March 2024

Environmental Impact Assessment

Report Volume 2

Proposed Extension to Scotshouse Quarry

Scotshouse Quarries Ltd.

Aghnaskew, Scotshouse, Co. Monaghan

MALONE O'REGAN

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Environmental Impact Assessment Report Volume 2

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Aghnaskew, Scotshouse, Co. Monaghan

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1 GENERAL

1.1 Introduction

Malone O'Regan Environmental (MOR) was commissioned by Scotshouse Quarries Ltd. (the Applicant) to prepare an Environmental Impact Assessment Report (EIAR) in support of a planning application to An Bord Pleanála (ABP) under Section 37L of the Planning and Development Act 2000 (as amended) for the extension of Scotshouse Quarry. An application for Substitute Consent under Section 177E of the Planning and Development Act 2000 (as amended) to regularise a 5.6hectare (ha) area of land within the Applicants landholding is currently under consideration with ABP (ABP case reference 316144). It is the intention of the Applicant for this application to be considered in conjunction with the Substitute Consent application in accordance with Section 37Lof the Planning and Development Act 2000 (as amended).

This EIAR assesses the potential effects of the proposed extension to the existing permitted and operational Scotshouse Quarry (planning reference 83/09). The proposed development does not seek to increase traffic levels beyond those previously occurring at the quarry (as outlined in the application for substitute consent currently before ABP), but to provide access to a known quality aggregate reserve at depths 90 metres above Ordnance Datum (mOD[1]) from surface level ca.157mOD at the highest point. Extraction will be completed through blasting and subsequent crushing and screening (the 'Proposed Development'). This application seeks to extend the extraction area.

It should be noted that there is currently no limit to quarry output under the existing permitted conditions. Where output is relevant, all assessments in this report have been based on the historic maximum extraction rate of 350,0000 tonnes per annum (tpa).

The requested term of the planning permission is thirty-five (35No.) years.

1.2 The Site

The site of the proposed extension lies in the townland of Aghnaskew, in the Barony of Dartree (Dartree by), Scotshouse, County Monaghan (ITM 649474 818324) and covers an area of ca. 14.6 hectares (ha) (henceforth referred to as the Site). Figure 1-1 below shows the location of the Site.

[1] Unless otherwise stated, all elevations are relevant to Malin Head datum

Figure 1-1: Site Location

This EIAR is structured as follows:

- Volume 1 – Non-Technical Summary:
- Volume 2 – Main Report:
- Volume 3 – Appendices (with supporting technical reports and drawings).

1.3 Applicant

The Applicant is Scotshouse Quarries Limited, under Managing Director Mr Paddy Connolly. Scotshouse Quarries Ltd is an Irish-owned, family-run business limited by shares since 2007. The directors have decades of experience producing crushed stone aggregates and specialist high polished stone value (PSV) washed chips, which are used for surface dressing and roadmaking by local authorities and contractors.

Scotshouse Quarries Ltd is the largest manufacturer of bituminous materials in Co Monaghan and is an important local employer, with ca. 25 full-time staff across their offsite working crew and onsite staff.

The company provides the following products:

- Greywacke aggregate;
- Crushed quarry stone;
- Fill materials for below concrete floors and footpaths;
- Surface dressing chips;
- Macadam; and,
- Various types of asphalt.

They also provide a surfacing service ranging from domestic driveways to the resurfacing of major roads. All products are made to the relevant international standards and nationally

defined parameters and are certified as required under the Construction Products Regulations 2011.

1.4 Background

On 25th July 1983, planning permission (Planning Reference: 83/09) was granted for a quarry development covering an area of 3.3ha (the 'Permitted Area' referenced in Figure 1-2 below). A landholding covering an area of 11.5ha was subsequently registered on 12th April 2005 under Section 261 of the Planning and Development Act, 2000 as amended (S261), and given quarry reference QY1 (the 'Registered Area'), with the conditions attached to planning grant 83/09 re-stated, modified and added to under Section 261(6)(a)(ii). Due to procedural error by the Planning Authority, ca. 5.6ha of this land was subjected to extraction which occurred outside Scotshouse Quarry as defined under 83/09. This 5.6ha of land (henceforth referred to as the Substitute Consent Area where applicable) was the subject of a substitute consent application made under Section 177E of the Planning and Development Act 2000 (as amended) to ABP on the 24th March 2023.

The Substitute Consent Area forms part of the Site for which the application Is being made (refer to Figure 1-2 below). Refer to Chapter 2 for further details.

Please note that for the remainder of this EIAR, the area granted permission under the original terms of the 83/09 planning grant will be described as 'Scotshouse Quarry'. For the purpose of this EIAR and its accompanying documents only, this term excludes the Substitute Consent Area. The Substitute Consent Area is part of the Proposed Development.

Figure 1-2: Boundary Lines

1.5 Site Description and Setting

Scotshouse Quarry is used to extract and process greywacke stone and has origins dating to pre-1963. Scotshouse Quarry entrance is located to the north, with ingress and egress directly

onto local road L6280. Entry to the Site will be via Scotshouse Quarry. Scotshouse Quarry floor has been worked out down to 105mOD. Various elements of quarry infrastructure are located here, including welfare facilities, the wheel wash and the crushing/screening and hot-mix macadam plants. See section 3.2 for further details.

Aggregates derived from the Proposed Development will be processed and readied for market utilising the established infrastructure within Scotshouse Quarry, augmented with a primary mobile crushing and screening plant following the active quarry face.

Scotshouse Quarry is situated ca.1km south-southeast of Scotshouse village in County Monaghan. The L6280 runs in a north-west to south-east direction alongside the eastern boundary of Scotshouse Quarry and adjoins the R212 to the west, providing the primary transport route for Heavy Goods Vehicles (HGVs) accessing and egressing Scotshouse Quarry and the Site. The R212 is a regional road which links Cavan Town and Clones in Co Monaghan.

'Monaghan' derives from the Irish for 'little hills', a reference to the drumlin topography that makes up much of the county, including the area around the Site. Drumlins [1] are oval-shaped hills largely composed of glacial drift which tend to occur in large clusters, giving rise to an egg-basket appearance in an aerial view. Drumlins are known to be a glacial formation, although expert opinions differ as to the exact mechanism of their creation. See Chapter 9 (Land, Soils and Geology) for further details.

The Site occupies one of the higher points in the immediate area with the land descending from the highest point at the southeast boundary (ca. 157mOD) in a northerly direction towards the lowest point (ca. 105mOD) on the quarry floor.

Monaghan Town is ca.30km to the northeast, approached via the R212 and the N54. The lands around the Site are primarily agricultural with scattered single-dwelling developments on all sides. There are several residential buildings in proximity to the Site, with the nearest being ca. 135m from the Site's northern boundary.

1.6 Proposed Development

The Proposed Development is for the extension of Scotshouse Quarry into adjoining lands containing known reserves of quality rock, which will enable Scotshouse Quarries Ltd. to continue to produce the highest quality of aggregates. The boundary of the Site associated with the Proposed Development is shown in Figure 1-3 below.

Figure 1-3: Site Boundary including Proposed Development

The extension is to allow the company to return to their previously established extractive capacity of ca.350,000 tonnes per annum. The proposed operations onsite will emulate the existing/previous excavation and processing operations within Scotshouse Quarry. The Proposed Development represents an expansion to the existing development rather than an intensification of activities. As such, there will be no additional traffic movements outside of those previously associated with historical activities. Further details are presented in Chapter 11 Traffic.

Scotshouse Quarry currently employs ca.25 staff directly as onsite personnel, hauliers, maintenance personnel and offsite crews. The quarry generates additional employment through the direct contracting for machinery maintenance and upkeep, as well as ancillary requirements for professional services.

The Proposed Development will not increase employment but will retain vital jobs in the locality. It is not proposed to introduce new facilities such as a canteen, office or washroom as these facilities are already in place within the existing quarry (see section 3.1 below).

The Proposed Development seeks to extract the land within the Site boundary (refer to Figure 1-3 above) to a level of 90mOD.

1.7 Notable Developments in the Area

An examination of potential notable developments in the area determined that there are no developments within 2km of the Site that have the potential for cumulative and in-combination effects to occur with the Proposed Development [2].

1.8 Environmental Impact Assessment

This EIAR has been prepared taking into account the requirements of the following legislation:

- Government of Ireland, Planning and Development Acts 2000 as amended (Part 10, Schedule 5) [3];
- EC "European Communities (Environmental Impact Assessment (EIA)) (Amendment) Regulations, 1999 (S.I. No. 93 of 1999) [4];
- Government of Ireland, Local Government Planning and Development Regulations 2001 (S.I. No. 600 of 2001), as amended [5];
- European Union (EU) (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018) [6];

The following existing and draft guidance were also considered:

- EC 'Guidance on the preparation of the Environmental Impact Assessment Report', 2017 [7];
- EPA 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports', 2022 [8];
- EPA 'Advice notes on current practice in the preparation of Environmental Impact Statements', 2003 [9];
- European Commission Interpretation of Definitions of Project categories of Annex I and II of the EIA Directive', 2015 [10];
- Department of Housing, Planning and Local Government (DoHPLG) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment 2018 [11];
- Department of Environment Heritage and Local Government (DoEHLG): Quarries and Ancillary Activities Guidelines for Planning Authorities, 2004 [12];
- European Commission 'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions', 1999 [13];
- Environmental Protection Agency (2006): Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [14];
- Department of Arts, Heritage and the Gaeltacht (DoAHG): Wildlife, Habitats & the Extractive Industry. Dublin, 2007 [15];
- Department of Housing, Planning, Community and Local Government (DoHPCLG): Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive) Circular Letter 1/2017, May 2017 [16]
- DoHPCLG: Transposition of 2014 EIA Directive (2014/52/EU) in the Land-Use Planning and EPA Licencing Systems Key Issues Consultation Paper, May 2017; and,DoHPCLG: Transposition of 2014 EIA Directive (2014/52/EU) in the Land-Use Planning and EPA Licencing Systems Key Issues Consultation Paper, May 2017 [17]; and
- Office of the Planning Regulator (OPR): OPR Practice Note PNO2 - Environmental Impact Assessment Screening, 2021 [18].

1.8.1 EIA Amending Directive (2014/52/EU)

On 14th April 2014, the EIA Directive (2014/52/EU) was adopted by the Council of the European Union (EU), which amends Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. Article 2 of the Directive (2014/52/EU) required all Member States to bring the Directive into force by 16th May 2017.

The Directive (2014/52/EU) clarifies aspects of the EIA Directive to bring it in line with the European Court of Justice judgements and introduces some additional provisions and procedural options. Accordingly, compliance with the amended Directive (2014/52/EU) will automatically ensure compliance with Directive 2011/92/EU.

In Ireland, the EU (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. 296 of 2018), came into effect on the 1st September 2018[2] and gave effect to Directive 2011/92/EU as amended by the EIA Amendment Directive.

Article 1 (2)(g) of the Amending EIA Directive provides that an EIA means a process consisting of the:

1) Preparation of an environmental impact assessment report by the developer;
2) Carrying out of a consultation;
3) Examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer and any relevant information received through consultation;
4) Reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (c) and where appropriate, its own supplementary examination; and
5) Integration of the competent authority's reasoned conclusion into its decision.

An EIAR document is produced as the key component of the environmental impact assessment (EIA) process. It provides a description of:

1) The baseline environment;
2) Identification of the potential effects (if any - both positive and negative) that are predicted to be incurred as a result of the Proposed Development; and,
3) A description of any control and mitigation measures required to avoid, reduce or eliminate such potential effects; and,
4) A description of the reasonable alternatives studied by the persons who prepared the EIAR, which are relevant to the Proposed Development and its specific characteristics.

1.8.2 Assessment Under Schedule 5

The relevant classes of development that require an EIAR are set out in Schedule 5 of the Planning and Development Regulations 2001 (as amended) [3]. Schedule 5 transposes Annex I and Annex II of the EIA Directive (85/337/ECC as amended) into Irish law under Parts 1 and 2 of the Schedule.

Part 1 of Schedule 5, sub-section 19 requires an EIAR for:

Quarries and open-cast mining where the surface of the site exceeds 25 hectares.

After the extension, the Site will be ca.17.9 ha. As such, it currently does not breach the threshold for Part 1, Item 19 of Schedule 5.

With respect to Part 2 of Schedule 5 of the Planning and Development Regulations 2001 (as amended), the following activities have been identified as potentially relevant to the Proposed Development.

Part 2, Item 2 (b) – Extractive Industry:

Extractive Industry

(b) Extraction of stone, gravel, sand or clay where the area of extraction would be greater than 5 hectares.

[2] Regulation 21, 67(d) and 69(e) came into effect on the 1st January 2019

Part 2 Item 13(a) – Changes, extensions, development and testing:

13 Changes, extensions, development and testing

(a) Any change or extension of development already authorised, executed or in the process of being executed (not being a change or extension referred to in Part 1) which would:

i. Result in the development being of a class listed in Part 1 or paragraphs 1 to 12 of Part 2 of this Schedule and

ii. Result in an increase in size greater than

- *25 per cent or*
- *An amount equal to 50 per cent of the appropriate threshold*

Whichever is the greater

The Proposed Development is an extension to an authorised development (refer to submission with An Bord Pleanála reference ABP-316144-23 on substitute consent under Section 177E). The size of the extension is greater than the threshold outlined under Part 2 Item 2(b) (5ha). In addition, it is also greater than 25% of the existing development and ca. 50%, of the threshold, and as such the Proposed Development is deemed to be subject to EIA under Part 2, Item 2 (b) and Item 13a part (i) and (ii).

1.9 Scope of the EIAR

In accordance with relevant EPA guidelines [8] the following attributes of the receiving environment and their interactions will be addressed within this EIAR:

- Population and Human Health;
- Biodiversity;
- Land & Soil;
- Water;
- Noise;
- Air & Climate;
- Cultural Heritage;
- Landscape & Visual; and,
- Material Assets – Traffic and Transport.

1.10 Structure of the EIAR

Table 1-1 provides a description of the EIAR structure.

Table 1-1: Structure and Description of the EIAR

Title	Description
Volume 1: Non-Technical Summary (NTS)	
NTS	The NTS contains an overview of the Proposed Development and the principal findings of the Environmental Impact Assessment (EIA) in non-technical language.
Volume 2: Main EIAR Report	
Chapter 1- 4	Chapters 1-4 provide an introduction to the Proposed Development, describes the Proposed Development, the need for the Proposed Development and the alternatives considered.
Chapters 5-14	Chapters 5-14 comprise of the assessment of predicted environmental effects, together with an evaluation of their significance and a description of any mitigation measures proposed to minimise effects.

Title	Description
	It also takes into account the interactions between the various environmental topics. Chapters 5-14 generally follows the structure set out below: a) A brief introduction to the chapter; b) An outline of the methodology employed; c) A description of the receiving existing environment relevant to the environmental topic under consideration; d) A description of the characteristics and predicted effects of the Proposed Development on the receiving environment; e) A description of the reductive or mitigation measures and / or the factors that will reduce or eliminate any significant environmental effects identified; f) A description of the residual effects of the Proposed Development. Residual effects are the remaining effects that will occur after the proposed mitigation measures have been taken into consideration; g) A description of the interactions with other environmental attributes; h) Details of any monitoring required during Site preparation and operations; i) Details of any rehabilitation required; and, j) Difficulties encountered in undertaking the assessment.
Chapter 15	Interactions of the Foregoing
Chapter 16	Chapter 16 outlines the overall Schedule of Commitments agreed by the applicant in the event that the planning application is authorised.
Volume 3: Appendices	
Appendix	Relevant topic specific technical documentation supporting the EIAR are contained within the Appendix and presented as a separate Volume of the EIAR (Volume 3)

1.11 Methodology

1.11.1 Assessment of Effects – Evaluation Criteria

The assessment of effects has been undertaken in accordance with best practice, legislation and guidance notes, as listed in Section 1.9 above. The evaluation of significance considers the magnitude of the change and the sensitivity of the resource or receptor. Unless otherwise stated, this approach has been adopted throughout the EIAR.

