmon) (1106)		
		Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430)		<i>Lutra lutra</i> (Otter) (1355)		



Designated Conservation Site Name	Site Code	Qualifying/Special Conservation Interest s	Qualifying/Special Conservation Interest - Species	Key threats and pressures to consider
		Petrifying springs with tufa formation (Cratoneurion) (7220)	<i>Vandenboschia speciosa</i> (Killarney Fern) (6985)	
		Old sessile oak woods with Ilex and Blechnum in the British Isles (91A0)		
		Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) (91E0)		



6.9.2 Potential Impacts on Habitats & Flora

No habitats listed on Annex I of the EU Habitats Directive (92/43/EEC) were recorded within the Substitute Consent site boundary. Botanical species protected under the Flora (Protection) Order 2022, listed in Annex II or IV of the EU Habitats Directive (92/43/EEC), or Red-listed in Ireland (Wyse-Jackson *et al.*, 2016) were not recorded during the site visits. The interior of the site is dominated by areas of spoil and bare ground, recolonising bare ground with very limited vegetative cover; small pockets of scrub and improved agricultural and wetland grassland, hedgerow sections, and drainage features occur around the margins. Historically, the Substitute Consent site was dominated by improved agricultural grassland bounded by hedgerows and treelines.

According to the EPA blueline database and historic 25" and 6" mapping, the Raheendoran Stream flowed through the Substitute Consent site prior to the quarrying activities. This stream drained the local area, including the Substitute Consent site, and discharged into the River Barrow, approximately 2.25km east. Whilst the Raheendoran Stream is still present downstream of the site, the headwaters of the stream which overlapped with the extraction area have been removed. Water which used to flow in the Raheendoran Stream currently gathers in ponds and flooded areas on the quarry floor. Some of this water is directed to a large settlement pond, whilst some flows along an existing access track in the northeast of the Substitute Consent site. All surface water from the quarry merges downstream of the settlement pond and flows to the east towards the Mortarstown Stream. The Mortarstown Stream discharges into the Fushoge River, which in turn discharges into the River Barrow, approximately 220m upstream of where the Raheendoran Stream discharges into the River Barrow. Historical habitats, including riparian habitats, that may have been associated with Raheendoran Stream within the Substitute Consent site were impacted by quarrying activities.

In habitat terms, the development of the quarry has resulted in the permanent loss of the headwaters and on-site reach of a small natural watercourse of Local Importance (Higher Value). This represents a medium magnitude, permanent adverse impact at Local level due to the complete removal of watercourse habitat and riparian corridor within the quarry void and the redirection of flows to an alternative catchment receptor. The effect is assessed as a moderate adverse impact at Local level that cannot be fully reversed in the absence of reinstatement of a functioning channel and riparian corridor.

The historic removal of approximately 35% of the hedgerow habitat across the entire site, removed field boundaries of variable quality. The effect is assessed as a low magnitude, permanent adverse impact on a habitat of Local Importance (Lower Value), resulting in a slight to, at most, moderate adverse effect at Local level.

On this basis, without mitigation, the overall significance is assessed as moderate adverse at site level during construction and operation phases of the quarry.



Construction/Enabling works

Enabling works required stripping of a thin layer of soil and subsoil to expose the bedrock and installation of site infrastructure. Within the Substitute Consent site boundary, this equated to additional loss of low-value habitats, predominantly improved grassland. No Annex I habitats are present and the scale of loss is local, permanent (for the duration of quarrying) and confined to habitats of low botanical diversity. Soil disturbance and compaction occurred during the formation of haul routes, laydown areas and stockpiles. Field boundaries Works potentially disturbed peripheral areas, potentially reducing botanical cover and seed bank viability in those small areas. Effects were likely to be localised and largely reversible where soils remain.

Earthworks and traffic may have elevated dust levels during the construction phase. This could have led to deposition on nearby swards, hedgerow foliage and emergent vegetation etc. which may impair photosynthesis and alter leaf surfaces where loads are high and persistent. Given the limited botanical resource on-site and relatively low conservation value of the habitats in the adjoining intensively managed agricultural land, any effects were likely to have been highly localised and non-significant.

Short-term pulses of suspended solids from newly formed drains or tie-ins have the potential to smother macrophytes or emergent fringing vegetation within on-site ditches or ponds if transported during rainfall. No Annex I habitat is present so any effect would have been episodic and likely to have been highly localised.

