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INTRODUCTION

- 5.1 This Biodiversity chapter forms part of the Environmental Impact Assessment Report (EIAR) prepared for P&S Civil Works Ltd. in support of a planning application to Cavan County Council to allow for the proposed quarry extension at Mullymagowan townland, Stradone, Co. Cavan.

Background

- 5.2 P&S Civil Works Ltd. has been operating the quarry commercially since 1968. The existing quarry at Mullymagowan produces high polished stone value (PSV) chippings to local authorities, both directly and through building suppliers. The planning application is to provide for the supply of aggregates for the local construction industry in the short to medium term.

General Description of the Site

- 5.3 The overall landholding of the applicant (which comprises their existing quarry) straddles the three townlands of Mullymagowan, Drummuck and Tirlahode Lower. The application site itself is centred at approximate Irish Transverse Mercator (ITM) 652679 X 799890 Y and is located fully within the townland of Mullymagowan, being c. 4.5km south of Stradone village and c. 10km southeast of Cavan town. The proposed extension area is approximately 4.9ha in size with a proposed extraction area of approximately 4.0ha
- 5.4 The general area is rural and agricultural in nature and characterised by a gently undulating topography associated with the indigenous drumlin landscape. Views in the area are generally enclosed by a series of low-lying hills, hedgerows and trees. Coniferous woodland features are also dispersed in the landscape. There are a number of minor worked gravel pits in the wider area. There is an active hard rock quarry in operation at Lavey, c. 1.4km southwest of the application site on the opposite side of the N3 road.

Brief Project Description

- 5.5 The proposed development being applied for under this planning application is to:
- Quarry extension development for rock extraction and associated processing over an area of c. 4 hectares within an overall planning application area of c. 4.9 hectares as previously permitted under P. Ref. 12/101 (P. Ref. 17/383) and never commenced;
 - A time period of 15 years is being sought to allow the previously permitted extraction be completed plus 2 years to complete restoration works (total duration sought 17 years);
 - The development proposed seeks to utilise existing ancillary buildings and facilities including weighbridge, wheelwash, portacabin office/canteen/toilet, waste water treatment system, processing plant, site entrance and all other associated site works, and ancillary activities as permitted by P. Ref. 07/827; and
 - Final restoration of the worked out quarry to a permanent water body and naturally regenerated wildlife habitat area.
- 5.6 As the proposals relate to the extension of an existing and established operation, there is no requirement for any new site infrastructure or facilities as part of this application.
- 5.7 A full project description is provided in Chapter 2 of this EIAR.

Purpose of this Report

- 5.8 The purpose of this biodiversity chapter is to describe the baseline ecological conditions at the Site and to identify potential significant effects associated with the proposed development. Where necessary appropriate mitigation measures will be set out to reduce residual effects to a suitable level.
- 5.9 This chapter forms part of the EIAR that will be submitted with the application for permission to assist the competent authority, in this case Cavan County Council, to carry out an Environmental Impact Assessment (EIA) of the proposed quarry extension.

Evidence of Technical Competence and Experience

- 5.10 The habitat survey was carried out by SLR project ecologist Victoria Molloy.
- 5.11 This report was prepared by Victoria Molloy and the technical review was carried out by SLR associate ecologist Michael Bailey.
- 5.12 Victoria Molloy holds a BSc. in Zoology from the University of Galway (formerly National University of Ireland, Galway). She has been working in consultancy for two years and has experience in terrestrial ecology, ornithological surveys, and in the preparation of Appropriate Assessments under the Habitats Regulations/Directive and in the writing of Natura Impact Statements. Victoria is a Qualifying Member of the Chartered Institute of Ecology and Environmental Management (CIEEM).
- 5.13 Michael Bailey holds a BSc. in Biology and Ecology from the University of Ulster and an MSc. in Quantitative Conservation Biology from the University of the Witwatersrand in Johannesburg. He has extensive experience in ecological studies and assessments across a range of sectors in Ireland and of agricultural, mining and renewable energy projects across Africa. He is a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM).

Legislation and Policy

Legislation

- 5.14 The following legislation are relevant to this report:
- The EIA Directive (2014/52/EU);
 - The Habitats Directive (92/43/EEC);
 - The Birds Directive (2009/147/EC);
 - European Communities (Birds and Natural Habitats) Regulations, 2011 - 2015.
 - The Wildlife Acts 1976 as amended;
 - Wildlife (Amendment) Act, 2000, 2010, 2012;
 - The Flora (Protection) Order 2015.
 - The Planning and Development Acts 2000 to 2020 - PART XAB.

- 5.15 The details of these legislation are summarised in **Appendix 5-A** of this report.

Local Planning Policy

- 5.16 The relevant local planning policies have been extracted from the Cavan Development Plan 2022-2028 and are presented in **Appendix 5-A** of this report. These policies are specific to “*Chapter 10: Natural Heritage*” of the development plan and are concerned with the policies and objectives relating to biodiversity and designated sites.

METHODOLOGY

- 5.17 The methods used to carry out the survey of the Site, to evaluate the ecological value and to prepare the biodiversity chapter is outlined in this section. The assessment methodology for this proposal was developed using the standard professional impact assessment guidance published in 2018 by the Chartered Institute of Ecology and Environmental Management (CIEEM).

Scope of the Chapter

- 5.18 The scope of this Biodiversity Chapter is to identify potential impacts likely to occur as a result of the proposed quarry extension, and to determine if the effects on biodiversity are significant. The scope of the report includes the provision of mitigation, compensation and enhancement measures as required.

Zone of Influence

- 5.19 The 'zone of influence' for a project is the area over which ecological features may be subject to significant effects because of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries. The zone of influence will vary for different ecological features depending on their sensitivity to an environmental change (CIEEM, 2018).
- 5.20 The 'zone of influence' for the project can be identified through review of the nature of the proposed development / works, the presence / absence of surface water receptors, the presence of ecological connectivity to the wider landscape and distance from known ecologically sensitive sites.