The criteria for determining the significance of impacts and the effects are set out in Figure 1-4 below, taken from the relevant EPA Guidance [8]. Definitions of impact as outlined by the EPA are included in Tables 1-2 to 1-7 below. These definitions are used throughout the EIAR. Certain chapters may use additional or alternative terms due to the specific methodology or guidance required within those chapters. Such alternative use will be stated within the chapter.

Figure 1-4: Description of the Environmental Effects

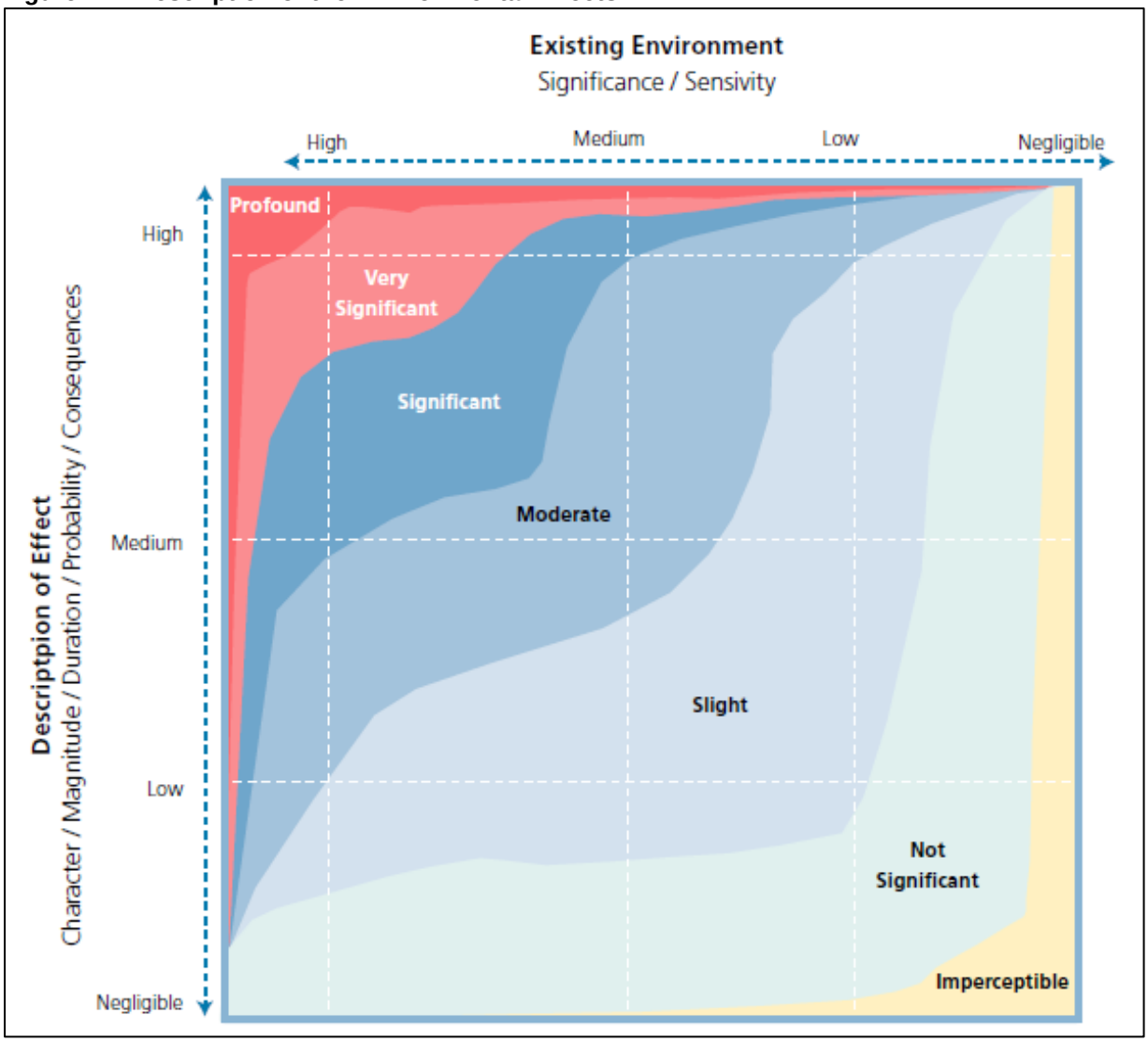


Table 1-2 defines the quality of effect of a Proposed Development on the environment ranging from positive to negative.

Table 1-2: Quality of Effect

Type of Effect	Quality of Effect
Positive Effects	A change which improves the quality of the environment.
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative / Adverse Effects	A change which reduces the quality of the environment.

Table 1-3 outlines the definitions of significance of effect of a Proposed Development on the environment ranging from imperceptible to profound.

Table 1-3: Definitions of Significance of Effect

Classification	Criteria
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.

Table 1-4 describes the terminology used to discuss the extent and context of effect of a Proposed Development on the environment.

Table 1-4: Describing the Extent and Context of Effects

Magnitude	Description
Extent	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)

Table 1-5 shows how likely an effect is to occur.

Table 1-5: Describing Probability of Effect

Magnitude	Description
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

Table 1-6 discusses the duration and frequency of effects. Momentary effects lasting from seconds to minutes will often be less concerning than a long-term and permanent effects, depending on their severity.

Table 1-6: Describing Duration and Frequency of Effects

Magnitude	Description
Momentary Effects	Effects lasting from seconds to minutes.
Brief Effects	Effects lasting less than a day (<1 day).
Temporary Effects	Effects lasting less than a year (<1 year).

Magnitude	Description
Short-term Effects	Effects lasting one to seven years (1-7 years).
Medium-term Effects	Effects lasting seven to fifteen years (7-15 years).
Long-term Effects	Effects lasting fifteen to sixty years (15-60 years).
Permanent Effects	Effects lasting over sixty years (>60years).
Reversible Effects	Effects that can be undone, for example through remediation or restoration.
Frequency of Effects	Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).

Table 1-7 defines the types of effects that can potentially occur as a result of a Proposed Development.

Table 1-7: Describing Types of Effects

Magnitude	Description
Cumulative Effects	The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
'Do Nothing' Effects	The environment as it would be in the future should the subject project not be carried out.
Indeterminable Effects	When the full consequences of a change in the environment cannot be described.
Irreversible Effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
Residual Effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
Synergistic Effects	Where the resultant effect is of greater significance than the sum of its constituents.
Indirect Effects (a.k.a. secondary or off-site effects)	Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
`Worst case' Effects	The effects arising from a project in the case where mitigation measures substantially fail.

1.12 Assessment of Cumulative Effects

Annex IV(5) subsection (e)23 of the EIA Directive, as amended, states that an EIAR should contain:

"A description of the likely significant effects of the project on the environment resulting from, inter alia:

e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use natural resources."

Annex IV (5) also states:

> *"The description of the likely significant effects on the [environmental] factors should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project."*

1.13 Assessment of the Risks of Accidents and Unplanned Events

In accordance with the EPA guidance [8] the risk of accidents and unplanned events which may be either caused by or have impact on the Site have been assessed in all relevant specialist chapters of this EIAR. A risk-based approach was employed for these assessments.

1.14 Project Team

The in-house Malone O'Regan (MOR) project team included the following:

Table 1-8: MOR In-House Project Team

Name	Role	Relevant Qualifications	Chapter(s)
Kenneth Goodwin	Associate Director, Acoustics. Project Director.	BSc, PgDip Acoustics, Full Member IOA, IEMA Practitioner, 19+ years' experience	Chapter 10 – Noise and Vibration
Klara Kovacic	Associate Director, Air, Climate and Sustainability	Meng, MSc, MIEMA, CEnv	Chapter 9 – Air and Climate
David Dwyer	Principal Consultant Project Manager	MSc, BA, 10+ years' experience	All MOR chapters
Nuria Manzanas	Senior Consultant. Senior Geologist	BSc Geology, MSc, PgEOL, 10+ years' experience	Chapter 7 – Land. Soils & Geology Chapter 8 – Water

In addition to the MOR project team, the team included the following specialists:

Table 1-9: External Environmental Consultants

Primary Author	Company	Relevant Qualifications	Chapter
Maeve Riley	Apem	Senior Ecologist. MCIEEM, MSc, BSc	Chapter 6 – Biodiversity
N/A	Macro-works	BA Hons Landscape Architecture	Chapter 12 – Landscape & Visual
Dr Charles Mount	N/A	MA and PhD in Archaeology, MBA, Dip EIA & SEA Management Member of Institute of Archeologists of Ireland.	Chapter 13 – Cultural Heritage

Primary Author	Company	Relevant Qualifications	Chapter
Maria Rooney	Tobin	Roads and Traffic Engineer. Chartered Engineer BEng Civil Engineering MEng Roads and Transport Engineering	Chapter 14 – Traffic & Transport

2 PLANNING HISTORY AND NEED FOR PROPOSED DEVELOPMENT

2.1 Introduction

This chapter of the EIAR sets out the need for the Proposed Development through analysis of the most recent development plans, planning guidelines, policy frameworks and reports issued by the relevant county, regional, state and semi-state bodies. It also provides a summary of the planning history of the Site and adjoining lands.

2.2 Planning History

2.2.1 Planning Reference 83/09

Scotshouse Quarry was initially granted permission for extractive activities on 25th July 1983, and there is evidence of pre-1963 origins for the Site. The initial permitted area covered 3.3 ha and there were ten (10No) conditions.

2.2.2 Section 261 Registration

In 2004, the then-owner (Mr Thomas Leddy) registered the entirety of the owned land at this location as a quarry site under Section 261 of the Planning and Development Act 2000 (as amended). The paperwork as submitted clearly stated that the total site area was 11.5ha with an extractive area of 10ha. The Site was registered and provided with reference number QY1. At this point, the extractive area had exceeded the area originally permitted under planning permission 83/09. However, Monaghan County Council (MCC) accepted the registration. This registration process gave rise to the need for the Applicant to apply for substitute consent for areas of the quarry which were extracted but which never received appropriate consent.

2.2.3 Planning Permissions Granted Since 2006

Scotshouse Quarry was purchased by Mr Paddy Connolly in 2006 on the understanding that planning permission applied to the entirety of the owned land as per the Section 261 registration. Scotshouse Quarries Ltd took ownership of the land in 2009. Since Mr Connolly took possession, eight successful applications for planning permission were made. These are set out in Table 2-1 below. In addition, in 2015 the Client successfully applied to MCC for a discharge consent for trade effluent (WP26/15).

Table 2-1: Planning Application History 2006-2012

Planning Ref	Applicant	Details	Decision	Grant Date
08/787	Paddy Connolly	Retention permission for existing floodlights.	Granted	02/10/2008
09/618	Padraic Connolly	Portal Framework building and associated works	Granted	25/03/2010
10/127	Paddy Connolly	Retention Permission for single-story pre-fabricated office building, weighbridge and 2.4m roadside fence	Granted	23/06/2010
14/124	Scotshouse Quarries Ltd	Retention permission for 2 Crushing plants, 1 screening plant, a concrete storage facility, conveyors, concrete feeding chute, concrete supporting structure, electrical services control container and utilities and associated works	Granted	27/02/2015

Planning Ref	Applicant	Details	Decision	Grant Date
14/157	Scotshouse Quarries Ltd	Construction of a site office, wastewater treatment unit, raised filter percolation area, car park, storm drainage, foul drainage and associated works.	Granted	25/07/2014
15/113	Scotshouse Quarries Ltd	Construction of coated road stone plant and associated works	Granted	20/08/2015
18/485	Scotshouse Quarries Ltd	Construction of electrical sub-station and switch room	Granted	13/12/2018
19/9011	Scotshouse Quarries Ltd	Extension of duration of planning permission granted under 14/157 until August 2024	Granted	11/09/2019
ABP-36144-23	Scotshouse Quarries Ltd	Application for substitute consent under Section 177E for the quarry on lands at Aghnaskew (Dartree by), Scotshouse, Co Monaghan	Received by ABP on 24/03/2023. TBD.	

2.2.4 Neighbouring Lands

A study of Co Monaghan's e-planning records from 1995 to date [19] shows that all such planning permissions are for single domestic dwellings (typically dormer bungalows), extensions or amendments to such dwellings or small-scale agricultural buildings.

2.3 Policy Context

2.3.1 National Policy

In 2018, the Government of Ireland released Project Ireland 2040, which is the government's overall strategic plan for managing a projected population growth of one million people (a 20% rise) by 2040 in a planned, productive and sustainable manner. Project Ireland 2040 is comprised of two documents:

- The National Planning Framework (NPF) [20] and,
- The National Development Plan 2021-2030 (NDP) [21].

The first Revision to the NPF is due in early 2024 but has not been published at the time of writing (March 2024).

The NPF sets out National Policy Objectives (NPOs). The document recognises the importance of the extractive sector, stating:

> *'Extractive industries are important for the supply of aggregates and construction materials and minerals to a variety of sectors, for both domestic requirements and for export. The planning process will play a key role in realising the potential of the extractive industries sector by identifying and protecting important reserves of aggregates and minerals from development that might prejudice their utilisation.*
>
> *Aggregates and minerals extraction will continue to be enabled where this is compatible with the protection of the environment in terms of air and water quality, natural and cultural heritage, the quality of life of residents in the vicinity, and provides for appropriate site rehabilitation.'*

Within NPF2040 there are ten National Strategic Outcomes (NSOs), of which NSO9 (Sustainable Management of Water, Waste and other environmental resources) states that:

> *'The abundant natural and environmental resources such as our water sources are critical to our environmental and economic well-being into the future. Conserving and*

> *enhancing the quality of these resources will become more important in a crowded and competitive world as well as our capacity to create beneficial uses from products previously considered as waste, creating circular economic benefits.'*

National Policy Objective (NPO) 23 is to:

> *'Facilitate the development of the rural economy through supporting a sustainable and economically efficient agricultural and food sector, together with forestry, fishing and aquaculture, energy and extractive industries, the bio-economy and diversification into alternative on-farm and off-farm activities, while at the same time noting the importance of maintaining and protecting the natural landscape and built heritage which are vital to rural tourism.'*

In addition to the above, the NPF2040 recognises that aggregate supply is essential for the fulfilment of the housing goals within the 2040 Plan:

> *'In the longer term to 2040, there will be a need for provision of at least 275,000 new homes in the cities, with half of these located in already built-up areas.'*

The Government published a national housing delivery strategy document, 'Housing for All' [22], in 2021 which estimated an average requirement for ca.33,000 new homes per year between 2021 and 2030 to answer Ireland's housing needs.

The NDP estimates that the public investments in infrastructure etc. laid out in the NDP will sustain approximately 80,000 direct and indirect construction jobs per annum over the lifetime of the plan. It outlines the intent to deliver approximately 6,000 affordable homes per year and to improve regional accessibility through enhanced public infrastructure. Multiple National Road projects are also outlined in the NDP to improve connectivity and accessibility.

Subsequent to the launch of Project Ireland 2040, the Irish Concrete Federation (ICF) produced its own report: "Essential Aggregates: Providing For Ireland's Needs to 2040" [23]. The report highlights the importance of aggregates as identified in the NPF2040 and states:

> *'It is essential that the importance of aggregates and aggregate-based products to Ireland's future is recognised by the Government and that Ireland's strategic reserves of aggregates are identified and protected and their use enabled in a sustainable manner. It is equally important that the quarrying industry plays its part in ensuring that operations are carried out in a sustainable manner and that the state's planning enforcement and procurement functions ensure that only authorised operators are entitled to supply the marketplace.'*

The document estimates that in order to fulfil the housing aims of NPF2040, the industry will need to supply approximately 1.5 billion tonnes of aggregate, and stresses that:

> *'Scarcities of some particular aggregate products are already emerging in the eastern and midland regions. Therefore, the future supply of aggregates needs to be planned, monitored and managed in a sustainable manner.'*

The ICF report also states that:

> *'To provide for the country's future development, Ireland's strategic reserves of aggregates need to be identified, quantified and protected.'*

2.3.2 Regional Policy

County Monaghan lies within the Border Strategic Planning Area, which also includes Counties Cavan, Donegal, Leitrim and Sligo. The 2022 population of the Border SPA was 419,473 according to the census of that year [24]. The Border SPA and the West SPA (Counties Galway, Mayo and Roscommon) make up the Northern and Western Region, which recorded a total population of 905,439 in the 2022 census [24].