Import of non-waste soils and stone carries a plausible, albeit low, risk of introducing viable propagules (e.g., rhizomes, seeds) of invasive or weedy species to worked margins. Establishment would first occur within the site, potentially altering the ruderal flora or colonising disturbed ditches.

Temporary lighting for enabling works could alter growth patterns of verge flora immediately adjacent to lit areas, but such effects are minor relative to other pressures and spatially limited. Given the relatively low value of the habitats at and proximate to the site, the effects are unlikely to be significant.

Potential effects on habitats and botanical species are dominated by additional loss of relatively low-value habitats, local soil disturbance, dust deposition near workfaces, and a low-likelihood introduction of non-native propagules with imported materials. No effects on Annex I habitat types or protected plant species are predicted based on the field and desktop studies undertaken.

Quarry operation

Extraction, stockpiling and traffic associated with the quarrying activity at the Substitute Consent site caused vegetation to be frequently removed or disturbed during the extractive



process. Botanical interest was likely to remain relatively low in active areas. Hedgerow sections and narrow verges at the site edge may have experienced periodic trimming and disturbance, with limited structural complexity.

In the absence of appropriate mitigation, repeated dust generation from the rock extraction, crushing and haulage can have suppressed growth of nearby swards and affect species composition in small peripheral patches and along hedgerows, favouring dust-tolerant ruderal taxa. Effects diminished with distance from sources and were likely to be highly localised to the Substitute Consent Site and immediate surrounding areas.

Process water and runoff (if untreated) had the potential to elevate suspended solids on-site ponds/drains, which can have reduced light penetration and smother macrophyte surfaces, limiting colonisation by submerged or emergent species. Given the artificial nature of waterbodies and absence of Annex I habitats, this represents a quality effect on relatively low-value aquatic/riparian vegetation within the site.

Ongoing disturbance combined with import of non-waste soils had, in the absence of appropriate controls, the potential to create suitable niches for opportunistic and invasive plants. Potential effects remain local and low magnitude, primarily influencing ruderal and marginal vegetation immediately adjacent to working areas. No pathways to Annex I habitats, or protected plant populations have been identified.

6.9.3 Aquatic species

Enabling works

The enabling works for the quarry involved the stripping of topsoil and subsoil, commencement of excavation of the quarry void and construction of haul roads, benches and settlement ponds. These works removed the headwaters and on-site reach of the Raheendoran Stream within the extraction area, together with its natural channel and riparian corridor.

For aquatic species, this phase resulted in the permanent loss of a short reach of a small natural watercourse of Local Importance (Higher Value), including its associated small stream macroinvertebrate community and any local movement route for fish or amphibians that may have been present. The magnitude of this historic impact is assessed as medium, adverse and permanent at Local level, giving rise to a moderate adverse effect at that level. The same works also created multiple artificial standing waterbodies in the quarry void, which provide new habitat for amphibians and aquatic invertebrates. However, these benefits do not negate the historic loss of natural stream habitat.

Operational phase

During the operational phase, the quarry water management system continued to collect surface water in flooded areas and settlement ponds and discharged treated water via the established outfalls to the Mortarstown Stream. The quarry ponds, flooded areas and



settlement pond now support standing water communities and provide breeding and foraging habitat for amphibians, including Smooth Newt and Common Frog, both of which are confirmed by eDNA sampling.

Under normal operating conditions, the settlement system provided attenuation and settlement of suspended solids, and no evidence of chronic water quality deterioration in downstream receptors was identified. There remained a residual risk of episodic pollution events, for example accidental hydrocarbon or silt releases, although such events were unlikely and there is no evidence that such events occurred as appropriate management of surface water appears to have been implemented.

The operational phase did not increase the extent of historic loss due to the removal of the headwaters of the Raheendoran. For amphibians, the presence of multiple ponds represents a slight beneficial effect at Local level relative to the pre-development situation, while for downstream aquatic receptors the ongoing risk is considered slight adverse at Local level. Overall, the operational phase is assessed as giving rise to a moderate adverse effect at Local level in relation to the historic removal of the head waters of the Raheendoran Stream, together with a slight beneficial effect at Local level for amphibians using the quarry ponds.