Desk Study

- 5.21 A desk study was carried out to collate the available existing ecological information on the Site. The Site and the surrounding area were viewed using existing available satellite imagery using Google maps¹ and Bing maps².
- 5.22 The National Parks and Wildlife Service (NPWS)³ and the National Biodiversity Data Centre (NBDC)⁴ online resources were accessed for information on sites designated for nature conservation and on protected habitats and species known from the 2 km grid squares H50F and N59J. Only records for the past 10 years are considered within this report as older records are unlikely to still be relevant given their age and the changes in land management that is likely to have occurred in the intervening period. Environmental Protection Agency (EPA) Maps⁵ were accessed for other environmental information, such as surface water features, relevant to preparation of this report.
- 5.23 Cavan County Council's website⁶ was accessed for information on relevant planning policy, while the planning portal⁷ was accessed for information on other proposed or permitted developments within the Site and immediate surrounding area.
- 5.24 Birds of Conservation Concern in Ireland (BoCCI) 2020-2026 (Gilbert et al 2021), published by BirdWatch Ireland and the RSPB NI, is a list of priority bird species for conservation action on the

¹ <https://www.google.ie/maps> (last accessed 25 October 2022)

² <https://www.bing.com/maps> (last accessed 25 October 2022)

³ <https://www.npws.ie/> (last accessed 25 October 2022)

⁴ <https://maps.biodiversityireland.ie/> (last accessed 25 October 2022)

⁵ <http://gis.epa.ie/> (last accessed 25 October 2022)

⁶ <https://www.cavancoco.ie/> (last accessed 25 October 2022)

⁷ <https://www.eplanning.ie/CavanCC/searchexact> (last accessed 25 October 2022)

island of Ireland. The BoCCI lists birds which breed and/or winter in Ireland and classifies them into three separate lists; Red, Amber and Green; based on the conservation status of the bird and hence their conservation priority. Birds on the Red List are those of highest conservation concern, Amber List are of medium conservation concern and Green List are not considered threatened. The BirdWatch Ireland website⁸ was accessed for information on birds of conservation concern.

- 5.25 All bird species are protected under the Wildlife Acts 1976 – 2018 but for the purposes of this report only records of species within the last 10 years that are Red or Amber-listed on BoCCI or listed on Annex 1 of the Birds Directive are included from records held by the NBDC and NPWS web searches (see **Table 5-1**).
- 5.26 The conservation status of mammals, amphibians, reptiles, fish and protected flora within Ireland and Europe was determined using one or more of the following documents: Wildlife Acts (1976 - 2012), the Red List of Terrestrial Mammals (Marnell *et al.*, 2009), Ireland Red Lists No.5: Amphibians, Reptiles and Freshwater Fish (King *et al.* 2011), The Flora (Protection) Order, 2015 (S.I. No. 356 of 2015) and the EU Habitats Directive 92/43/EEC.
- 5.27 The documents reviewed to assist the preparation of this report include: the Natura Impact Statement for the project (SLR, 2022).

Field Surveys

Habitat Survey

- 5.28 The Site was visited on 18 October 2022 and a walkover survey was carried out by Victoria Molloy. The objective of the site visit was to describe and evaluate the ecological features within the Site.
- 5.29 Habitats were identified and classified using '*A Guide to Habitats in Ireland*' (Fossitt, 2000) during the visit. The dominant plant species present in each habitat type were recorded. Species nomenclature follows Parnell & Curtis (2012) for scientific and English names of vascular plants.
- 5.30 Incidental sightings or evidence of birds, mammals or amphibians were also noted during the habitat survey and the habitats evaluated for their suitability to support such species.

Limitations

Desk Study

- 5.31 Desk study data is unlikely to be exhaustive, especially in respect of species, and is intended mainly to set a context for the study. It is therefore possible that important habitats or protected species not identified during the data search do in fact occur within the vicinity of the site but have not been previously recorded. Interpretation of maps and aerial photography has been carried out using recent imagery, but it has not been possible to verify the accuracy of any statements relating to land use and habitat context outside of the field study area.

Field Surveys

- 5.32 There were no barriers to Site access and the weather was not limiting. The habitat survey was carried out in October, which is within a sub-optimal period for vegetative surveys but still within a season where most of the biodiversity of the site, fauna and flora, can be determined.

⁸ <https://birdwatchireland.ie/> (last accessed 25 October 2022)

ASSESSMENT APPROACH

5.33 The ecological evaluation and assessment within this chapter has been undertaken with reference to relevant parts of the 2018 Guidelines for Ecological Impact Assessment in the UK and Ireland developed by the Chartered Institute of Ecology and Environmental Management (CIEEM, September 2018). Although this is recognised as current good practice for ecological assessment, the guidance itself recognises that it is not a prescription about exactly how to undertake an ecological impact assessment (EclA); rather, they “*provide guidance to practitioners for refining their own methodologies*”. For the full guidance, refer to <https://www.cieem.net/data/files/ECIA%20Guidelines.pdf>. The approach to impact assessment also has regard to advice set out in the EPA guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR) published in 2022.

Important Ecological Features

5.34 Ecological features can be important for a variety of reasons and the rationale used to identify them is explained in the text. Importance may relate, for example, to the quality or extent of the site or habitats therein; habitat and / or species rarity; the extent to which such habitats and / or species are threatened throughout their range, or to their rate of decline.

Determining Importance

5.35 The importance of an ecological feature should be considered within a defined geographical context. The following frame of reference has been used in this case, relying on known/published accounts of distribution and rarity where available, and professional experience:

- International (European).
- National (Ireland).
- Regional (Ulster).
- County (Cavan).
- Townland (Mullymagowan).
- Local (intermediate area between Site and Townland), and
- Site (the red line boundary of the development).

5.36 The above frame of reference is applied to the ecological features identified during the desk study and surveys to inform this report.

5.37 In assigning a level of value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Examples of relevant lists and criteria include species of European conservation importance (as listed on Annexes II, IV and V of the Habitats Directive or Annex 1 of the Birds Directive), species protected under the Wildlife Acts 1976 - 2020 and Birds of Conservation Concern in Ireland 4 (Gilbert *et al.* 2021).

5.38 The approach to impact assessment, as set out in CIEEM guidelines, only requires that ecological features (habitats, species, ecosystems and their functions/processes), that are considered to be important and potentially affected by the proposed development are carried forward to detailed assessment. It is not necessary to carry out detailed assessment of receptors that are sufficiently widespread, unthreatened and resilient to impacts from the proposed development and will remain viable and sustainable. Therefore, for the purposes of this report, only ecological features of Local importance or greater and/or subject to legal protection have been subject to detailed assessment.

Impact Assessment

5.39 Where appropriate the impact assessment process involves the following steps:

- identifying and characterising potential impacts.
- incorporating measures to avoid and mitigate (reduce) these impacts;
- assessing the significance of any residual effects after mitigation;
- identifying appropriate compensation measures to offset significant residual effects (if required); and
- identifying opportunities for ecological enhancement.