The Regional Assembly produced the current Regional Spatial and Economic Strategy (RSES) 2020-2032 [25], which:

> *'provides a high-level framework for the Northern and Western Region that supports the implementation of the National Planning Framework and the relevant economic policies and objectives of Government.'*

Within the RSES, the Regional Assembly states that the Region needs:

> *'a better understanding of the availability and use of our natural resources,'*

that:

> *'Efficient use of resources is important to all parts of the region and in all sectors of the economy.'*

and that:

> *'The region's abundant natural resources have been used for industry and employment.'*

It also states that a sustainable future for the region is one that avoids wasting raw natural resources.

The RSES acknowledges that the natural capital of the Region, which includes geological resources, supports numerous sectors across the Region, including construction.

Regional Planning Objective 5.5 is to:

> *'ensure efficient and sustainable use of all our natural resources, including inland waterways, peatlands and forests in a manner which ensures a healthy society a clean environment and there is no net contribution to biodiversity loss arising from development supported in this strategy.'*

The RSES outlines the need for various infrastructure projects. These include infrastructure relating to housing and population needs and within sectors such as renewable energy, tourism and transport. The RSES Transport Investment Priorities (section 6.3 of the RSES) acknowledges that the accessibility of the Region depends upon management and investment in regional and local roads.

An important factor in road maintenance is the Polished Stone Value (PSV) of the surface material. PSV is a measure of the resistance of an aggregate to the polishing action of vehicle tyres passing over the road surface. A high PSV provides improved skid resistance. An aggregate's PSV determines its suitability for use in surfacing asphalt or in surface dressing (i.e., the renewing of a road surface with bitumen and aggregate chipping). Testing the PSV of an aggregate is carried out in accordance with international standards such as NS812 Part 14:1989 [26]. Those aggregates extracted and processed at Scotshouse Quarry have a high PSV and are suitable for surface dressing chips, as assessed annually by the National Standards Authority of Ireland (NSAI).

Given the high PSV of the produced aggregates, the Applicant's experience and the use of modern fleets of road surfacing equipment, the Site could play a significant role in supplying aggregates for the infrastructural improvement works outlined in the RSES and those planned by the County Council (see section 2.3.3 below).

Regional infrastructure projects intended for construction and delivery into service within the life-time of the current RSES, which would provide a market for the aggregates produced by Scotshouse Quarries Ltd., include:

- N2 Clontibret to the Border, with a connection to the A5 (Northern Ireland);
- N2 Ardee to south of Castleblaney;

- N3 Virginia Pass;
- N4 Carrick-on-Shannon to Dromod;
- N13 Ballybofey Stranoriar Bypass;
- N13/N14/N56 Letterkenny bypass and dual carriageway to Manorcunningham; and
- N14 Manorcunningham to Lifford.

In addition, the following projects are intended to be taken through to construction:

- N3 north of Kells to Enniskillen;
- N5/N26/N58 Mountfalcon to Swinford and Castlebar East to Bohola;
- N13 Manorcunningham to Bridgend/Derry;
- N13 Stranoriar to Letterkenny;
- N15 Sligo to Bundoran;
- N15 Stranoriar to Lifford;
- N16 Sligo to Blacklion;
- N53 Dundalk to N2 at Carrickmacross;
- N54/A3 Cavan to Monaghan Town;
- N55 Cavan Town to Athlone;
- N61 Athlone to Boyle improvement works; and,
- N63 Longford to M17 at Annagh.

Further projects outlined in the RSES are:

- The Garavogue Bridge scheme in Sligo;
- The Sligo West Distributor Road;
- The East-West Dundalk to Sligo Road;
- The development of a Strategic Development Zone abutting Ireland West Airport Knock (IWAK) to attract aviation-related industries to the Region; and,
- Amenity projects including the development of greenways, cycle networks and the provision of Park-and-Ride facilities within Galway.

All the above-listed projects will require aggregate resources.

2.3.3 Monaghan County Development Plan 2019-2025

The Monaghan County Development Plan 2019-2025 (MCDP) came into effect on 1st April 2019 [27]. Since then, the following Variations have come into effect:

- Variation 1 came into effect from 6th January 2020 and inserted a new Policy (NRP 7) regarding the N2 upgrade route between Ardee and Castleblayney;
- Variation 2 came into effect from 7th December 2020 and establishes that the provisions of the National Planning Framework and the Northern & Western Regional Spatial and Economic Strategy take precedence over the provisions of the MCDP. It also established Carrickmacross as a location with *'strategic development potential of a regional scale'*;
- Variation 3 came into effect from 4th April 2022 and included a new objective (MPO15) within the Monaghan Town Settlement Plan; and,
- Variation 4 came into effect from 4th April 2022 and included a new objective (MPO16) within the Monaghan Town Settlement Plan.

No Variation to date has any impact on the Proposed Development.

2.3.3.1 Monaghan County Infrastructure Projects

With regard to infrastructure development, of those projects from the RSES listed in section 2.3.2 above two are located entirely or mainly within County Monaghan:

- N2 Clontibret to the Border, with a connection to the A5 (Northern Ireland); and,
- N2 Ardee to south of Castleblaney.

In addition, there are four (4No.) projects at the design stage which will be National Road projects:

- N2/N52 Monaghan Town Northern Link Route;
- N54 Clones by-pass;
- N53/N2 Dundalk Road – Tullyvin Roundabout Road Link; and,
- N53 Ballynacarry Bridge replacement.

2.3.3.2 Local Population Policy

The MCDP [27] predicts a population growth within Co Monaghan of 1.04% per annum with an estimated 2025 population of 67,253 people [27]. Approximately 37% of Co Monaghan's current population lives within urban areas and MCC aims to increase this to at least 40% by focusing on more intense growth in Monaghan Town itself and only permitting rural development that is appropriate to the setting. Clones Town (the nearest town to the Site) will be encouraged to supply further employment opportunities.

Outside the urban centres, Scotshouse is one of 10 villages selected as "Tier 4 settlements" within the MCDP. The predicted population for Scotshouse in 2025 is 292 persons, out of a total of 4,527 persons for the whole of the Tier 4 settlements. Although MCDP contains specific development objectives for the Tier 4 villages, the Site falls outside the "developmental envelope" of Scotshouse and therefore is not likely to be affected by such objectives.

2.3.3.3 Local Industrial Policy

The MCDP acknowledges the importance of the extractive industry within Co Monaghan and its potential for environmental impacts:

> *'Mineral reserves including stone, sand, gravel and peat are processed at many locations across Monaghan. There is also potential for the traction of precious and base minerals in the County. These significant natural resources make an important contribution to the economy and it is important that they are safeguarded for future use whilst also ensuring that impacts on the environment and communities are acceptable.'*

Section 4.8 of MCDP includes the following policies for mineral extraction:

ERP 1 *To safeguard for future extraction all identified locations of major mineral deposits in the County.*

ERP2 *To promote development involving the extraction of mineral reserves and their associated processes, where the Planning Authority is satisfied that any such development will be carried out in a sustainable manner that does not adversely impact on the environment or on other land uses. Consideration in this regard shall be given to the impact of the development on the local economy.*

Section 15.25 of the MCDP includes the following policies for development applications from the extractive industry:

EIP1 *To require all applications for extractive development to submit the following as part of the planning applications:*

a) Map detailing total site area, area of excavation, any ancillary proposed development and nearest dwelling and/or any other development within 1km of the application site.
b) Description of the aggregate to be extracted, method of extraction, any ancillary processes (crushing etc), equipment to be used, stockpiles, storage of soil and overburden and storage of waste materials.

c) Total and annual tonnage of extracted aggregates' expected lifetime of the extraction, maximum extent and depth of working and a phasing programme.
d) Details of water courses, water table depth and hydrological impacts, natural and cultural heritage impacts, traffic impact and waste management.
e) Assessment of cumulative impact when taken with other extractive operations in the vicinity.
f) Likely environmental effects, proposed mitigation measures and restoration and after-care proposals.

EIP2 *To prohibit extractive development within an area of primary or secondary amenity, Special Protection Areas (SPAs), Special Areas of Conservation (SCAs), Natural Heritage Areas (NHA/pNHAs), Architectural Conservation Areas (ACAs) or on or near protected structures unless in exceptional circumstances where the Planning Authority is satisfied that the need for the resource outweighs the environmental impact.*

EIP3 *To restrict development proposals located in close proximity to existing extractive sites of significant resource potential where such developments would limit future exploitation.*

EIP4 *To restrict extractive developments that may have a detrimental impact on the natural or built environment or matters of acknowledged public importance including the use of public rights of way.*

Appendix 6 of the MCDP lists quarrying and mining as developments that may impact on water quality and that should therefore consult the Planning Authority regarding environmental protection measures and to provide information sufficient to demonstrate how water quality protection will be achieved. Chapter 8 assesses the potential effects of the Proposed Development on water in the area.

Appendix 10 of the MCDP sets out quarrying as a development which may require a Traffic and Transport Assessment (TTA). Chapter 14 of this EIAR assesses the potential impacts on Traffic and Transport.

Appendix 22 of the MCDP is the Noise Action Plan (2018-2023) and section 2.1.9 of this sets out suggested noise limits for quarrying and ancillary activities (see Chapter 10 – Noise and Vibration).

This EIAR will enable the application to comply with all these requirements from MCC.

2.3.3.4 Local Land Use Policy

Table 9.1 of the MCDP lists the following land use zones:

- Town centre (TC);
- Existing residential (ER);
- Proposed Residential A (PRA);
- Proposed Residential B (PRB);
- Strategic Residential Reserve (SR);
- Industry, Enterprise and Employment (IE);
- Existing Commercial (EC);
- Community Facilities & Services (CS);
- Recreation Amenity (RA);
- Landscape Protection/Conservation (LP); and,
- Flood Risk Area.

Table 9.3 of the MCDP sets out the Zoning Matrix, which provides the acceptability or unacceptability of various potential developments within the zones above (excluding the Flood

Risk Areas). Quarrying/extractive industries are explicitly excluded from every zone, as can be seen in the extraction from this table shown in Table 2-2 below.

Table 2-2: Zoning Matrix Extract (MCDP)

Development	TC	ER	PRA/EB	SR	IE	EC	CS	RA	LP
Quarrying/Extractive Industries	X	X	X	X	X	X	X	X	X

The MCDP states that where an area of land is not otherwise zoned, it is deemed to be agricultural. An examination of such zoning provides for agricultural use and 'any ancillary uses, including residential'. Other uses may be permitted, subject to case-by-case assessment. Due to the exclusions set out in MCDP Table 9-3 (see Table 2-2 above), extractive industry development is limited to such areas as the location of the Site by default.

2.4 Need for the Proposed Development

The NPF2040 [20] sets out a target of sustainable growth of Ireland's rural communities, with approximately 50% of the projected population growth to 2040 intended to take place outside of the five major Irish cities (Dublin, Cork, Galway, Limerick and Waterford). Of this 50%, a minimum of 30% (15% of total population growth) is planned to take place within the existing built-up footprint of current settlements. The projected growth requires new infrastructure, including housing, schools and other public services and transport networks. The Regional policy seeks to make efficient use of the Region's natural resources and to carry out major developments within the framework of national policy.

Even within the context of a circular economic model, this will require substantial quantities of raw materials including aggregates and the intended rural growth means that the market for building materials will have a strong regional and local element. The potential scarcity in the midland and eastern region (as highlighted in the ICF report) increases the importance of supplies from other regions such as the Proposed Development.

There is only one working quarry within the local (10km-radius) area, including over the border into Northern Ireland: Nulty's Quarry (owned by John Nulty Ltd), located in Co. Cavan at ITM 646530 808416, ca 10km south of the Site. This fact alone provides an insight into the regional importance of the Proposed Development.

Following the Proposed Development, the extended quarry is estimated to be capable of producing ca.8,000,000 tonnes of aggregate, with an annual output of ca.350,000 tonnes. This does not represent an increase of previous extraction rates. The extension will allow Scotshouse Quarries Ltd to continue at previous production rates and enable the company to compete on a secure footing for the anticipated 35-year lifetime of the extended quarry. This (35 years) is the proposed term for this regionally and nationally important resource.

Scotshouse Quarries Ltd has supported the economy of the local area through direct employment of up to 25 staff. However, the very limited reserves available within the area originally permitted means that without the Proposed Development, Scotshouse Quarries Ltd is unlikely to be able to maintain these employment levels.

It is considered that the Proposed Development aligns with the objectives/polices of the NPF, NDP, RSES, and CDP and will in many cases directly contribute to the successful implementation of objectives/policies.

3 DESCRIPTION OF DEVELOPMENT

3.1 Introduction

This Chapter provides an overview of the existing environmental conditions, the current operations within the Site and a description of the Proposed Development.

3.2 Scotshouse Quarry

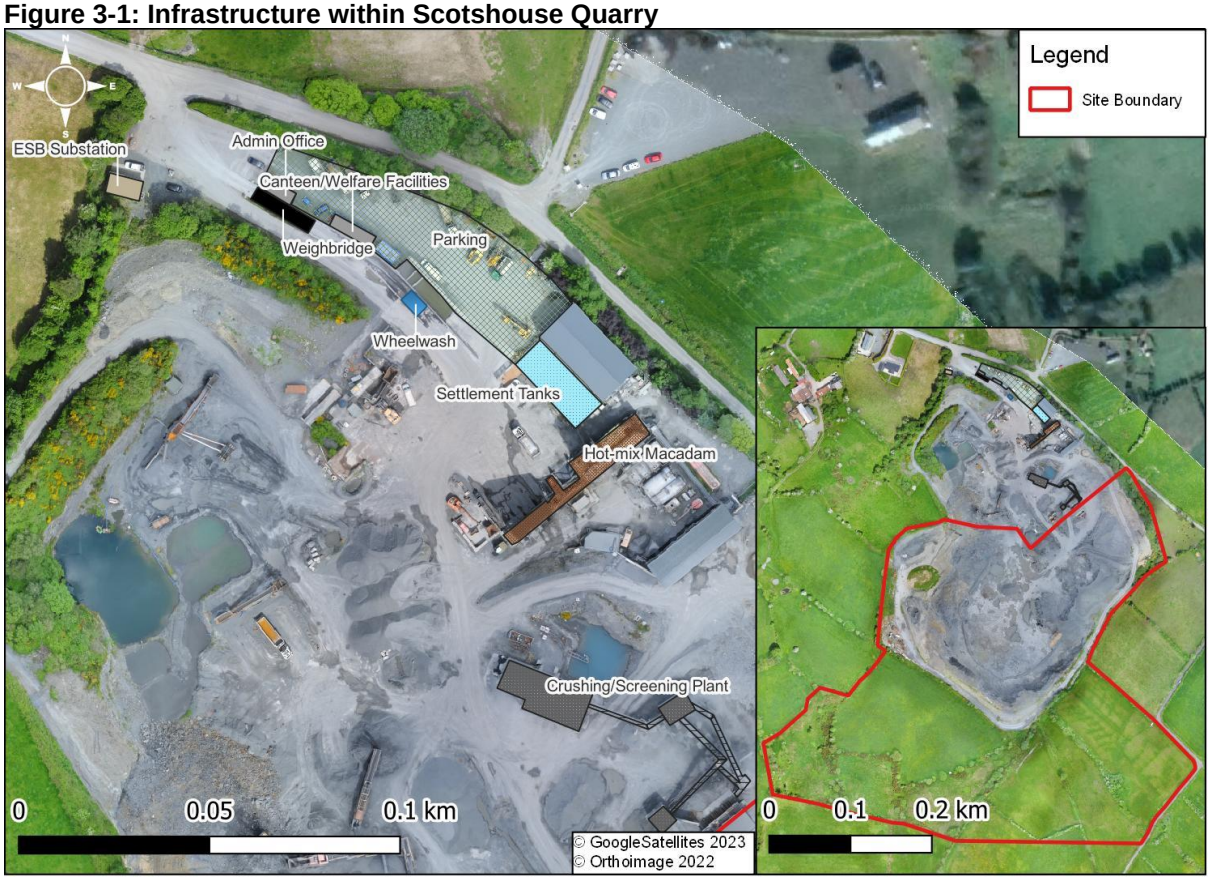
Scotshouse Quarry first received planning permission in 1983 (83/09) and has known pre-1963 origins. Refer to Chapter 2 for further details. It has been operated by Scotshouse Quarries Limited since 2009.