6.9.4 Non-volant mammals

Enabling works

The enabling works removed improved grassland (GA1) and associated hedgerows within the footprint of the extraction void and processing areas. This resulted in the loss of general foraging and shelter habitat for common non-volant mammals such as Irish Hare, Fox and small mammals. No Badger setts or other breeding or resting places of protected non-volant mammals were recorded within the substitute consent boundary, and the affected habitats are of Local Importance (Lower Value).

The magnitude of impact on non-volant mammals during the enabling works is assessed as low, adverse and permanent at Local level, reflecting the removal of a modest area of low biodiversity value habitat in the context of extensive similar habitat in the surrounding agricultural landscape. The resulting effect is considered to have been slight adverse at Local level.

Operational phase

During the operational phase, the quarry continued to function as a high disturbance level environment with regular vehicle movements, plant operation and human presence. These activities reduced the suitability of the quarry interior for more disturbance-sensitive mammals and increased mortality risk for small mammals and Hare through traffic collisions. At the same time, the quarry void, spoil and edges are used opportunistically by generalist species such as Irish Hare and Red Fox for foraging and movement.



Given the continued availability of similar or better-quality habitat in the surrounding lands, and the absence of breeding or resting places of species of higher conservation concern, the operational phase impacts are assessed to have been of low magnitude, adverse and long term at Local level. The overall effect on non-volant mammals is assessed as slight adverse at Local level.

6.9.5 Bats

Enabling works

The enabling works removed hedgerows, treelines and the head waters of the Raheendoran stream corridor within the extraction footprint. Linear habitat features would previously have provided commuting routes and foraging habitat for bats moving through the landscape. On the other hand the creation of the quarry void, benches and ponds introduced new areas of sheltered, unlit open water that provided foraging opportunities for species such as Common Pipistrelle, Soprano Pipistrelle and Daubenton's Bat.

No bat roosts were identified within the Substitute Consent site and the aerial mapping of the pre-works site does not indicate high suitability features for roosting bats. The enabling works therefore are likely to have marginally reduced local foraging and commuting habitat rather than impacting upon any roosts.

The magnitude of impact during the enabling phase is assessed as low to medium, adverse and long term at Local level, reflecting both the loss of some commuting features and the creation of alternative foraging habitat. The resulting effect is considered moderate adverse at Local level, as the former hedgerow and stream corridor linkages within the site have been removed.

Operational phase

During the operational phase, the quarry ponds and wet grassland areas were used by bats for foraging, while hedgerows and treelines around the quarry perimeter provided commuting routes. Passive detector surveys in 2025 confirmed activity by at least five bat taxa, including pipistrelle species, Leisler's Bat, Daubenton's Bat and Brown Long-eared Bat. Night-time lighting within the quarry is absent, so the site remains suitable for light-sensitive species, and there is no evidence of significant barrier effects related to lighting.

Operational activities, including vehicle movements and intermittent lighting, may have caused some localised disturbance, but bats continue to forage within and around the quarry void. No roosts are present within the active quarry. The magnitude of operational phase impact is assessed as low, adverse and ongoing at Local level. Taking into account both the historic loss of linear features and the current use of the site by foraging bats, the overall operational effect is considered slight to moderate adverse at Local level, with no significant effect.

6.9.6 Birds



Enabling works

The enabling works partially removed the pre-existing field pattern of improved grassland (GA1) and associated hedgerows and riparian vegetation within the extraction area. This resulted in the loss of nesting and foraging habitat for common farmland and woodland edge bird species, including passerines, corvids and possibly small numbers of ground nesting birds, and removed the narrow riparian strip along the former Raheendoran stream course.

These habitats are of Local importance, ranging from lower to higher, and similar or better-quality farmland and hedgerow habitat remains extensive in the surrounding landscape. No locally important population of any species of conservation concern is known to have been entirely dependent on the habitat removed. The magnitude of impact on birds during the enabling works is assessed as low, adverse and permanent at Local level, resulting in a slight to, at most, moderate adverse effect at that level.

Operational phase

During the operational phase, the quarry void, faces, spoil and ponds supported a modified avian assemblage, including hirundines, wagtails and other species that utilise bare ground and open water, while the surrounding hedgerows, plantation forestry and grassland continue to support a typical farmland bird community. Operational noise, traffic and human activity may have reduced the suitability of the active quarry floor and plant area for more disturbance-sensitive species, although birds are regularly observed foraging within similar quarry voids.