5.40 When describing impacts, reference has been made to the following characteristics, as appropriate:

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

5.41 The impact assessment process considers both direct and indirect impacts: direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process or feature, e.g. the creation of roads which cause hydrological changes, which, in the absence of mitigation, could lead to the drying out of wet grassland.

5.42 Consideration of conservation status is important for evaluating the effects of impacts on individual habitats and species and assessing their significance:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area.
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

Significant Effects

5.43 The 2018 CIEEM guidance sets out information in paragraphs 5.24 through to 5.28 of the guidance document which describes the concept of ecological significance. Significant effects are qualified with reference to an appropriate geographic scale, and the scale of significance of an effect may or may not be the same as the geographic context in which the feature is considered important.

5.44 A significant effect, for the purposes of EclA, is defined as an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of

biodiversity). Effects can be considered significant at a wide range of scales from international to local.

- 5.45 The nature of the identified effects on each assessed feature is characterised. This is considered, along with available research, professional judgement about the sensitivity of the feature affected, and professional judgement about how the impact is likely to affect the site, habitat, or population's structure and continued function. Where it is concluded that an effect would be likely to reduce the importance of an assessed feature, it is described as significant. The degree of significance of the effect takes into account the geographic context of the feature's importance and the degree to which its interest is judged to be affected.

Cumulative Effects

- 5.46 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a proposed development results in individually insignificant impacts that, when considered in-combination with impacts of other proposed or permitted plans and projects, can result in significant effects.
- 5.47 Other plans and projects that should be considered when establishing cumulative effects are:
- proposals for which consent has been applied but which are awaiting determination;
 - projects which have been granted consent, but which have not yet been started or which have been started but are not yet completed (i.e. under construction);
 - proposals which have been refused permission, but which are subject to appeal, and the appeal is undetermined;
 - constructed developments whose full environmental effects are not yet felt and therefore cannot be accounted for in the baseline; or
 - developments specifically referenced in a National Policy Statement, a National Plan or a Local Plan.

Avoidance, Mitigation, Compensation & Enhancement

- 5.48 Where potentially significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM Guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of impacts where possible, the application of mitigation measures to minimise unavoidable impacts and then compensation for any remaining impacts. Once avoidance and mitigation measures have been applied, residual effects are then identified along with any necessary compensation measures, and incorporation of opportunities for enhancement.
- 5.49 It is important to clearly differentiate between avoidance mitigation, compensation and enhancement and these terms are defined here as follows:
- Avoidance is used where an impact has been avoided, e.g. through changes in scheme design;
 - Mitigation is used to refer to measures to reduce or remedy a specific negative impact in situ;
 - Compensation describes measures taken to offset residual effects, i.e. where mitigation in situ is not possible; and
 - Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

BASELINE ECOLOGICAL CONDITIONS

5.50 This section sets out the baseline conditions for the ecological features considered within the Site using the findings of the desk study and field survey.

Sites Designated for Nature Conservation

5.51 Sites which have been designated for nature conservation are discussed in this section. These designations may include; Natura 2000 sites, Natural Heritage Areas, National Parks, Nature Reserves, Wildfowl Sanctuaries and Ramsar Sites.

5.52 The proposed development area is not within or adjacent to any site designated for nature conservation or subject to any nature conservation designations (**Figure 5-1**).

Natura 2000 Sites

5.53 There are no Natura 200 Sites within the Site. The nearest Natura 2000 sites are Lough Oughter and Associated Loughs SAC [000007] c. 14.3 km northwest of the Site at the closest point when measured in a straight line, Lough Oughter Complex SPA [4049] 14.5 km northwest and Lough Sheelin SPA [004065] c. 14.6km southwest of the Site.

5.54 These Natura 2000 sites are not directly connected via ecological features such as hedgerows or treelines and are sufficiently distant from the site to not be affected by dust or noise from the project construction or operational phases. However, as there is a potential for surface and groundwater connections between Lough Oughter and Associated Loughs SAC and Lough Oughter Complex SPA a stage 2 Appropriate Assessment was conducted and a Natura Impact Statement (NIS) was prepared.

5.55 The conclusion of the NIS determined that, based on the best available scientific information, and considering the project with mitigation measures, the extension of the quarry area will not undermine the conservation objectives for Lough Oughter and Associated Loughs SAC and Lough Oughter Complex SPA, either alone or in-combination with other projects or plans. Therefore, Natura 2000 sites are excluded from any further consideration in this report.

Proposed Natural Heritage Areas / Natural Heritage Areas

5.56 There are no Natural Heritage Areas (NHA) or proposed Natural Heritage Areas (pNHA) located within a zone of influence for the project. The nearest NHA/pNHA is Lough Ramor (000008), located approximately 12.9 km southeast of the Site.

5.57 Therefore, proposed Natural Heritage Areas/Natural Heritage Areas are scoped out and excluded from any further consideration in this report.

Rare and Protected Flora and Fauna

5.58 The NBDC database was searched for records within the 2 km grid squares H50F and N59J within which the Site is located. The records returned are of varying ages so for the purposes of preparing this report only the relevant records dated within the last 10 years, are listed in **Table 5-1** below.

5.59 The absence of recent (within 15 years) records of species from the NBDC database does not necessarily imply that a species does not occur within the search area rather it has not formally been recorded as present. Similarly, the presence of a record for a protected species within the 2 km grid squares does not mean that the species is present within the Site.

Field Survey

5.60 The habitats and species recorded within the application site are described, classified and evaluated in this section of the report, and described further in the sections below.

Habitats

5.61 Habitats present within the Site, as recorded during the walkover survey, are described in this section. Habitat classification follows that of 'A Guide to Habitats in Ireland' (Fossitt, 2000). A habitat map for the site is provided as **Figure 5-2** at the end of this report.

Active Quarry Site (ED1/ED2/ED3/ED4)

5.62 The existing quarry is located to the southeast of the Site. This area consists of a mosaic of disturbed ground habitats including exposed sand, gravel, or till (ED1), spoil and bare ground (ED2), recolonising bare ground (ED3, see **Plate 1**), and active quarries and mines (ED4). This area also includes stockpiles of extracted material.

5.63 Areas with recolonising vegetation are dominated by ruderals such as yarrow *Achillea millefolium*, dandelions *Taraxacum* spp., docks *Rumex* spp., red clover *Trifolium pratense*, and coltsfoot *Tussilago farfara*. Occasional grasses are also present including *Agrostis* sp., cocksfoot *Dactylis glomerata*, and crested dogs-tail *Cynosurus cristatus*. Other species also include bryophytes and immature willows *Salix* sp.).