Scotshouse Quarry lies immediately on the southwest side of the L6280, ca. 700m south of the junction between the L6280 and the R212. The R212 joins the N54 at Clones (8km north of Scotshouse Quarry), providing access to Monaghan Town to the northeast and Cavan to the southwest. Approximately 6km south of Scotshouse Quarry, the L6280 joins the L2023 which runs east to Cootehill and connects to numerous regional roads.

Scotshouse Quarry includes the following established components/infrastructure (see Figure 3-1 below):

- A working quarry within the original area;
- ESB substation;
- Site office;
- Vehicle parking;
- Staff welfare facilities;
- Weighbridge;
- Wheel wash;
- Associated settlement ponds;
- Crushing/screening plant;
- Hot-mixed macadam plant; and,
- Kerosene-fired backup generator for the macadam plant.

Figure 3-1: Infrastructure within Scotshouse Quarry



3.2.1 Wheel Wash

The wheel wash is located on the access road between the quarry floor and the access gate onto the L6280 (see Figure 3-1 above). It consists of a 9.3m x 3.7m concrete-lined depression supplied by intercepted run-off stormwater from the quarry sides and extraction floor. During prolonged periods of dry weather, it can be topped-up from the mains water supply. Maintenance in the form of the removal of accumulated silt is routinely carried out by use of an excavator. HGVs associated with the Proposed Development will utilise the existing wheel wash prior to exiting Scotshouse Quarry.

3.2.2 Weighbridge

The weighbridge is located to the west of the entrance gate, between the gate and the wheel wash. HGVs associated with the Proposed Development will utilise the existing weighbridge prior to exiting Scotshouse Quarry.

3.2.3 Parking

There is no public transport between local settlements and Scotshouse Quarry and all staff travel by private car or on foot/bicycle. On-site parking is sufficient for expected staffing levels and no on-road parking will take place.

3.2.4 Fuel and Oil Storage

Fuel is stored within a purpose-built bunded tank inside a covered garage. All quarry-owned HGVs and all on-site mobile plant and equipment are refuelled on the concrete plinth next to the fuel garage. Refuelling is carried out by trained personnel, with suitable drip trays and easy access to emergency spill kits. Storm drainage from the refuelling plinth feeds into the settlement tanks located next to the quarry offices.

Oils and other maintenance liquids are stored in suitable bunded/double-skinned/drip-tray containers, on hard-standing and secured in the main site garage close to the access gate. Any oil or lubricant changes or routine servicing of wheeled or tracked plant is undertaken within suitable garage facilitates. The Proposed Development will rely on the existing procedures and policies in relation to fuel/oil storage, and as such, no refuelling or storage will occur within the Site.

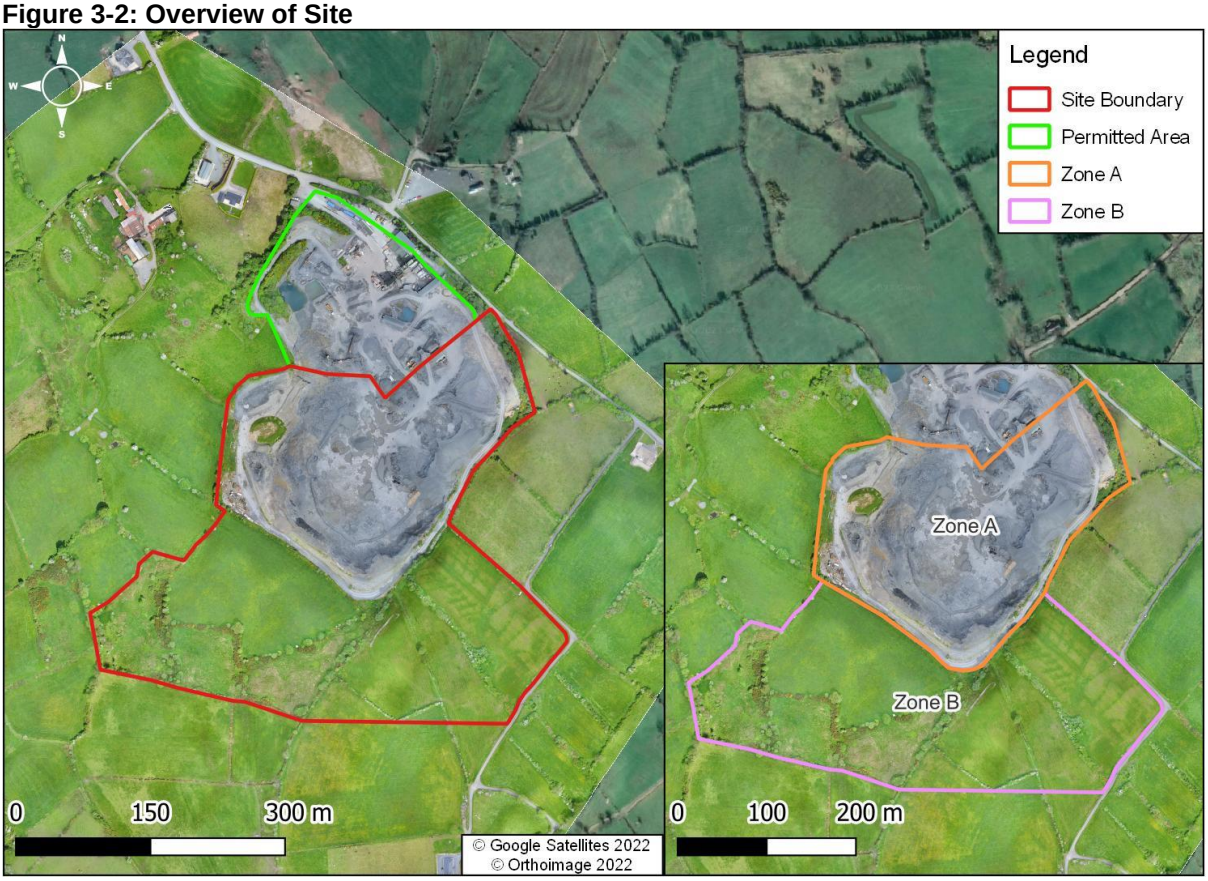
3.3 Description of the Proposed Development

The Proposed Development incorporates an area of ca.14.6ha, extending the registered quarry QY1 in a southerly direction. This consists of:

- Zone A – covers 6.5 ha. area of land previously exposed to extraction activities, including that area for which substitute consent has been applied;
- Zone B – covers 8.1 ha. area of land to the south of the existing excavated area which is currently and previously used for pasture.

Figure 3-2 below shows the different zones within the Site.

Figure 3-2: Overview of Site



Scotshouse Quarry contains the established infrastructure (see section 3.2 and Figure 3-1 above) which adjoins the northern boundary of the Site. The Proposed Development will seek to extract aggregates which will be transported to Scotshouse Quarry for further processing, utilising existing infrastructure.

Scotshouse Quarry will continue to operate during the lifetime of the Proposed Development with impacts, where deemed relevant, cumulatively assessed as part of this EIAR.

The Proposed Development and Scotshouse Quarry would employ ca.25 people on- and off-site, including onsite personnel, hauliers, and maintenance personnel. Additional in-direct downstream employment is generated through contracting for machinery maintenance and

upkeep as well as ancillary requirements for professional services, including though not limited to:

- Health and safety specialists;
- Refuelling;
- Blast specialists;
- Environmental monitoring personnel; and,
- Quality control personnel.

The Proposed Development will not lead to any increase in this downstream employment but will enable it to continue.

The contour survey of the Site indicates an average extracted depth to 104-105mOD within the existing quarry floor. The average ridge height is 130mOD, with the highest point recorded to be 150mOD.

3.3.1 Scale of the Proposed Development

The Proposed Development includes for the:

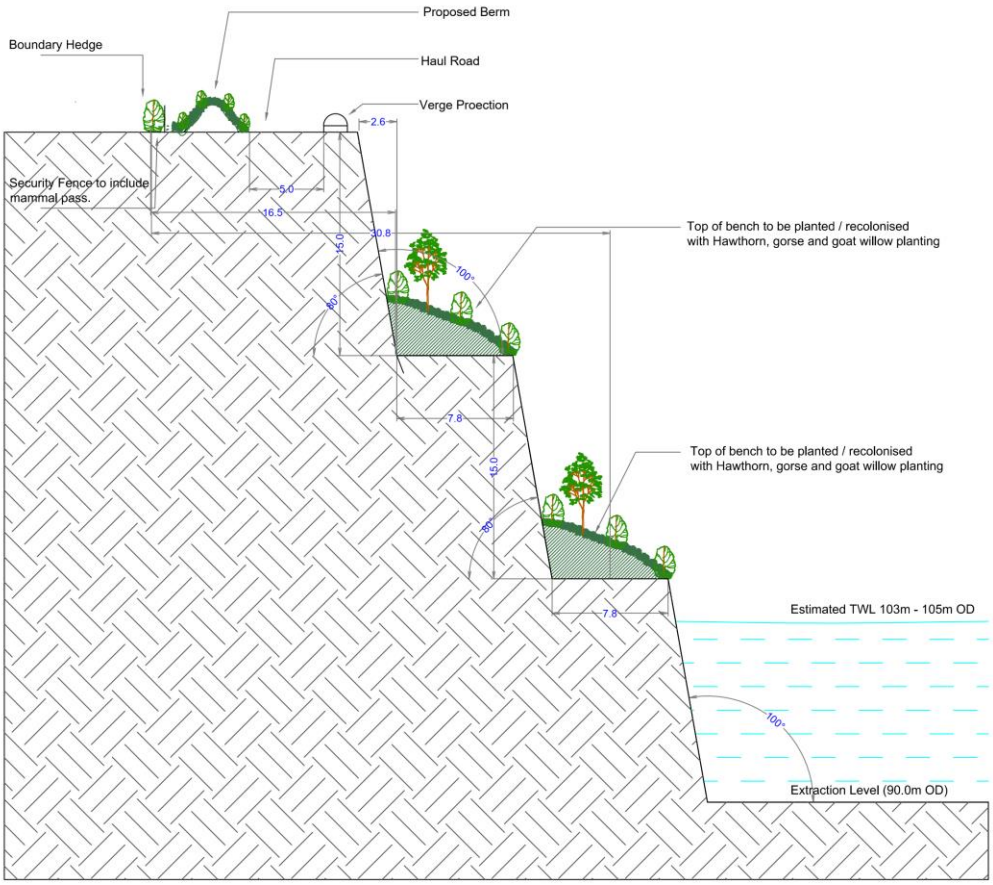
- Development of excavated ground within the northern portion of the Site to ca. 90mOD;
- The extension of the Site to the southeast and southwest;
- The extraction of this extension to ca. 90mOD; and,
- The restoration of the Site.

The Proposed Development will extend Scotshouse Quarry to a total of ca. 17.9ha. The Site has an estimated reserve of ca. 3,642,300 m^3 of rock or ca. 8,013,060 tonnes, using an estimate of 2.2 tonnes per m^3 of aggregate. The Proposed Development plans to extract and process up to the historic maximum output of 350,000 tonnes per annum.

The Proposed Development will seek to utilise existing haul routes to access the extension lands. The Proposed Development will involve the stripping of the existing overburden (where it is present) to access the underlying rock in the extension lands. The removed overburden will be used to construct peripheral screening berms and for restoration works. The existing hedgerows, where present along the Site boundaries, will be retained (refer to Chapter 6 - Biodiversity).

The Proposed Development will seek to extract rock from the existing levels down to 90mOD. Industry-standard blasting methods will be utilised to produce broken rock by creating a series of benches – see Figure 3-3 below for a general impression.

Figure 3-3: Proposed Benches – Indicating Typical Section



Front end loaders will feed the broken rock to a mobile crushing and screening plant for processing. The resultant aggregate will then either be transported back to Scotshouse Quarry for further processing or will be transported offsite for direct use.

The Proposed Development will continue with the quarry activities currently in-place at Scotshouse Quarry, incorporating blasting, mobile crushing, screening and stockpiling. Ancillary activities including asphalt production are assessed cumulatively, where relevant, in this EIAR.

As shown in Figure 3-3 above, the quarry extension will consist of benches no greater than ca. 15m deep. The number of benches will vary, depending upon the existing ground height and depth of over burden, with the final quarry floor across the extent of the Site being ca. 90mOD. It is estimated that up to 3 benches will be formed in the extraction of the rock in Zone B to bring this land down to the desired quarry floor of ca. 90mOD.

Upon removal of the aggregate reserve, rehabilitation of the Site will be completed to render the Site safe to the local community and more attractive to local biodiversity.

Due to unknown future economic and market needs it is likely the Proposed Development will extract at lower rates than the peak permitted extraction rate, and therefore will need a longer operational period. Moreover, the potential scarcity in the midland and eastern region (as highlighted in the ICF report) [23] increases the importance of supplies in this region. The Proposed Development presents an opportunity to safeguard valuable resources for future

generations and their development goals. As such, planning permission is being sought for 35 years (inclusive of 2 years for the Rehabilitation Phase).

3.3.2 Land Take

The lands in Zone A (see Figure 3-2 above) are owned by the Applicant and have been subject to historic quarrying. Ground levels are variable within this zone, depending upon the number of historic blasting conducted. It is proposed to initially reduce all of Zone A to a common floor level, prior to developing this zone deeper by 1 bench to reach the desired depth of ca 90mOD.

Zone B constitutes agricultural land which will involve the purchase of land from three neighbouring land-holders and the inclusion of land to the immediate south-east of the Substitute Consent Area which is already held by the Connolly family (Refer to Figure 3-4 below displaying the relevant land boundaries). Land levels within these agricultural fields gradually rises from the boundary with Zone A (ca130mOD) to the high point in the south (ca146-150mOD). There is a derelict stone farm building present in the southwestern portion of Zone B2. These will be removed as part of the site development works, and in-line with relevant mitigation and design strategies outlined in specialist chapters of this EIAR.

See Figure 3-4 below for the delineation of each Zone and Figure 3-5 for the boundaries of the individual land-holdings. Letters of consent have been obtained from the relevant current land-owners – see Appendix 3-1.