Given the common and widespread nature of the bird species recorded in the area and surrounding unexcavated farmland in 2025, the magnitude of operational phase impact is assessed as low, adverse and ongoing at Local level. The operational effects are considered slight to moderate adverse at Local level and are not significant.

6.9.7 Other taxa

Enabling works

Enabling works removed areas of improved grassland and hedgerow that are likely to have supported typical assemblages of terrestrial invertebrates and general fauna and replaced them with bare ground, spoil, quarry faces and waterbodies. No evidence was found of rare or protected terrestrial invertebrates, reptiles or other taxa of high conservation value associated with the pre-development habitats. The affected habitats are considered to be of Local Importance (Lower Value) for these groups.

The magnitude of impact on other taxa during the enabling works is assessed as low, adverse and permanent at Local level, representing a change in habitat structure and composition rather than a clear loss of high value ecological resources. The corresponding effect is slight adverse at Local level.



Operational phase

During the operational phase, the mosaic of bare ground, rocky faces, early successional vegetation and ponds within the quarry is likely to have supported a range of disturbance-tolerant and pioneer invertebrates, together with common herpetofauna, including Common Frog and Smooth Newt, which use the quarry ponds for breeding. The increased habitat heterogeneity is likely to have benefited some invertebrate species associated with warm, sparsely vegetated ground and shallow water margins, although operational disturbance and periodic groundworks may have limited the development of more mature habitat structures.

Given the absence of records of rare or protected invertebrates or reptiles, and the generally low baseline value of the pre-quarry grassland and hedgerow habitats, the operational phase changes are considered to be of low magnitude at Local level, with a mix of minor adverse and minor beneficial effects for different taxa. Overall, the impact on other taxa during the operational phase is assessed as neutral to slight adverse at Local level.

6.9.8 Do Nothing Scenario

As described above, the baseline for this project is identified as c. 1995, reflecting conditions prior to the commencement of quarrying activities at the Substitute Consent site. The 'Do-Nothing' scenario is defined as the condition that would exist within the Substitute Consent site if quarrying activities never took place. The site would most likely have remained improved agricultural grassland bounded by hedgerows and treelines. The Substitute Consent site may have supported alternative land practices such as commercial forestry. The Raheendoran Stream would have continued to flow through the Substitute Consent site in an unaltered state and its associated habitats would have remained intact. There would be no significant alteration to the existing ecological value of the Substitute Consent site.

6.9.9 Cumulative and In-Combination Effects

In order to fully assess the potential impact of the Substitute Consent on the receiving environment and on Natura 2000 sites in the wider area, the project must be assessed alone or in-combination with existing activities and proposed plans for the region. In general, if individual projects and plans adequately address the potential risks to the receiving environment there is significantly less risk of cumulative and in combination effects.

Cumulative effects have been considered in line with EIA and EPA guidance, using planning history and aerial imagery to identify other existing and permitted projects within an appropriate zone of influence. For terrestrial receptors the focus is the immediate farming and forestry landscape around the quarry. For aquatic receptors the focus is the Mortarstown Stream, Fushoge River and their connection to the River Barrow. Relevant activities include other local quarries and extractive sites, agricultural intensification and drainage, and local roads and small industrial or commercial developments.

At habitat and species level, the development of the quarry contributed to an incremental pattern of loss and modification of improved grassland, hedgerows and minor watercourses



in a landscape that is already dominated by intensive agriculture and scattered quarries. The historic removal of GA1 grassland, variable quality hedgerows and the headwaters of the Raheendoran Stream at the site is one of several localised changes of this type. These habitats are common and widespread in the wider area and substantial tracts of similar habitat remain, while quarry ponds and regenerating areas within the void now provide alternative habitat for some taxa. Taking account of other identified projects, the cumulative magnitude of effect on habitats, birds, bats, non volant mammals, invertebrates and amphibians is considered low to (at most) medium at local scale, and the resulting cumulative effects are assessed as slight to moderate adverse at Local level, not significant at County or higher levels. No change in Water Framework Directive status of any waterbody is anticipated as a result of cumulative effects.