Improved Agricultural Grassland (GA1)

5.64 Patches of improved agricultural grassland are dispersed throughout the Site. This habitat transitions into neutral and calcareous grassland (GS1) in the south of the site and into wet grassland (GS4) in the north and west of the Site (**Plate 3**).

5.65 The improved agricultural grassland on-site is dominated by grasses which are currently being grazed to a short sward by livestock. Other, non-grass species include docks *Rumex* spp., selfheal *Prunella vulgaris*, thistles *Cirsium* spp., buttercups *Ranunculus* spp., white clover *Trifolium repens*, and red clover *Trifolium pratense*. Occasional rushes *Juncus* sp. are also present in the transitional areas between agricultural grassland and wet grassland (GS4).

Neutral and Calcareous Grassland (GS1)

5.66 An area of neutral and calcareous grassland is located to the south of the site. This is continuous with the improved agricultural grassland and can be accessed by the livestock on-site. However, this area appears to be less intensively grazed and has a wider variety of flora species. The dominant grass species are *Agrostis* sp., cocksfoot *Dactylis glomerata*, and crested dogs-tail. Perennial ryegrass *Lolium perenne* is also present, but not dominant (see **Plate 2**).

5.67 Other species include docks *Rumex* spp., selfheal *Prunella vulgaris*, thistles *Cirsium* spp., buttercups *Ranunculus* spp., white clover, red clover, common ragwort *Jacobaea vulgaris*, common daisy *Bellis perennis*, plantains *Plantago* spp., and yarrow.

Wet Grassland (GS4)

5.68 The agricultural grassland (GA1) transitions into wet grassland to the north and west of the site. This wet grassland is species-poor and is grazed by the livestock on-site. Rushes *Juncus* spp. dominate these patches of wet grassland. Other flora species present are *Agrostis* sp., crested dogs-tail, and buttercups *Ranunculus* spp. (**Plate 4**). The soil is typically wet, becoming more waterlogged in close proximity to the drainage ditch (FW4) which runs along the western site boundary.

Scrub (WS1)

- 5.69 A patch of mixed scrub is located adjacent to the southern woodland habitat on-site. Another, smaller patch is also located at the north of site, containing a similar flora species assemblage. Gorse *Ulex* sp., bramble *Rubus fruticosus* agg., and bracken *Pteridium aquilinum* are the dominant species found within the scrub (**Plate 5**). Other species include hawthorn *Crataegus monogyna*, common nettle *Urtica dioica* and thistles *Cirsium* spp..

(Mixed) Broadleaved Woodland (WD1)

- 5.70 There are two patches of broadleaved woodland on-site. The southern patch of woodland is less mature, with fewer trees at a height of more than 5m and a mostly dense scrub understorey. The northern patch of woodland is more mature with a clear understorey and more diverse field layer (**Plate 6**). Tree species within these woodlands include ash *Fraxinus excelsior*, sycamore *Acer pseudoplatanus*, willows *Salix* spp., and hazel *Corylus avellana*. Field and ground layer species include hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, bramble, ivy *Hedera helix*, herb Robert *Geranium robertianum*, buttercups, deer fern *Blechnum spicant*, *Rosa* spp., and common tormentil *Potentilla anglica*.

Hedgerows (WL1)

- 5.71 A line of hedgerow is located along the southern site boundary and between the field of dry calcareous and neutral grassland (GS1) and the southern-most patch of agricultural grassland (GA1) (**Plate 7**). The species assemblage within this hedgerow is similar to that of the patches of scrub on-site. Gorse *Ulex* sp., bramble, and bracken are the dominant species found within the scrub. Other species include hawthorn, common nettle and thistles (*Cirsium* spp.).

Treelines (WL2)

- 5.72 Three treelines are found on-site. Two are found along field boundaries within the site. These treelines are dominated by sycamore with other species including hawthorn, ash, willows, and blackthorn. Ivy is found growing along some of the larger trees within the treeline (**Plate 8**).
- 5.73 The third treeline is located along the south-eastern site boundary. It consists mainly of willows of approximately 5-6m in height.

Drainage Ditch (FW4)

- 5.74 A drainage ditch with running water is found along the western and north-western site boundary (**Plate 9**). The water flows in a northerly direction, exiting the site at its northern-most point. The banks of the ditch are heavily vegetated by grasses and/or scrub species. This drainage ditch connects to the Mullymagowan Stream⁹ (EPA Code: 36-1263) at the northern site boundary where it exits the Site.

Species**Rare and Protected Species**

- 5.75 The NBDC database was searched for records of rare and/or protected species from the 2 km grid squares H50F and N59J within which the Site is located. The records of rare and/or protected species are presented in **Table 5-1** below.

⁹ Locally known as the Mullymagowan Stream but referenced as the Corraneary Stream on EPA map viewer

Table 5-1
Rare and/or Protected Species Recorded Within 2 km grid squares H50F and N59J

Species	Date of Last Record	No. of Records	Conservation Status	Dataset
Smooth Newt <i>Lissotriton vulgaris</i>	29/06/2016	1	Protected Species: Wildlife Acts	Amphibians and reptiles of Ireland

Protected Flora

5.76 No protected flora species were noted on-site during the field survey.

Amphibians

5.77 Smooth newt *Lissotriton vulgaris* are protected under the Wildlife Acts 1976 as amended. Species protected under the Wildlife Act are those listed on Schedule 5. Since the publication of the Wildlife Act 1976, the list of Schedule 5 species has been extended through the publication of Wildlife Act 1976 (Protection of Wild Animals) Regulations in 1980 and 1990. Common frog and smooth newt were added to the Wildlife Act 1976 as amended by regulations made in SI 282/1980.

5.78 While suitable habitat for smooth newt is present within the wet drainage ditches and stream to the north of the Site, no evidence of this species was recorded during the field survey. These drainage ditches are located within the 20m buffer zone along the edge of the proposed extraction area and, therefore, will not be directly impacted by the proposed development.

5.79 The previous planning permission (P. Ref. 12/101) was subject to water discharge licence SS/W005/11, granted on 08/02/2012. The proposed development will also be controlled by this discharge licence, whose conditions prevent the emission of untreated effluent into the watercourses. Therefore, there is little to no potential for indirect impacts on amphibian habitats as a result of the proposed quarry extension.