Figure 3-4: Breakdown of Zones

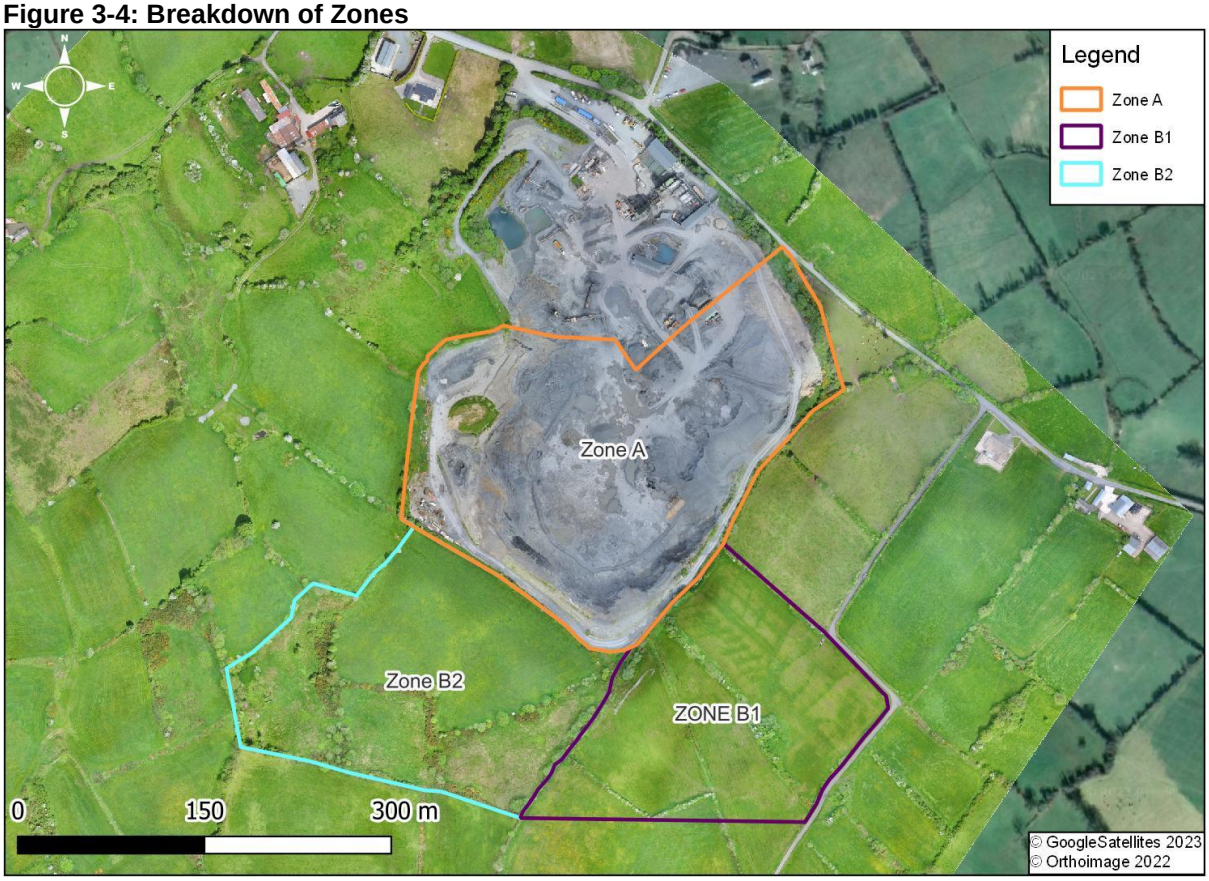


Figure 3-5: Current Land-holdings of Land within Quarry Extension Boundary

3.3.3 Development Phasing

There are distinct activities associated with the works of each phase of the Proposed Development. As part of the assessment, there will be three phases assessed under each environmental topic:

- Construction Phase;
- Operational Phase; and,
- Restoration Phase; (including closure and aftercare phase).

The Site closure and aftercare phase will primarily focus on monitoring the success of the restoration phase within the Site. In the event that intervention is needed to improve the success of the restoration goals, the monitoring team will inform the relevant site manager. As such, closure and after care is not assessed distinctly from the Restoration Phase.

3.3.3.1 Construction Phase

The Construction Phase relates to the preparation of the agricultural fields located in Zone B for rock extraction activities. Works will include the:

- Removal of overburden;
- Removal of derelict stone building (only in Zone B2);
- Creation of soil embankments and berms along the new Site boundaries;
- Creation of haul roads between all operational areas of the Site;
- Planting of the embankment; and,
- Installation of security fencing to prevent unauthorised access to the Site during the Operational Phase.

Plant required at this phase will primarily consist of a bulldozer and excavator. This phase will result in an exposed rock outcropping. which is suitably prepared for extraction through blasting. The planting of the soil embankments, as described in Chapter 6 Biodiversity and illustrated on Figure 3-6 below, will commence upon the development of the embankments in order to stabilise the berm slopes and ensure that they blend into the local environment.

The Site will be accessed via the haul roads linking the Site to Scotshouse Quarry, which itself only has a single point of access (see section 3.3.4 below). Access will be gated and secured when activities are not occurring. It is proposed that security fencing will be positioned around Zone B, with the installation of fencing and appropriate signage along boundaries with third parties. The security fence will include sections that will permit mammal passage to the planted berm.

Zone B will be prepared for extraction over two Construction Phases to minimise exposed rock until it is required for blasting. It is proposed to prepare the extension lands comprised of Paddy Connolly's land and Soden's land initially (Zone B1 as outlined in Figure 3-4 above). Once the rock within these lands have been suitably exploited, the extension lands comprised of Markey and Boylan will be prepared for extraction following the aforementioned methodology. The only additional works required in Zone B2 is the removal of the derelict stone building. This building consists of stone walls with an iron clad roof. The potential for dust emissions during the removal of this structure is quite low. The resultant waste will be disposed of with all relevant waste regulations. It should be noted that the removal of this structure is planned to take place during the Zone B1 preparation works. Refer to Section 3.3.3.2 below on phasing for further details.

The construction phase (site preparation) will be completed over a 6-month period cumulatively (i.e., over two periods). Construction will be carried out by existing Scotshouse Quarries employees. Working hours for the construction phase will be the same as the working hours for the quarry:

- Monday-Friday 07:00 – 19:00, with processing occurring only between 08:00 – 18:00;
- Saturday 08:00 – 14:00; and,
- Sunday/Bank Holiday Closed.

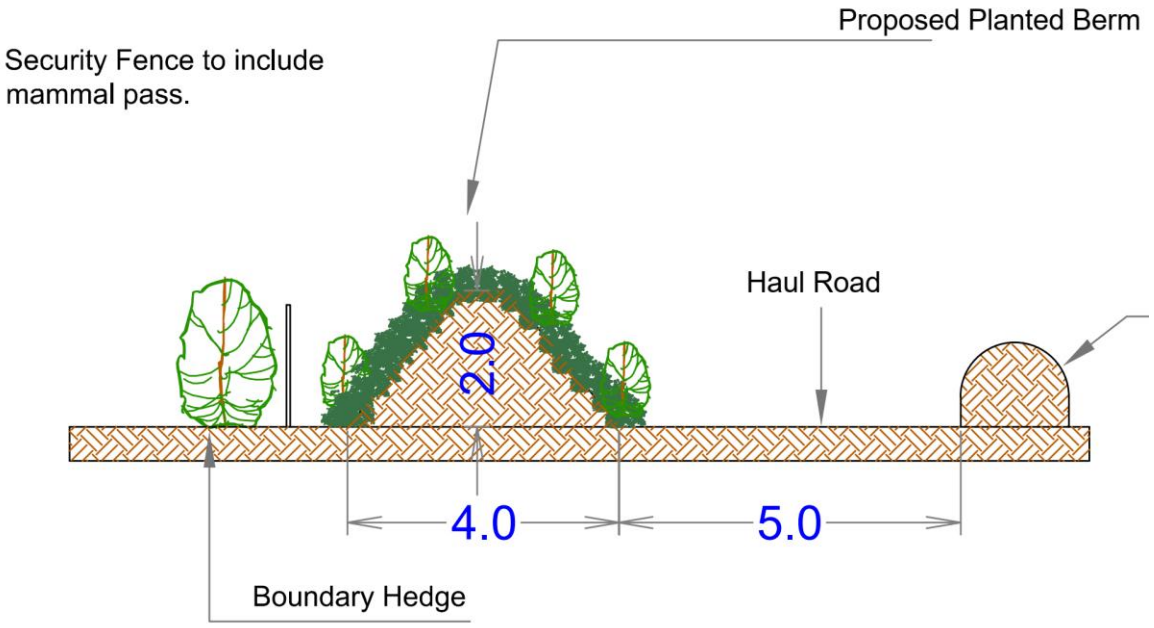
Workers will utilise established welfare facilities within the existing quarry. The construction phase will not be completed sequentially with the operational phase. As such, the applicant will commence extraction activities in Zone A while also preparing lands for extraction in Zone B. Refer to Section 3.3.3.2 below on phasing for further details.

3.3.3.2 Operational Phase

Scotshouse Quarry and the operations associated with it are well established. The Proposed Development will operate in a similar manner. The operational face will be developed in a phased manner, using industry standard drilling and blasting techniques to release the rock from the quarry benches.

The extraction area will maintain a minimum buffer with adjoining lands of ca.9 m to provide an area of minimal disturbance around the Site. This extraction buffer will be used for the siting of the berm and security fencing. The berm will be constructed from overburden stripped as part of the preparation works in the extension lands. The berm will be ca. 4m wide and 2m high and will be planted with native tree species to aid screening and provide features which may offer biodiversity enhancement. Figure 3-6 provides a schematic of the planned boundary berm-and-fence structure.

Figure 3-6: Schematic of Boundary Berm and Fence



The berm will be constructed along the periphery of the Zone B. The berm will be planted with native tree species. The planted trees will be inspected by a suitably qualified arborist two years after initial planting and then as necessary until 5 years after the cessation of operations. This action is to ensure they are growing as expected and to determine if the existing hedgerows require supplemental planting.

Rock will be prepared for processing into aggregate and other products by programmes of controlled intermittent blasting. This requires the selected area of rock face to be readied by a drilling rig, installation of explosives by a competent blast specialist, detonation, which breaks/shatters a given portion of rock face. During and after a blasting event, the area is closed to personnel for safety purposes. Once the area has been deemed safe, the blasted rock can be processed. This processing represents the main activity of the quarry.

Processing will consist of the primary crushing and screening by mobile plant near the blast area followed by transportation, either directly to market or to the main processing plant within the existing Scotshouse Quarry to the north of the Site. This requires the use of various plant such as tracked excavators, rubber tyred loading shovels and a variety of crushers and screeners. Crushed and screened aggregate will be stockpiled onsite prior to removal from the quarry or use in the macadam manufacturing operation within Scotshouse Quarry.

Scotshouse Quarry produces aggregate chippings for use in surface dressing and macadam, along with different grades of crushed stone and customer-tailored aggregates. The Proposed Development will seek to provide the raw material for these products.

The following mobile equipment will be used during the Operational Phase of the Proposed Development:

- One (1) x Volvo 300 excavator;
- One (1) x Sandvik QJ341 Jaw Primary Crusher;
- One (1) x Roco 1600 Scalping Screen;
- One (1) to Two (2) x Roco tracked conveyer/stacker; and,
- One (1) x Volvo L180 Wheel Loader.

The Operational Phase will be divided into 8 phases and will result in the existing ground level across Zones A and B being extracted down to 90mOD. Figure 3-7 below presents the phasing scheme for the upper and lower elevations, which is described here.

During the operation, the phasing design will include for a low point on the Site to be maintained. This will act as a sump to hold water which may be encountered from water ingress such as storm events or groundwater faults. The water held within this sump will be pumped off at a controlled rate suitable to comply with the existing discharge licence for the Site (refer to Chapter 8 Water for further details).

Phase 1

The first phase will commence in Zone A, where the applicant will extract the remaining rock deposits in the north-western portion of the Site down to the established quarry floor, reducing the existing ground level from ca. 130mOD at its highest point to ca. 105mOD. This phase will run concurrently with phase 2 – refer to Table 3-1 below.

Phase 2

While extraction activities are occurring within Phase 1, the applicant will commence site preparation works (Construction Phase) in Zone B1 of the extension lands (i.e., the land currently owned by Connolly and Soden), following the methodology described in Section 3.3.3.1 above. Once these lands have been prepared, extraction activities associated with phase 2 can commence. Extraction activities associated with this phase will reduce the existing ground level from ca. 140mOD at its highest point to ca. 120mOD. Aggregates will be transported back to the existing quarry for further processing via the existing haul route on the eastern periphery of the Site. However, as the ground level is reduced new temporary haul routes will be constructed to maintain connectivity with the existing quarry infrastructure This phase will run partly in concurrence with Phases 3 and 4, as shown in Table 3-1 below.

Phase 3

Phase 3 will seek to extract the remaining deposits from ca. 115mOD at its highest point to ca. 105mOD in the eastern portion of Zone A. Phase 3 will run in partial concurrence with phases 2 and 4 (see Table 3-1 below)

Phase 4

Phase 4 will seek to extract deposits within the central and eastern portion of Zone A from 105mOD to 90 mOD. These deposits associated with this phase extend beneath those in Phase 3 and as such will be accessible following their removal. This phase will be in partial concurrence with phases 3 and 5 (see Table 3-1 below). This phase will provide a sump for water storage. This will aid the Applicant's ability to avoid water leaving the Site at a greater rate than permitted via the discharge licence as this void will act as large sump, requiring water to be pumped from it thereby altering the current gravity fed arrangement. Prior to this phase, the Applicant will ensure there will always be a low point in the quarry (i.e. below 100MOD).

Phase 5 & Phase 6

While extraction activities are occurring within Phase 5, the applicant will commence site preparation works (Construction Phase) in Zone B2 of the extension lands (i.e., the land currently owned by Markey and Boylan), following the methodology described in Section 3.3.3.1 above. These lands will be accessed via the existing access track along the western periphery of the Site. During the preparation of Phase 6 lands, extraction activities associated with phase 5 will be on-going. Extraction activities associated with this phase will reduce the existing ground level from ca. 120mOD at its highest point to ca. 90mOD within Phase 5.

Following preparation works in Phase 5, extraction activities will commence in Phase 6. Extraction activities associated with Phase 6 will reduce the existing ground level from ca.

140mOD at its highest point to ca. 120mOD in Zone B1. Both Phase 5 and Phase 6 will be completed concurrently, providing an opportunity for summer/winter benches pending water levels at the Site. The latter stages of phase 6 will be concurrent with the earlier stage of phase 7, as per Table 3-1 below.

Phase 7

Phase 7 will seek to extract the remaining deposits in Zone B1 from 105mOD to ca. 90mOD. The latter stages of phase 7 will be concurrent with the earlier stages of phase 8 (see Table 3-1 below).

Phase 8

This phase will seek to extract the remaining deposits in the western portion of Zone A from 105mOD its highest point to ca. 90mOD. This will be the last phase of operations associated with the Proposed Development. See Table 3-1 below.

Each of these stages will be completed in a distinct manner over the course of the operational life of the Proposed Development. Nevertheless, the activities associated with each stage will be relatively consistent.