In relation to European sites, a separate Natura Impact Statement has been prepared, which assesses likely significant effects on all relevant sites, alone and in combination with other plans and projects in the hydrological and ecological zone of influence. That assessment concludes that the water management and other control measures that were implemented for the quarry means that, either alone or in combination with other plans or projects, no adverse effects arose on the integrity of any European site in view of its conservation objectives. This rEIAR adopts the conclusions of the Natura Impact Statement in respect of in combination effects on European sites.

6.10 Mitigation Measures

Environmental controls that were used to protect both groundwater and surface water quality during the Operational Phase are detailed in Chapter 8 of the EIAR. Water management measures generally limited the risk of run-off of contaminants to surface or groundwater bodies.

A discharge licence was granted by Carlow County Council in November 2011 (DL/S4/2011/2) with the purpose of licensing discharges to waters as defined in the Local Government (Water Pollution) Acts, 1977-2007. The quarry was registered by the previous owner in 2005 over an area of 25.7 hectares and had 18 conditions imposed in 2007 by Carlow County Council under Section 261(6)(a)(i), (Carlow County Council reg. ref.: QY14) which sought assurance in relation to limiting noise levels, prohibiting surface water runoff to discharge to the public road, requiring any necessary environmental licencing is obtained, prohibiting wastewater discharge, restricting the construction of ancillary buildings, requiring the public road is kept clean, requiring unsoiled surface water run-off collection and disposal, and requiring a restoration plan be submitted to the Planning Authority. These commitments were effective in addressing potential negative effects on sensitive downstream habitats and species. The following mitigation measures were applied:

- The hours of operation were as follows: between 0700 hours and 1900 hours from Monday Friday and 0700 to 1300 on Saturday.
- The quarry did not operate on Sundays, Bank Holidays or Public Holidays.



- During the construction/operational phase of the proposed development, the noise level from within the boundaries of the site measured at noise sensitive locations in the vicinity, did not exceed:
 - an Leq,1h value of 55 dB(A) between 0800 to 1800 Monday through Friday and between 0900 and 1300 on Saturday.
 - an Leq, 1hr value of 35dB(A) at any other time. Night-time emissions shall have no tonal component.
- A water management system comprising the following was implemented:
 - Water entering the quarry void largely comprises largely of rainfall or runoff from the lands immediately upgradient of the quarry. There is no significant inflow of groundwater which reduces the volume of water to be attenuated and subsequently discharged.
 - Due to the low permeability of the underlying bedrock aquifer, this water gathers on the floor of the quarry.
 - There are 2 main flooded areas (one in the north and one in the south) on the quarry floor which provide significant attenuation of water.
 - A suitably sized settlement pond was also constructed downgradient of the quarry and provides additional attenuation of water from the southern section of the quarry.

It is considered that with the implementation of the mitigation measures outlined above, the development and operation of the quarry did not result in any likely, significant effects on groundwater and/or surface water. As a result, there were no significant potential to affect the conditions within the designated sites hydrologically linked to the Site: River Barrow & River Nore SCA and Cloghrick Wood pNHA. A NIS accompanies this planning application and with the application of the proposed environmental controls, mitigation and monitoring, it is objectively concluded that no significant effects arising from the development and operation of the quarry did occur in relation to the Natura 2000 sites (i.e. River Barrow & River Nore SAC or indeed any other Natura 2000 site in the wider hinterland).

6.11 Restoration Plan

It is proposed to implement a site restoration plan for the site. Restoration will include planting the soil storage areas in the northwest and northeast of the site with native woodland mosaics to promote and enhance ecological corridors and increase habitat biodiversity. This proposed woodland will include high and low canopy trees in addition to understory and shrub species. The existing boundary vegetation will be retained and protected. Riparian planting along the watercourse exiting the site is proposed. The quarry floor will be allowed to naturally regenerate.



6.12 Residual Effects

Residual impacts are those that remain after the development and operation of the quarry with its environmental management and surface water controls and taking account the historic works that have already taken place and restoration proposals for the site.

Overall, residual ecological effects are confined to Local level and are generally slight to moderate adverse, with some slight beneficial outcomes for amphibians. No significant residual impacts at County, Regional or National level are assessed and no residual adverse effects on the integrity of any European site have been identified, consistent with the conclusions of the Natura Impact Statement.

6.13 References

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