5.80 As such, the potential for impacts on amphibians can be ruled out in this report.

Birds

5.81 Sand martin nests were located in aggregate stockpiles within three locations on the active quarry habitat during the habitat survey (**Plate 10**). The locations of these sand martin nests are shown in **Figure 5-3**. Point #1 contains approximately 106 potential nest holes, point #2 contains approximately 30 potential nest holes, and point #3 contains approximately 25 potential nest holes. Sand martins are Amber-listed on the BoCCI list.

5.82 The bird assemblage of the Site would be evaluated as important at the Local level.

5.83 Since the field survey of October 2022 the stockpile holding the sand martin nest site 1 has been removed. However, there is a large sand stockpile just outside the application site but still within the main quarry landholding, which can be used as an alternative sand martin nesting site (see **Figure 3**). There are no plans to remove this sand stockpile as part of the proposed project.

Mammals

Bats

5.84 There are no records in the NBDC of any bat species from the 2 km grid squares in which the Site is located.

- 5.85 Habitats within the site were evaluated for bat foraging, commuting and roosting suitability using criteria developed by the BCT (See **Appendix 5-B**).
- 5.86 Trees within the proposed site were also evaluated for their potential to support roosting bats. There are trees of sufficient size and age to contain potential roost features (PRFs), but no PRFs could be seen from the ground. Trees within the Site were evaluated as having negligible suitability to support roosting bats.
- 5.87 The woodland and scrub habitats within the Site are moderately suitable for foraging and commuting bats. There is connectivity between these habitats and the wider landscape via hedgerows and treelines.
- 5.88 The bat assemblage of the Site would be evaluated as important at the Local level.

Other Mammals

- 5.89 There were no other mammal signs noted within the Site and other mammals are excluded from further consideration in this report.

Invasive Species

- 5.90 The NBDC database was searched for records of invasive species within the 2 km grid squares H50F and N59J within which the Site is located. One record, dated within the last 5 years, were returned for the following plant species listed under the Third Schedule of the EC Birds and Natural Habitats Regulations 2011:
- Salmonberry *Rubus spectabilis*.
- 5.91 No plant or animal invasive species listed under the Third Schedule of the Habitats Directive and subject to restrictions under Regulations 49 and 50 were observed during the ecological site walkover in October 2022. Invasive species are scoped out of further consideration in this report.

Summary of Important Ecological Features

- 5.92 Important ecological features to be carried forward for detailed assessment are summarised below. The importance of these features is summarised along with their legal status.

Birds

- 5.93 Sand martins are Amber-listed on the BoCCI list. The bird assemblage of the Site would be evaluated as important at the Local level.

Bats

- 5.94 Bats are protected under the Wildlife Acts 1976 as amended, and the Habitats Directive. The bat assemblage of the Site would be evaluated as important at the Local level.

ASSESSMENT OF EFFECTS AND MITIGATION MEASURES

5.95 This section sets out the potential impacts and their effects on important ecological features. The information available from the desk study and fieldwork has been used to identify impacts and the significant effects including positive, negative, direct, indirect and cumulative effects. The following design principles and “designed-in” mitigation have informed the assessment of impacts.

- The existing operations in the applicant’s wider landholding are currently regulated by conditions attached to the existing planning permission: P. Ref. 07/827.
- P&S Civil Works Ltd. has and will continue to implement / evaluate a full range of dust mitigation measures at the existing quarry in accordance with the DoEHLG (2004) Quarries and Ancillary Activities: Guidelines for Planning Authorities, and the EPA (2006) Environmental Management Guidelines for Environmental Management in the Extractive Industry, refer to Chapter 8 of this EIAR.
- P&S Civil Works Ltd. has and will continue to implement / evaluate a full range of noise mitigation measures at the quarry in accordance with the DoEHLG (2004) Quarries and Ancillary Activities: Guidelines for Planning Authorities, and the EPA (2006) Environmental Management Guidelines for Environmental Management in the Extractive Industry, refer to Chapter 10 of this EIAR.
- The quarry is, and the proposed extension will be subject to water discharge licence SS/W005/11, granted on 08/02/2012. The conditions laid out in this discharge licence prevent the emission of untreated effluent into the watercourses.

5.96 Taking the above into account, the principal potential impacts of the proposed development are outlined in the following sections.

Do Nothing Impact

5.97 In the absence of the proposed development, it is likely that the site would continue to be semi-natural grasslands and the areas of woodland and scrub would continue to take over the site over time.

Potential Impacts and Effects

Bats

Potential Impacts

5.98 The proposed quarry extension will result in the loss of potential bat foraging and commuting habitat in the form of scrub and woodland removal. The proposed quarry extension may also result in the loss of potential bat roosting habitat in the form of woodland removal.

Proposed Mitigation Measures

5.99 The following mitigation measures are proposed:

- Prior to the removal of any woodland within the site, additional surveys should be conducted on any trees with PRFs;
- Prior to felling, a potential roost feature (PRF) assessment and survey should be carried out to ensure that no bats are using the trees due to be felled on-site for roosting;
- If bats, or signs of bats, are discovered during the pre-felling survey then works should not commence until all necessary bat surveys are complete and, if required, a derogation licence has been granted;

- All existing external hedgerows, treelines, existing planting along the application site boundaries will be protected and retained as far as possible. This will retain ecological corridors along the boundaries of the Site.

Significance of Residual Effects

5.100 There will be no significant residual effect on bats as a result of the construction or operational phases of the proposed development.

Birds

Potential Impacts

5.101 The proposed development will result in the temporary loss of hedgerows and trees within the development site. This represents loss of potential nesting habitat for commonly occurring bird species.

5.102 In addition, there may be removal of some of the temporary aggregate stockpiles within the Site which will result in the loss of the sand martin nesting sites.

Proposed Mitigation Measures

5.103 All existing external hedgerows, treelines, and existing planting along the application site boundaries will be protected and retained as far as possible. This will retain ecological corridors along the boundaries of the Site to the surrounding habitats and will provide suitable bird nesting habitat. There will only be the loss of a small amount of isolated vegetative habitats within the Site.

5.104 When the stockpiles which have been used by sand martins within the application are to be removed they should not be disturbed during the bird nesting season, 1st March and 31st August.

5.105 If possible, similar stockpiles could be created in quiet areas of the quarry and/or within the wider landholding quarry area that will not be used and which will be left to accommodate breeding sand martins.

Significance of Residual Effects

5.106 The loss of vegetation within the Site will not result in a significant residual effect on breeding birds. However, the removal of stockpiles could result in the loss of some breeding habitat for sand martins, but the retention/creation of other piles will compensate for any loss.