Figure 3-7: Proposed Phasing Plan, Showing Upper and Lower Elevation Phases

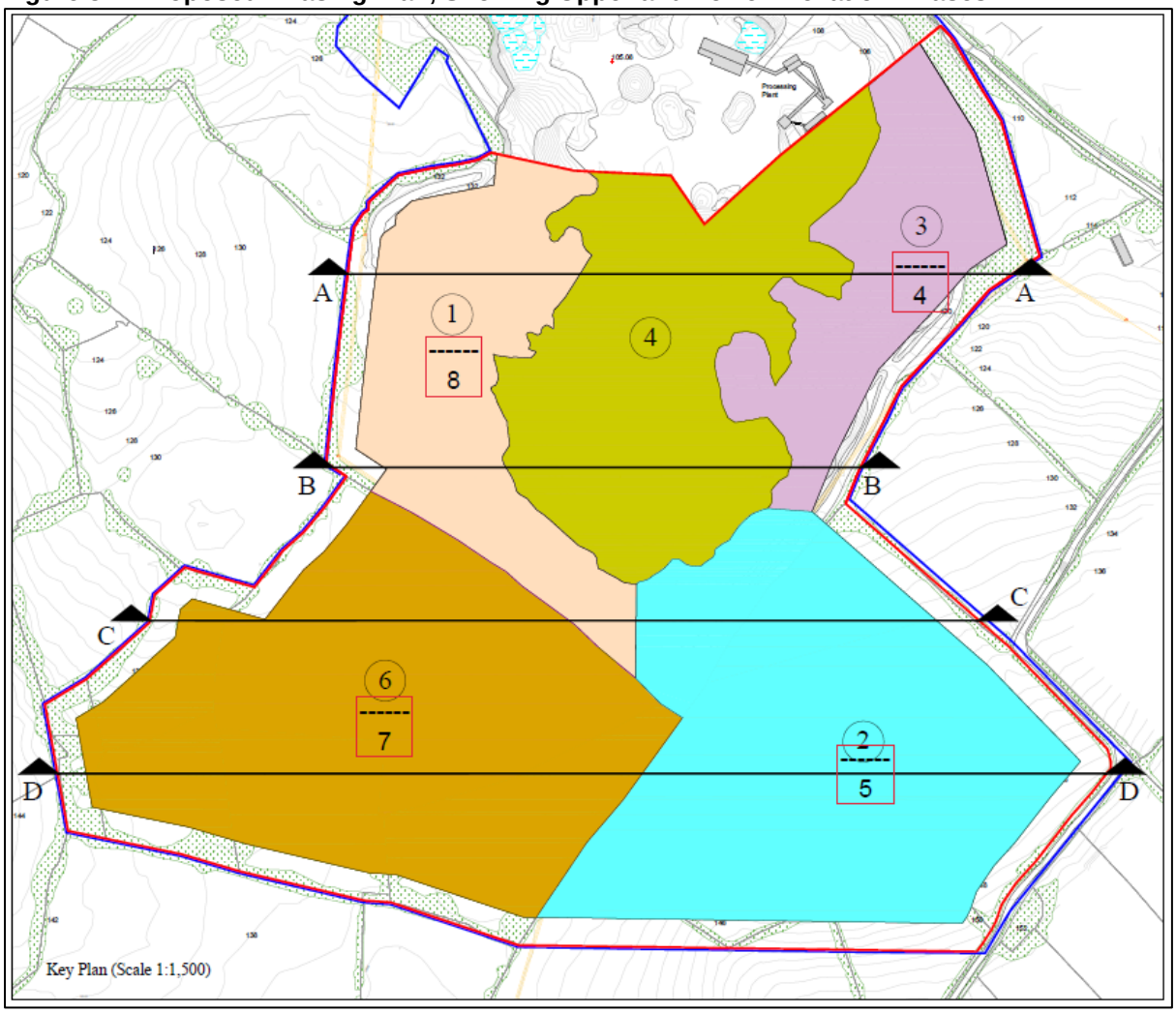


Table 3-1: Phase Overlap During Site Operations

Phase	Illustration Indicating Where Overlap Between Phases Will Occur											
Phase 1												
Construction Phase (Preparation of Zone B1)*												
Phase 2												
Phase 3												
Phase 4												
Phase 5												
Construction Phase (Preparation of Zone B2)*												
Phase 6												
Phase 7												
Phase 8												
Restoration Phase												

Notes: * denotes construction phase will be completed over 3-month period.

3.3.3.3 Restoration Phase

Upon the completion of extraction activities, the Site will be made safe and left in a state which may enable a biodiverse habitat to develop. The resultant ground level across Zone A and B will be below the water table – the estimated groundwater level is 104-105mOD. As such, groundwater will be allowed to recharge and form a water body across the Site. Given the low conductivity of the rock in the Site, it will take many years for inundation to former levels to occur. This represents a departure from the rehabilitation plan previously submitted to the competent authority for Zone A. As submitted under the Substitute Consent application, this is necessitated by the deepening of the quarry.

The Rehabilitation Phase will include site closure and the key deliverable will be the provision of an extended water body with improved boundary landscaping to facilitate and encourage aquatic bird species. Additional bird and bat boxes will be erected around the periphery of the Site.

The boundary embankments, which will be well established with ca. 30 years of development, will be left in-situ to provide a visual screen for these species from the surrounding landscape. At this stage, all plant and equipment will be removed from the Site. A ramp will be created from the exit haul route with additional aggregate as needed into the future water body, which will allow safe egress from the final water level.

3.3.4 Safety and Security

Scotshouse Quarry's northeastern boundary is immediately adjacent to the L6280. The western section of this boundary is secured by a palisade fence and the single, lockable, access gate for Scotshouse Quarry. The eastern section of this boundary consists of a high bank with low-growing bushes and trees. A drainage ditch runs between this bank and the L6280. Currently, the remaining boundaries of Scotshouse Quarry consist of ditches and trees. There are warning signs in both directions along the L6280, which is the only road bordering Scotshouse Quarry. Additional security measures at Scotshouse Quarry consist of internal lighting and security cameras.

As part of the Construction Phase of the Proposed Development, it is proposed that a security fence is erected around the peripheries of Zone B, to prevent unauthorised access into the Proposed Development. As the Construction Phase (Preparation) will be completed over two separate periods, the security fence will be established along existing land boundaries. As such, the fence will be erected around Zone B1 initially to ensure no unauthorised access occurs. This fence will be modified to extend around the periphery of Zone B1 as part of the preparation works in this area of the Site.

This fence will be fitted with appropriate signage to warn personnel of the dangers associated with a working quarry.

3.3.5 Screening

To the northwest of Scotshouse Quarry, the ditches and trees that form the boundary provide partial screen from the outside. To the northeast, Scotshouse Quarry is screened by the bank with its vegetation (see section 3.3.4 above). Further to the east, the topography screens Scotshouse Quarry from view. Approximately 500m to the west, local road L62801 runs north-to-south but the topography of the land to the immediate east of the road screens Scotshouse Quarry from the view of the road.

The land to the south rises, with Scotshouse Quarry viewable from certain points. However, the preparation phase for Zone B will include the creation of screening berms on all boundaries of Zone B. These berms will be planted with native tree species which will provide additional screening to the berm itself.

3.3.6 Site Hydrogeology

A hydrological/hydrogeological assessment has been carried out on the Site, taking into account the current water regime. For further details, see Chapter 8 – Water.

3.3.7 Dewatering

Scotshouse Quarry operates under a discharge licence, with a permitted flow volume of 360m^3 per day. This licence was granted by Monaghan County Council in 2015. The application was supported by a detailed hydrological report, refer to Chapter 8 – Water for details.

The planned depth of extraction will take the floor of the Site below the water-table. This will require intermittent dewatering, which will be carried out via the use of a submersible pump. From the completed assessment regarding dewatering (see section 8.3.18 below), the current discharge licence will be sufficient to support the dewatering which will be necessary as part of the operational phase of the Proposed Development.

3.3.8 Construction Management

During the construction process, the methods of working will comply with all relevant legislation and best practice to reduce the environmental impacts of the work.

3.3.9 Construction Staffing and Working Hours

Construction will be carried out by existing Scotshouse Quarries Ltd. employees. Working hours for the construction phase will be the same as the working hours for Scotshouse Quarry (see section 3.4.2 below).

3.3.10 Construction Traffic

There will be no increase in traffic levels arising from the construction phase of the Proposed Development.

3.4 Operational Phase

3.4.1 Staffing Numbers

Scotshouse Quarry employs 14-20 persons for on-site operations and 5-6 persons for off-site crew. The Proposed Development is not anticipated to increase this number. However, current Scotshouse Quarry staffing numbers will not be sustainable in the long-term without the Proposed Development.

3.4.2 Operational Hours

The Proposed Development will not change the operational hours of Scotshouse Quarry, which will remain as they are currently:

- Monday-Friday 07:00 – 19:00, with processing occurring only between 08:00 – 18:00;
- Saturday 08:00 – 14:00; and,
- Sunday/Bank Holiday Closed.

3.5 Utilities

Mains electricity is provided to Scotshouse Quarry via the ESB sub-station adjacent to the Site entrance. An ESB powerline that intersects the Site will be re-routed by ESB prior to works commencing. An application to move the powerline will be submitted to ESB Networks if the planning application is successful[3].

[3] Steps to be taken can be view at https://www.esbnetworks.ie/existing-connections/alterations-and-meter-work/relocate-a-pole-or-line

Potable water is provided via mains supply and private well. There is no sewage supply at Scotshouse Quarry. Onsite toilets and welfare waste are collected by licensed specialist (refer to Section 3.6.1 below).

No change to the above is planned due to the Proposed Development.

3.6 Drainage

3.6.1 Foul Drainage

Welfare foul water from the site office and canteen is discharged via gravity-fed pipe to a septic tank located opposite the site office. Further hygiene facilities are provided in a portable toilet located just inside the quarry access gate onto the public road. Both the porta-loo and the septic tank are emptied on an as-needed basis by licensed contractors and disposed of at a suitably licensed off-site facility. As there is no change to staffing numbers arising from the Proposed Development, there will be no change to foul drainage.

3.6.2 Stormwater Drainage

The quarry floor has a shallow gradient which slopes towards the quarry access gate. Run-off from the quarry floor to the north of the Proposed Development currently drains overland via informal channels and large puddles. This run-off is intercepted either by the wheel-wash or by the yard interceptor drain at the quarry access gate. The drain is 20m x0.7m and is ca.0.1m deep below a removable metal grate. This discharges into an open channel at the eastern end and flows via a 150mm pipe into the settlement tanks (see section 3.6.3 below). As the Proposed Development extends ground level below the current level of 105mOD it will be necessary to commence pumping water to the existing lagoons for use in onsite processes as gravity will no longer provide a suitable means of drainage (see section 3.3.7 above). The dewatering will be completed at a rate which will ensure the discharge limit of 360m^3/day will not be exceeded at any time. The extraction of the lower bench in Phase 4 (see section 3.3.3.2 above) will provide a natural attenuation and settlement pond during periods of excessive rain that may occur while the upper benches are worked.

3.6.3 Trade Effluent Discharge

Scotshouse Quarries Ltd were granted a trade effluent discharge licence by MCC (WP26/15) following the granting of planning ref 14/124 (see section 2.2 above). This permits the discharge of trade effluent from:

- Mineral washing;
- Washing out of vehicles;
- Wheel washing; and,
- Run-off from yard areas.

The trade effluent is collected and held within a concrete-lined pit containing four (4No.) linked settlement tanks. This is located close to the northeastern boundary fence. The tanks have a combined surface area of ca.230m^2 and are divided by interior walls. Water enters the first tank at the northwest end and discharges via the final tank at the southeast via a hydrocarbon class interceptor (See Figure 3-8 below). From the interceptor, the effluent flows via a buried 150mm pipe to the open roadside drain to the exterior of the quarry fence. The drain flows to the northwest, being culverted under the L2780, and flows through neighbouring agricultural land before discharging to a wetland area downstream of Dunsrim Lough.

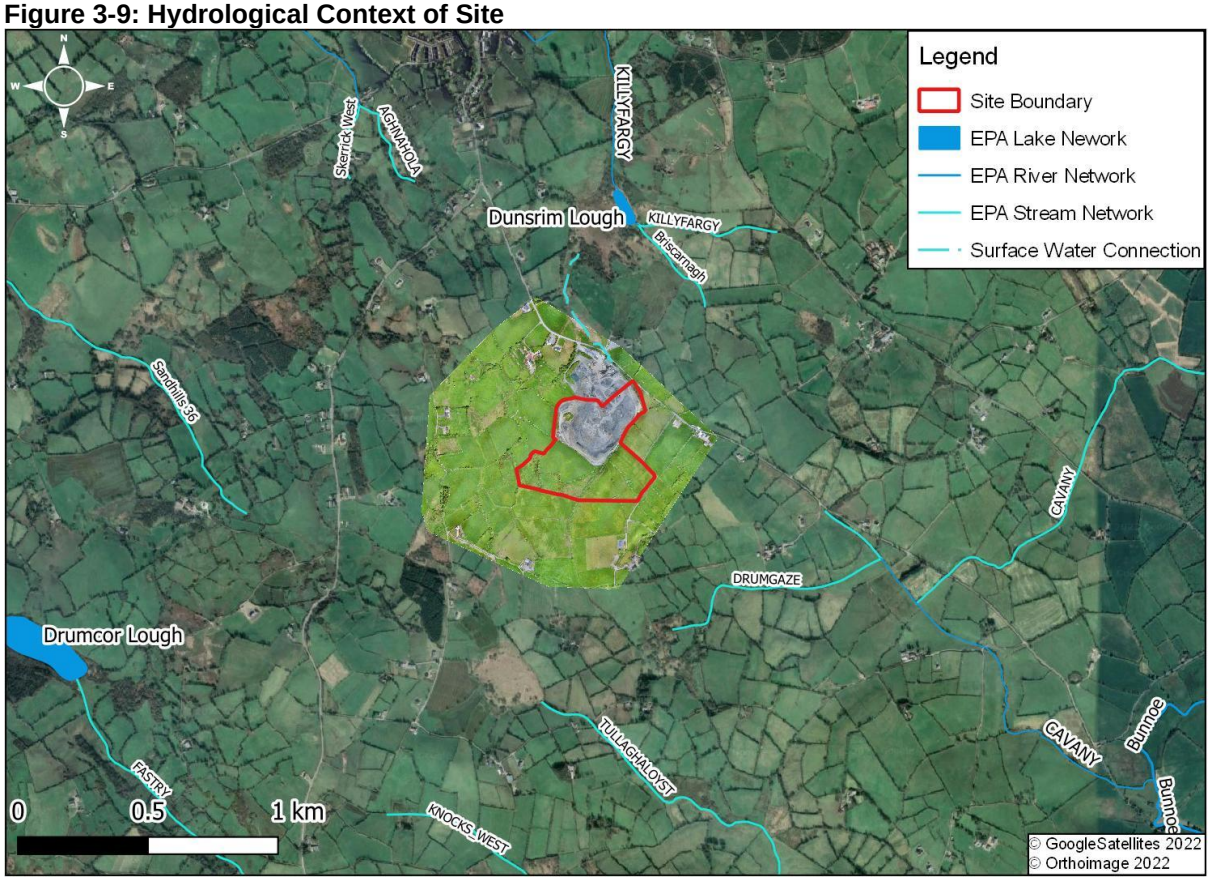
The existing quarry discharges account for only a fraction of the licence limits (i.e., approximately 25-30% of the permitted volume of water allowed to be discharged from the Site). The Proposed Development will seek to utilise the existing discharge licence to remove groundwater/surface water encountered during the operational phase of the Proposed Development (that is excess to processing requirements). In brief, the proposed operational activities will be phased in a manner which will ensure there will be a sump available to hold

excess water. The sump will also act as a settlement pond, allowing any solids to settle out. This water will be pumped using a submersible pump at a rate that ensures the discharge limit is complied with. Refer to Chapter 8 for further details.

Figure 3-8: Scotshouse Quarry Drainage

The Site is hydrologically connected to one Natura 2000 designated site: Lough Oughter and Associated Loughs SAC. This is connected to the Site via the drain/drainage ditch that feeds into Dunsrim Lough (see above). Dunsrim Lough is connected to the Briscarnagh Stream and Gortnana_010 river, which feeds into the SAC. Refer to Chapter 6 (Biodiversity) and Chapter 8 (Water). See Figure 3-9 below.

Figure 3-9: Hydrological Context of Site



3.6.4 Receiving Waters

The receiving surface water is a drain/drainage ditch which connects to Dunsrim Lough via an intervening wetland. The Briscarnagh Stream feeds into the Killyfargy (IE_NW_36G750800, segment code 36_1304) approximately 400m northeast of the Site via Dunsrim Lough. Downstream of the Lough, the combined Killyfargy flows north to join the Gortnana River in the village of Scotshouse. The Gortnana enters the Finn River at the Northern Ireland border, and the direction of flow then continues northwest through parts of the Lough Oughter and Associated Loughs SAC and the Lough Erne system before entering Donegal Bay.

3.6.5 Local Potable Water

There are numerous private wells in the area around Scotshouse Quarry (see Chapter 8 – Water). Properties to the south of the Site are largely dependent on private wells for water supply. The village of Scotshouse is within a Public Water Supply (PWS) source protection area, with the Outer Protection Area lying ca.1km north-northwest from Scotshouse Quarry [28]. A comprehensive assessment has determined that the Proposed Development will have a not significant, negative affect on these wells and the PWS.

3.7 Restoration and Aftercare

No part of Scotshouse Quarry has undergone any restoration at the time of writing (March 2024). A full Restoration Plan forms part of this EIAR and is supplied with this planning permission. The restoration will be carried out in accordance with then-current best practice guidelines and in compliance with relevant legislation. It is envisaged that the Restoration Plan will take 18 months to complete, with a suitable following period of monitoring.

3.8 Current Mitigation Measures

The original planning permission (ref 83/09) set out conditions which included requirements for the:

- Suppression of dust;
- Limits on noise levels;
- Prohibition of surface water flow onto the public road;
- Storage of topsoil against future site restoration; and,
- Planting of native trees/retention of hedges to act as a screen.

4 ALTERNATIVES CONSIDERED

4.1 Introduction

The Planning and Development Regulations 2001 (as amended) specify the information to be contained within an Environment Impact Statement (EIS). Schedule 6 1(d) specifies that an EIS shall include '*An outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice taking into account the effects on the environment.'*

The EIA Directive 2014/52/EU requires an EIAR to contain:

> *'A description of the reasonable alternatives (for example, in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including comparison of the environmental effects.'*

The EPA's 2022 guidelines further state:

> *'The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected. Option. A detailed assessment (or 'mini-EIA') of each alternative is not required.'*

Taking account of the above and taking into account the nature of the Proposed Development, this chapter documents the alternatives to the Proposed Development that were considered, including the 'Do Nothing' scenario.

4.2 'Do Nothing' Option

The 'Do Nothing' option would restrict excavation activity to the 3.3ha. originally granted planning permission under planning ref 83/09. Although Scotshouse Quarries Ltd. can and will continue to extract aggregates in this area, from an operational perspective a larger footprint is essential to the future viability of the company due to the need to increase their stock of reserves.

4.3 Alternative Locations

As greywacke is a finite natural resource and forms part of the geology of an area, quarry locations are restricted by the presence of economically-viable volumes. There are further considerations that must also be taken into account, including:

- The ownership of the land and the cost of acquiring land in other hands;
- The presence of other rocks or soils within the greywacke deposit;
- The relatively unproven technical quality of reserves elsewhere;
- Depth below surface;
- Presence of groundwater within the anticipated depth of extraction;
- Access to haulage routes;
- Proximity to markets;
- The costs of developing alternative sites; and,
- The need for plant and equipment on-site.

Taking these factors into consideration, extending Scotshouse Quarry as proposed in the planning permission application is considered to be the most viable option for the continuation of Scotshouse Quarries Ltd.'s business, given the presence of known quality aggregate in close proximity to already established infrastructure without proximity to residential receptors.

4.4 Alternative Extension

The northeastern boundary of the quarry runs along the L6280 local road – extension in this direction would require the creation of an entire second site. In addition, the nature of excavation work means that the opening of a second site in this location would require either the purchase of additional highly-specialised equipment to work the new site, or the constant moving of plant and equipment across the public road. This would impact on local road-users and require on-going control of any impacts arising from this movement of potentially dust-laden plant.

The landscape to the northwest drops in elevation, and the resource quality of the aggregate in this direction is therefore unsure. Extension of the quarry to the east may be a feasible future option, however this will require detailed assessment and purchase of lands, which are not currently available.

4.5 Selection of the Proposed Development

For the Applicant to continue the historic level of excavation activity, there is a need for an increased sustainable supply of aggregates from the resources within the quarry to enable a return to past full capacity. Opening additional quarries would require exploration of the underlying geological environment, the assessment of the local water-table, the supply of additional equipment and other considerations. Increasing the depth within Scotshouse Quarry would not supply sufficient natural resources. Extension to the north, east or southeast presents practical difficulties (see section 4.4 above). Therefore, extension into the agricultural lands to the southwest and west is the practical option.

The owners of these lands are agreeable to the sale of their lands, contingent upon the granting of planning permission.

4.6 Alternatives Uses of Surrounding Land including the 'Do Nothing' Alternative

The locality is currently largely in agricultural use with a small number of single-dwelling developments. Given the anticipated population growth within Ireland, the pressure for housing and public infrastructure is likely to increase over the coming decades [20]. In light of this, the MCDP [27] includes several objectives concerning rural housing:

HSO1: *'To plan positively for future housing in the County within existing defined settlements, to realise the economics of providing infrastructure and services in towns and villages, enabling their plan led expansion whilst facilitating sustainable rural housing where it supports and promotes the prosperity of existing rural communities.'*

RSO3: *'To facilitate housing in rural areas under strong urban influence for those who have a rural generated housing need and to apply a presumption against urban generated rural housing development.'*

RSO4: *'To maintain population levels in the remaining rural areas by accommodating appropriate rural development and to consolidate the existing town and village structure'*

Therefore, should the Proposed Development not go ahead as per the planning permission, there is a possibility that later realisation of the aggregate resource will be curtailed due to encroachment of other development onto the Site.

In the event that Scotshouse Quarries Ltd do not extend the current Site, it is anticipated that the available resources would become exhausted. In the long-term therefore, the Applicant would be forced to cease excavation activities in the area. This would result in the loss of important local full-time employment and the need to source required aggregate from elsewhere.

5 POPULATION AND HUMAN HEALTH

5.1 Introduction

This chapter was prepared to provide a description and assessment of the likely effects of the Proposed Development in terms of population and human health.

The local or receiving population comprises a significant element of the overall environment. In carrying out developments, one of the principal concerns is that people should experience no diminution in their quality of life as a consequence of the construction and operational phases of a development.

5.2 Methodology

A desk-based study was carried out to characterise the environment in relation to human beings, including the receiving population, change over time in population, employment levels and human health indicators.

This chapter has been prepared taking cognisance of the guidance set out in Chapter 1 and the following specific guidance documents:

- Institute of Public Health Ireland (IPHI) Health Impact Assessment Guidance (2021) [29];
- Institute of Environmental Management and Assessment (IEMA) Health Impact Assessment in Planning, *Impact Assessment Outlook Journal, Vol 8* (2020) [30];
- IEMA Health in Environmental Impact Assessment, A Primer for a Proportionate Approach (2017) [31];
- IEMA: Effective Scoping of Human Health in Environmental Impact Assessment (2022) [32];
- IEMA: Determining Significance for Human Health in Environmental Impact Assessment (2022) [33];
- International Association for Impact Assessment (IAIA) and European Public Health Association (EPHA): Human Health – Ensuring a High Level of Protection (2020) [34]; and,
- EPA: Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022) [8].

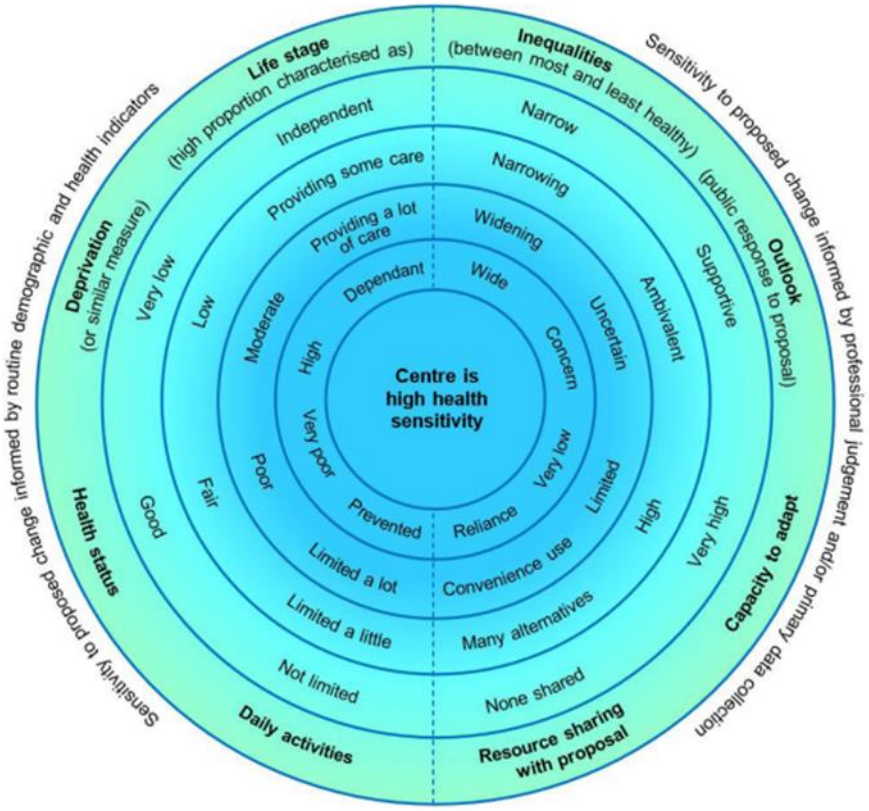
5.2.1 Health Sensitivity

In accordance with the IPHI guidance, the health sensitivity of the local population was determined following the methodology set out in *Part 4: Analysis tools and resources* of the above Guidance [29] and summarised in Figure 5-1 below. The determined sensitivity in each factor was considered in order to determine an over-all sensitivity for the local population of both the immediate area and of the nearest population centre – Scotshouse village. The results of this analysis are set out in section 5.6 below.

The following sources were consulted and used to determine both the sensitivity of the local population and the potential impacts on them:

- Central Statistics Office (CSO) Census Data for 2016 and 2022 [24]; and
- CSO Census Mapping Small Area Population Maps [35].

Figure 5-1: Health Sensitivity Conceptual Model



5.3 Receiving Environment

5.3.1 Population Information

The CSO provides data on population and socio-economic aspects of the population at different levels for the entire state, at county level and for individual Local Electoral Areas (LAs) and Electoral Divisions (ED) within each County.

The Site is situated in the Local Electoral Area (LEA) [35] of Ballybay-Clones (LEA-5) in County Monaghan and within the ED of Currin.

The boundaries for all census areas may change between individual censuses and it is not always therefore possible to directly compare the data.

5.3.1.1 Small Area Population Statistics

In the 2011 census, 'Small Areas' were established to give greater clarity and context to population trends. The Site is located solely in the A177031001 Small Area (SA), with the extent of SA A177031001 shown in Figure 5-2 below.

Prior to the 2022 census, SA 177031001 included part of Scotshouse Village (the nearest sizable settlement to the Site), other parts of which also lay within the neighbouring SAs 177031002 and 177031003. As of the 2022 census, Scotshouse Village is a stand-alone Small Area (A177031003) and the former SA177031001 and SA177031002 have been combined into SA A177031001. It is therefore not possible to directly compare the population numbers for the immediate Scotshouse Village SA itself.

Figure 5-2: Extent of Small Area A177031001

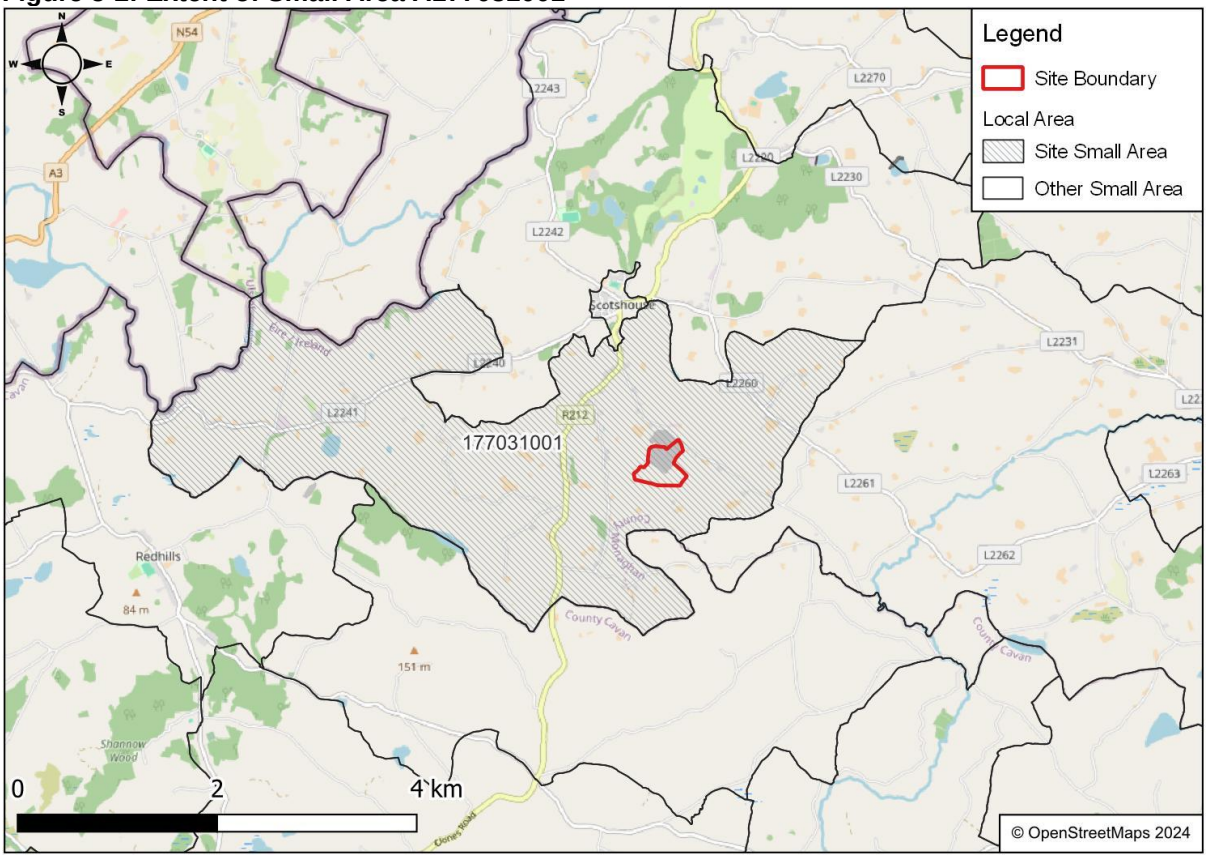


Table 5-1 below shows the current (2022) population figures for the immediate SA to the Site. The corresponding figures for the State, County and current LEA and ED are shown for context. To provide a guideline to the local population growth, the combined 2011 population data for SA 177031001, 177031002 and 177031003 is given in relation to the 2022 data for the same combined area. Population change for County Monaghan and Ireland are also provided, However, due to considerable boundary changes at LEA and ED level since the 2016 census, the population figures for the LEA and the ED are not comparable.

Table 5-1: Population Data 2022 and Change 2011-2022

Area	Population 2011	Population 2022	Change (No.)	Change (%)
Small Area 177031001	660	729	69	+10.45%
Small Area 177031002				
Small Area 177031003				
Currin ED	676	729	Not comparable	
Ballybay-Clones LEA	18,495	18,421	Not comparable	
Monaghan	61,386	65,288	3,902	+6.36%
Ireland	4,761,865	5,149,139	387,274	+8.13%

5.3.1.2 Local Population

The nearest population centre to the Site is Scotshouse Village.

Table 5-2 below shows some key statistics regarding the local population, for both the immediate area and for the location population centre, taken from the CSO 2022 Census Mapping Small Area Population map [35]. The County Monaghan and Ireland figures are given for comparison.