Cumulative Effects

5.107 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a project results in individually insignificant impacts that, when considered in combination with impacts of other proposed or permitted plans and projects, can result in significant effects (CIEEM, 2018).

5.108 The following plans were reviewed for strategies and objectives that may act in-combination with the project:

- Cavan County Development Plan 2022-2028

5.109 There are no strategies or objectives in the Cavan County Development Plan 2022-2028 that are likely to result in significant effects when considered in-combination with the proposed quarry extension.

5.110 Cavan County Council planning portal was accessed to examine recent planning applications within 5 years in the vicinity of the Site for potential to act in-combination with the project. The recent planning applications found in the vicinity of the Site consist of small-scale domestic and agricultural construction projects. The proposed developments in the vicinity of the Site are sufficiently small-scale and distant from the Site. Therefore, there is no potential for cumulative or in-combination effects with these plans and projects.

Proposed Monitoring

5.111 The proposed development is not likely to result in significant residual effects; potentially the only monitoring will be the use of aggregate stockpiles by breeding sand martins. Should sand martins start to build nests in the stockpiles then they cannot be removed or touched during the bird breeding season.

CONCLUSIONS

5.112 The habitats present within the Site are commonly occurring throughout Ireland or have limited value for biodiversity and are evaluated to be either important at the Site level or not important. The only potential ecological feature likely to be affected by the proposed continued use of the quarry is the breeding sand martins for which sand stockpiles should be retained or created to allow them to breed each year.

5.113 The proposed development will not result in any significant effects on the biodiversity of the Site and provided the recommended best practice and mitigation is implemented it is considered that development will not result in any residual significant effects on the biodiversity of the Site.

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- <https://birdwatchireland.ie/> (last accessed 25 October 2022)

PLATES

Plates 1 – 10



Plate 1: Recolonising Bare Ground (ED3)



Plate 2: Dry Calcareous and Neutral Grassland (GS1)



Plate 3: Improved Agricultural Grassland (GA1)



Plate 4: Wet Grassland (GS4)



Plate 5: Scrub (WS1)



Plate 6: Broadleaved Woodland (WD1)



Plate 7: Hedgerow (WL1)



Plate 8: Treeline (WL2)



Plate 9: Drainage Ditch (FW4)



Plate 10: Example of Sand Martin nests on Site – Photographed at Point #3 on Figure 5-3

FIGURES

Figure 5-1: Natura 2000 Sites within 2km of the Site

Figure 5-2: Habitat Map

Figure 5-3: Sand Martin Nest Sites

APPENDICES

Appendix 5-A: Relevant Legislation and Planning Policy

Appendix 5-B: Guidelines for assessing the potential suitability of proposed development sites for bats

APPENDIX 5-A: RELEVANT LEGISLATION AND PLANNING POLICY

Relevant Legislation¹⁰

EIA Directive

The EIA Directive, Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment as amended by Council Directive 97/11/EC of 3 March 1997, Directive 2003/35/EC of 26 May 2003 and Directive 2009/31/EC of 23 April 2009, now codified in Directive 2011/92/EU of 13 December 2011 and amended in Directive 2014/52/EU of 16 April 2014, is designed to ensure that projects likely to have significant effects on the environment are subject to a comprehensive assessment of environmental effects prior to development consent being given. The EIA Directive was first transposed into Irish law by the European Communities (Environmental Impact Assessment) Regulations, 1989 (S.I. No. 349 of 1989) which amended the Local Government (Planning and Development) Act, 1963 (and other legislation) to provide for environmental impact assessment.

Habitats and Birds Directive

The Habitats Directive ensures the conservation of a wide range of rare, threatened or endemic animal and plant species. Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora was adopted in 1992 and aims to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements. It forms the cornerstone of Europe's nature conservation policy with the Birds Directive and establishes the EU wide Natura 2000 ecological network of protected areas, safeguarded against potentially damaging developments.

The Natura 2000 network of protected areas is known as Special Areas of Conservation (SAC) and Special Protection Areas (SPA). In general terms, they are considered to be of exceptional importance in terms of rare, endangered or vulnerable habitats and species within the European Community. The requirements of the Habitats Directive have been transposed into Irish law through the European Communities (Birds and Natural Habitats) Regulations 2011 [S.I. No. 477/2011]. This legislation affords protection to both Special Protection Areas and Special Areas of Conservation.

Special Areas of Conservation (SAC) are designated under the Conservation of Natural Habitats and of Wild Fauna and Flora Directive 92/43/EEC (Habitats Directive) which is transposed into Irish law by the EC (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). Special Protection Areas (SPA) are classified under the Birds Directive (2009/147/EC on the Conservation of Wild Birds). Article 6(3) of the Habitats Directive requires an 'appropriate assessment' to be undertaken for any plan or project that is likely to have a significant effect on the conservation objectives of a Natura 2000 site. An 'appropriate assessment' is an evaluation of the potential impacts of a plan or project on the integrity of a Natura 2000 site, and the incorporation, where necessary, of measures to mitigate or avoid negative effects.

National Legislation

Flora and fauna in Ireland are protected at a national level by the Wildlife Acts 1976 to 2018 and the Floral (Protection) Order 2015. Natural Heritage Areas (NHA) are areas that are considered to be important for the habitats present or for the species of plants and animals supported by those habitats. Under the Wildlife Amendment Act 2000, NHAs are legally protected from damage from the date they were formally proposed for designation. Section 19(1) of the Act states that 'Where there is a subsisting natural heritage area order in respect of any land, no person shall carry out, or cause or permit to be carried out, on that land any works specified in the order or any works which are liable to destroy or to significantly alter, damage or interfere with the features by reason of which the designation order was made'.

¹⁰ Please note that the summary of relevant legislation provided here is intended for general guidance only. The original legislation should be consulted for definitive information.

In addition, a list of proposed NHAs (pNHAs) was published in 1995 but to date these have not had their status confirmed. Prior to statutory designation, pNHAs are subject to limited protection under various agri-environment and forestry schemes and under local authority planning strategies such as County Development Plans.

Relevant Planning Policy

The planning policy and legislation that is relevant to the development.

Cavan County Development Plan 2022-2028

The relevant local planning policies have been extracted from Volume 1 of the Cavan County Development Plan 2022-2028. These policies are specific to “*Chapter 10: Natural Heritage*” and are concerned with the policies and objectives relating to biodiversity.

Natural Heritage Development Objectives

It is a development objective of Cavan County Council to:

NH1 Conserve, protect and manage the County’s natural heritage assets for future generations while encouraging appreciation, understanding and enjoyment of the amenity value for the present generation.

NH2 Maximise the social, economic and environmental benefits that may be derived from the conservation and management of Cavan’s Natural Heritage and green infrastructure.

NH3 Support the implementation of relevant actions in the National Biodiversity Plan, the All Ireland Pollinator Plan and the National Peatlands Strategy.

NH4 Implement, in partnership with Cavan County Heritage Forum, relevant stakeholders and the wider community, Cavan County Heritage and Biodiversity Plans and any revisions thereof.

NH5 Integrate biodiversity consideration into all Cavan County Council activities through the County Biodiversity Action Plan process.

NH6 Ensure the protection of species of flora and fauna afforded legal protection under Irish and European Legislation.

NH7 Assess the impact on biodiversity of proposals for large developments, particularly those on greenfield sites, or in environmentally sensitive areas. Such developments must include measures for the enhancement and protection of biodiversity.

NH8 Promote the conservation of biodiversity outside of designated areas, including features such as wetlands, woodlands, hedgerows and uplands.

NH9 Working in close partnership with the Heritage Council, National Parks and Wildlife Service, Fisheries Boards, Fáilte Ireland, Office of Public Works, Geological Survey Ireland to deliver on the strategic actions of the current Cavan County Heritage Action Plan and the Cavan County Action Biodiversity Plan or subsequent plans adopted within the lifetime of the development plan.

Development Objectives for Designated Sites

It is a development objective of Cavan County Council to:

NHDS1 Protect and conserve Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas and proposed Natural Heritage Areas.

NHDS 2 Ensure an Appropriate Assessment is carried out in respect of any plan or project not directly connected with or necessary for the management of the site but likely to have a significant effect on the integrity of a European Site(s), either individually or in-combination with other plans or projects, in view of the site’s conservation objectives.

NHDS3 Ensure that any plan or project that could have an adverse impact on a NHA, pNHA, SAC, SPA (either by themselves or in combination with other plans and projects) or upon the conservation objectives of the site or would result in the deterioration of any habitat or any species reliant on that habitat will be subject to the requirements of Article 6(3) and Article 6(4) of the Habitats Directive.

NHDS4 Ensure an Appropriate Assessment (AA) in accordance with Article 6(3) and Article 6(4) of the Habitats Directive, and in accordance with the Department of the Environment, Heritage and Local Government

Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 2009 and relevant EPA and European Commission guidance documents, is carried out in respect of any Plan or Project likely to have significant effect on a Natura 2000 site(s), either individually or in combination.

NHDS5 Require an ecological appraisal for development not directly connected with or necessary to the management of Natura Sites, or a proposed Natura Site and which are likely to have significant effects on that site either individually or cumulatively.

NHDS6 Support the development of a Strategic Habitat Map for the Cuilcagh Lakelands UNESCO Global Geopark in consultation with National Parks and Wildlife Service and relevant stakeholders.

NHDS7 Promote the maintenance and as appropriate, achievement of favourable conservation status of habitats and species and to improve the ecological coherence of the Natura 2000 network, by maintaining and where appropriate, developing features in the landscape which are of major importance for wild fauna and flora.

NHDS8 Ensure that new development proposals affecting designated sites have regard to the sensitivities identified in the SEA Environmental Report prepared in respect of this plan.

NHDS9 Have regard to the views of the National Parks and Wildlife Service in respect of proposed development where such development may have an impact on a designated National or European site or proposed site for designation.

NHDS10 Consult with National Parks and Wildlife Service (NPWS) in regard to any developments (those requiring planning permission and those not requiring planning permission) which the council proposes to carry out within pNHAs, NHAs, SACs, SPAs, SPAs and other important ecological sites.

NHDS11 Maintain the conservation value of Council owned land within NHAs and pNHAs and promote the conservation value of Council owned land adjoining NHAs.

NHDS12 Continue to undertake surveys and collect data that will assist Cavan County Council in building its knowledge base and meeting its obligations under Article 6 of the Habitat Directives.

NHDS 13 Projects giving rise to adverse effects on the integrity of European sites (cumulatively, directly or indirectly) arising from their size or scale, land take, proximity, resource requirements, emissions (disposal to land, water or air), transportation requirements, duration of construction, operation, decommissioning or from any other effects shall not be permitted except as provided for in Article 6(4) of the Habitats Directive, viz there must be: (a) no alternative solution available, (b) imperative reasons of overriding public interest for the plan to proceed; and (c) adequate compensatory measures in place.

NHDS 14 Contribute towards the protection and enhancement of biodiversity and ecological connectivity where these form part of the ecological network and/or may be considered as ecological corridors or stepping stones.

Development Objectives for Non- Designated Sites

It is a development objective of Cavan County Council to:

NHND1 Support the protection of non-designated sites and acknowledge the need to protect non-designated habitats and landscapes and to conserve biological diversity.

NHND2 Conserve the existing wide range of flora, fauna and wildlife habitats in the county through the preservation of ecological corridors and networks vital to the migration, dispersal and genetic exchange of wild species. To designate County Biodiversity Sites within the lifetime of this plan and to protect the ecological integrity of these sites.

NHND3 Implement the actions of Cavan County Biodiversity Plan and any subsequent revisions in fulfilment of the requirements of the National Biodiversity Plan.

NHND4 Continue habitat mapping of the county to enable planning for the future development in a sensitive and sustainable manner and this mapping to inform the development management policy.

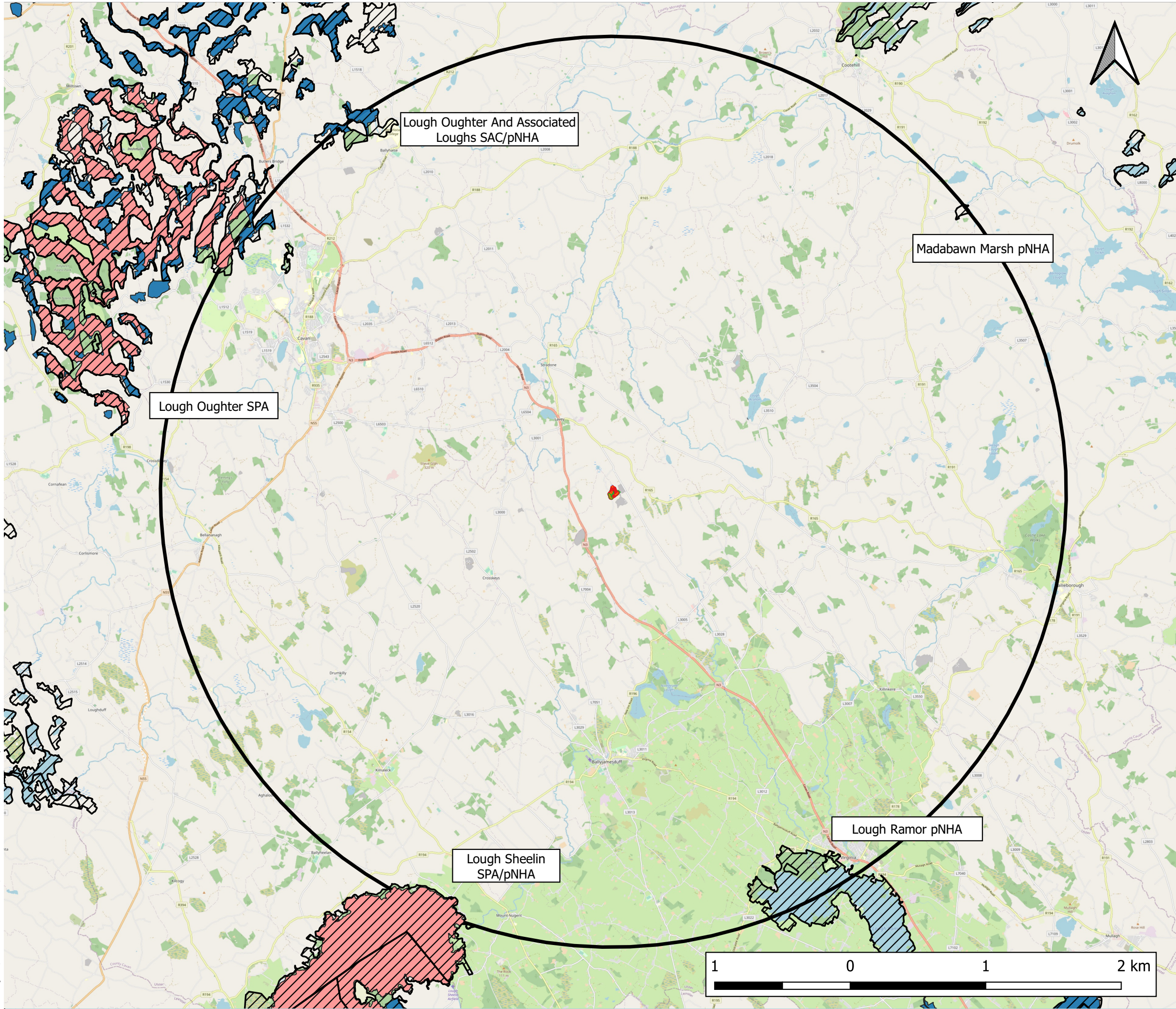
NHND 5 Require an Ecological Impact Assessment (EclA) for any proposed development which have a significant impact on rare, threatened and or protected species and non-designated habitats of biodiversity value.

APPENDIX 5-B - BAT CONSERVATION TRUST GUIDELINES FOR ASSESSING THE POTENTIAL SUITABILITY OF PROPOSED DEVELOPMENT SITES FOR BATS

Guidelines for assessing the potential suitability of proposed development sites for bats

Suitability	Description of Roosting Habitats	Description of Communing and Foraging Habitats
Negligible	A building, structure, tree or other feature with negligible habitat features likely to be used by bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A building or structure with one or more potential roost features that could be used by individual bats opportunistically, but do not provide enough space, shelter, protection or appropriate conditions (for example temperature, humidity, height above ground, light levels, levels of disturbance) and/or suitable surrounding habitat to be used on a regular basis, or by larger numbers of bats. Buildings in this category are unlikely to support a maternity colony or be used by hibernating bats. A tree of sufficient size and age to contain potential roost features but with none seen from the ground, or features seen with only very limited roosting potential (i.e. some small cracks or crevices, low ivy cover).	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated and not very well connected to the surrounding landscape by other habitat and/or features. Suitable but isolated habitat that could be used by small numbers of foraging bats.
Moderate	A building, structure, tree or other feature with one or more potential roost sites that could be used by bats due to their size, shelter, protection or appropriate conditions (for example temperature, humidity, height above ground, light levels, levels of disturbance) and surrounding habitat but unlikely to support a roost of high conservation value status. Buildings, structures and trees falling into this category would not be expected to support a maternity colony, or significant hibernation or transitory roost.	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A building, structure, tree or other feature with one or more potential roost sites that are obviously suitable for use by large numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection or appropriate conditions (for example temperature, humidity, height above ground, light levels, levels of disturbance) and surrounding habitat. Buildings, structures and trees falling into this category may be expected to support a maternity colony, or significant hibernation or a significant transitory roost.	Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as a broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roost.

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NOTES

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2. CYAL50316488
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LEGEND

- 15km Radius Buffer
- National Heritage Area (NHA)
- Potential National Heritage Areas
- Site Outline
- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)



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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

**QUARRY AT MULLYMAGOWAN,
STRADONE, CO. CAVAN**

DESIGNATED SITES MAP

FIGURE 5-1

Scale
1:50000 @ A3

Date
FEBRUARY 2023

SLR Projects\904200 P&S Civil Works\064821 Stradone EIA\05 Biodiversity



NOTES

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LEGEND

- ED2/ED3/ED4 - Spoil and bare ground, recolonising bare ground, active quarries and mines
- FW4 - Drainage ditches
- GA1 - Improved agricultural grassland
- GS1 - Dry calcareous and neutral grassland
- GS4 - Wet grassland
- Potential Sand Martin Nests
- Stradone site outline
- WD1 - (Mixed) broadleaved woodland
- WL1 - Hedgerows
- WL2 - Treelines
- WS1 - Scrub



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QUARRY AT MULLYMAGOWAN,
STRADONE, CO. CAVAN

HABITAT MAP

FIGURE 5-2

Scale
1:50000 @ A3

Date
FEBRUARY 2023

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NOTES

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LEGEND

-  Alternative Sand Martin Nesting Site
-  Potential Sand Martin Nests
-  Site Outline



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**QUARRY AT MULLYMAGOWAN,
STRADONE, CO. CAVAN**

SAND MARTIN NESTS LOCATION MAP

FIGURE 5-3

Scale
1:50000 @ A3

Date
FEBRUARY 2023