Table 5-2: Population Statistics (2022)

Dataset	SA A177031001	Scotshouse Village	Co. Monaghan	Ireland
Registered Permanent Households	83	108	21,689	1,702,289
Unoccupied Buildings (%)	18%	12%	13%	13%
Population No (% Male/Female)	242 (50.8/49.2%)	317 (51.4/48.6%)	35,288 (50.4/49.6)	5,149,139 (49.4/50.6%)
Age Breakdown (%)				
Aged 0 - 9	9.50%	22.40%	14.03%	12.39%
Aged 10 – 14	11.16%	10.09%	7.92%	7.27%
Aged 15 - 19	7.44%	6.31%	6.71%	6.56%
Aged 20 – 24	4.96%	4.10%	5.08%	5.96%
Aged 25 – 64	49.17%	48.90%	50.34%	52.74%
Aged 65 – 80	15.29%	5.99%	12.32%	11.56%
Aged 80+	2.48%	2.21%	3.60%	3.52%
% with Irish/UK Nationality	97.11%	85.80%	87.41%	84.52%
% Identifying as White Irish	97.11%	82.02%	81.92%	75.61%
% Identifying as Irish Traveller	0.00%	0.95%	0.41%	0.64%
BEM/Irish BEM	0.00%	0.95%	2.12%	4.71%
% with No/Poor/Unknown levels of Spoken English	1.24%	1.26%	3.34%	2.45%
% of:				
1 person households	22.89%	24.07%	24.47%	23.14%
>1 adult households	73.49%	58.33%	64.16%	65.48%
Single-parent households	3.61%	17.59%	11.36%	11.38%
% Owner/Occupiers (population)	91.57%	50.00%	70.32%	65.77%
% Renting	4.82%	46.30%	23.595	27.48%
(Private Landlord)	(3.61%)	(34.26%)	(14.90%)	(17.96%)
(Local Authority/Housing Body	(1.20%)	(12.04%)	(8.69%)	(9.52%)
% with Central Heating:	95.18%	99.07%	95.85%	93.85%
(Oil-Fired)	(81.93%)	(93.52%)	(74.50%)	(38.79%)
(Coal/Wood/Peat-Fired)	(10.84%)	(1.85%)	(6.13%)	(8.86%)
(Electric/Gas-Fired)	(1.20%)	(1.85%)	(12.98%)	(44.40%)
% with confirmed water supply	100.00%	99.07%	98.63%	97.72%
(Mains Water Supply)	(15.66%)	(79.63%)	(44.86%)	(79.90%)
(Private Water Supply)	(66.27%)	(1.85%)	(13.18%)	(9.90%)

Dataset	SA A177031001	Scotshouse Village	Co. Monaghan	Ireland
(Group Scheme)	(18.07%)	(17.59%)	(40.15%)	(7.69%)
% with Stated Sewerage	97.59%	99.07%	99.11%	94.95%
(Mains Sewerage)	(2.41%)	(91.67%)	(42.11%)	(63.30%)
(Septic Tank)	(90.36%)	(6.48%)	(49.36%)	(24.78%)
% With a Disability	17.77%	18.93%	18.81%	21.55%
% Working Age Unable to Work (Illness/Disability)	4.69%	4.67%	4.43%	4.58%
% Caring for Disabled Person	4.55%	5.68%	5.54%	5.81%
Health:				
Very Good/Good	88.84%	90.54%	85.58%	82.89%
Fair	7.44%	6.31%	8.85%	8.64%
Bad/Very Bad	0.83%	1.58%	1.53%	1.74%

5.3.1.3 EPA Pobal Information for SA A177031001

The census statistics have been used by Pobal on behalf of the Government of Ireland to develop deprivation indices to help inform planning and policy decisions [36]. Deprivation is categorised into eight bands from 'extremely affluent' to 'extremely disadvantaged'. Small Area 177031001 is categorised as being 'marginally below average'. Table 5-3 below sets out the relevant factors drawn from the 2022 census results. Due to the SA boundary changes between 2016 and 2022, it is not possible to directly compare results between different census dates.

Table 5-3: Deprivation Indices (2022)

Indicator	SA A17731001	Scotshouse Village	Co. Monaghan
Pobal HP Index	-3.69	-2.35	-3.36
Pobal HP Description	Marginally Below Average	Marginally Below Average	Marginally Below Average
Age Dependency Ratio*	38.43%	40.69%	37.87%
Primary Education only#	16.88%	13.04%	14.50%
Third Level Education#	25.32%	36.02%	31.84%
Male Unemployment Rate^	6.15%	10.39%	8.19%
Female Unemployment Rate^	1.96%	4.92%	8.11%

* The Pobal age dependency ratio is the percentage of persons aged 0-15 & >64 within the whole population. Higher ratios mean a greater dependency burden on the working age population. In 2022 the comparable figure for Ireland was 34.74%

In the 2022 census, 11% of the population of Ireland aged 15+ had no formal education/primary education only and 48% had a third-level education [35]

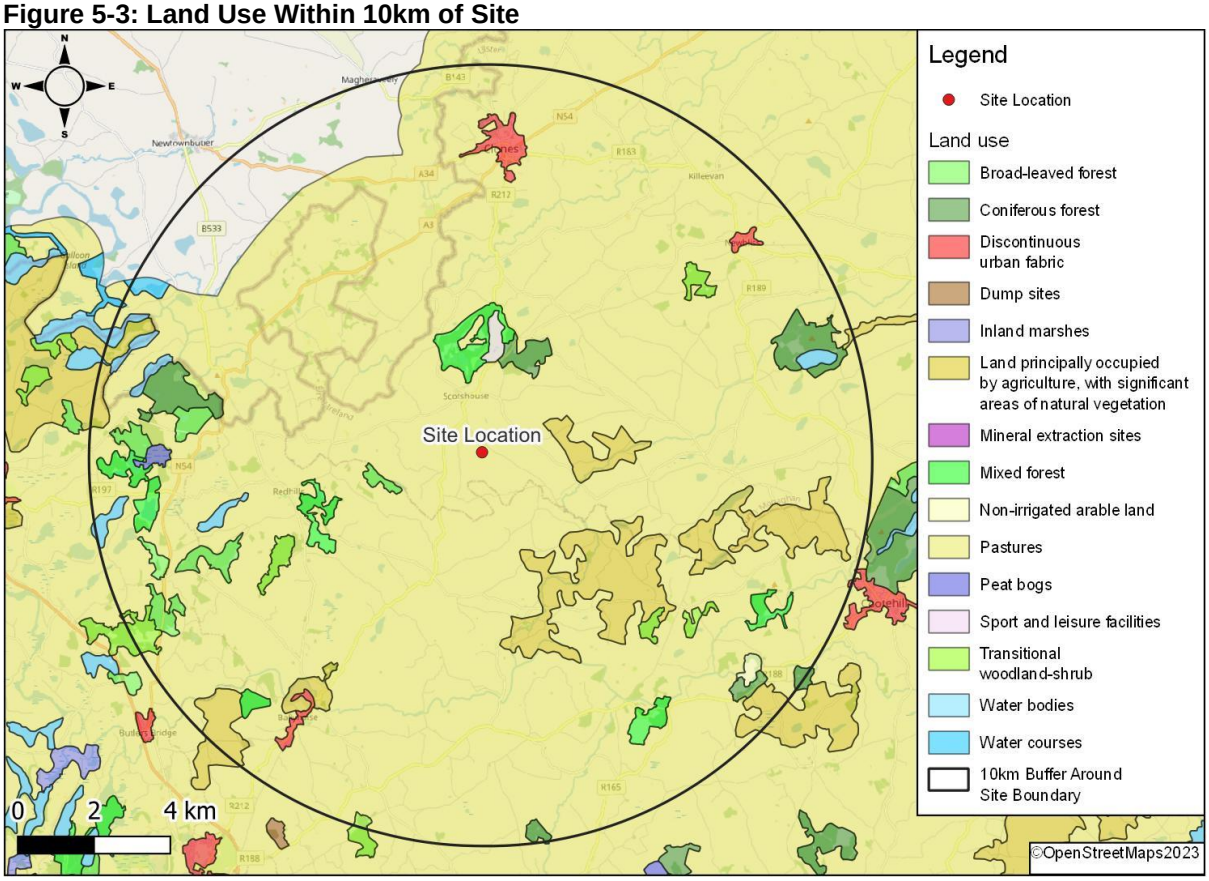
^The national unemployment rate for (Q2) 2022 was 4.5% for males and 4.5% for females [24]

5.3.2 Surrounding Land Use

The surrounding land use is predominantly agricultural (pasture and crops) with small water bodies and areas of coniferous/broad-leaved and mixed forest. There are also scattered

agricultural businesses (e.g., pig and poultry farms) and individual rural businesses (e.g., B&Bs and a golf club). Residential development consists of scattered individual dwellings and more concentrated urban areas such as Scotshouse village and small local towns. See Figure 5-3 below.

Figure 5-3: Land Use Within 10km of Site



The closest residential building is ca. 135m from the northern Site boundary (see Figure 5-4 below).

The nearest sizeable settlements are:

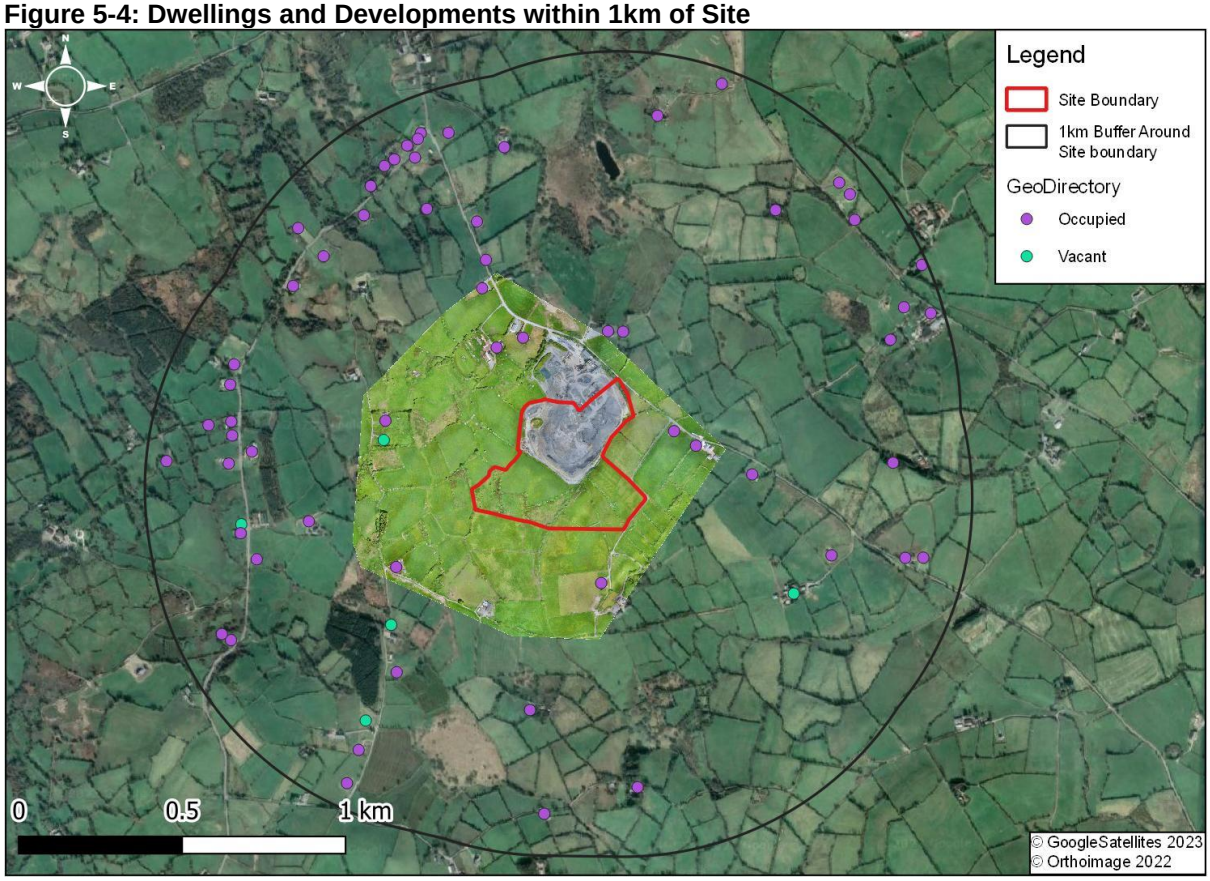
- Clones Town (8km North);
- Cootehill Town (10km Southwest);
- Belturbet Town (11km West);
- Cavan Town (23km South); and
- Monaghan Town (29km Northeast).

In addition to the above, there are numerous small villages in the area around the Site. The closest is Scotshouse village, which lies to the north-northwest. The village boundary is 0.7km away and the village proper is 1.5km distant by road. The village contains St Enda's National School (lying in the north of the village), a playground and a community centre. Currin GAA lies ca1.8km northwest of the village, on the edge of a wooded area containing Coolnacarte Plantation and Mullaghmore Wood. Clones Golf Club is located on the northeastern side of this wooded area, 3km northeast of Scotshouse. Hilton Lough and Garden Lough, located within this wooded area, both drain into the Annies Stream (IE_NEW_36G750800, segment code 36_1550), which joins the Gortnana downstream of the Site.

To ensure compliance with EIP1 in the MCDP [27], an examination of all dwellings and developments within 1km of the Site was undertaken. This found a total of sixty-five (65No.) buildings in this area. Of these, eighteen (18No.) are rated as being for "Crop and Animal Production, Hunting and Related Service Activities", a term which would include farm-houses.

The majority of the remainder are residential properties. The location of these buildings in relation to the Site is shown in Figure 5-4 below.

Figure 5-4: Dwellings and Developments within 1km of Site



5.3.3 Economic Activity and Employment

The economic activity/employment figures and occupational details of the population aged 15-64 for the Site and its locality against the wider region are outlined in Tables 5-4 and 5-5 below [35]. The high percentage of process/plant/machine operatives and skilled tradespersons in the local area (the immediate Small Area and Scotshouse Village) shown in Table 5-5 reflects the importance of construction and extraction industries in the area.

Table 5-4: Principal Economic Status According to 2022 Census

Area	In Work	Student	Retired	Caring for home/family	Unemployed	Unable to Work
SA177031001	57.81%	11.46%	17.7%	5.21%	2.60%	4.69%
Scotshouse Village	59.35%	9.81%	11.68%	8.41%	5.14%	4.67%
Co Monaghan	56.07%	10.35%	16.35%	7.24%	4.98%	4.43%
National Average	56.09%	11.10%	15.90%	6.58%	5.10%	4.58%

Table 5-5: Occupations of Local Working-Age Population (2022)

Occupation	A177031001	Scotshouse Village	Co. Monaghan	Ireland
Administrative and Secretarial Occupations	6.90%	11.76%	8.82%	9.20%
Associate Professional & Technical Occupations	6.90%	4.41%	7.61%	11.71%
Caring, Leisure, Service Occupations	10.34%	8.09%	8.10%	7.35%
Elementary Occupations	10.34%	10.29%	10.04%	8.15%
Manager/Director/Senior Officials	5.17%	9.56%	6.50%	7.72%
Process, Plant and Machine Operatives	3.62%	9.56%	10.92%	6.91%
Professional Occupations	16.38%	14.71%	15.67%	20.31%
Sales and Customer Service Occupations	5.17%	5.15%	4.95%	6.18%
Skilled Trade/Occupations	24.14%	22.06%	19.95%	12.57%
Not Stated	6.03%	4.41%	7.44%	9.90%

5.3.3.1 Employment Opportunities in the Surrounding Area

Opportunities for employment exist within the vicinity of the Site in the towns of Clones, Cootehill, Belturbet, Cavan and Monaghan Town and in rural industries and smaller settlements within the surrounding area.

Figures from the 2016 Census demonstrate [35] that at least 86.4% of the working population and 55.0% of the student population of the immediate Small Area travelled by private transport, with 40% of the student population travelling by bus/minibus/coach. Less than 3% of each group walked and no-one reported using a bicycle. Travel time for work/education was less than 30 minutes for 61.7% of the population and less than 7% of the population had a commute of an hour or more. This indicates that much travel for work and education was relatively local.

The 2022 census [35] found that 79% of the working population of the immediate Small Area commuted via private transport, compared to a national figure of 63%, although the proportion reporting as working mainly from home in the local Small Area is 11.8%, which is slightly above the national figure of 11.3%.

Direct comparison between the two sets of census data is not possible, as the 2016 data includes the population of Scotshouse Village.

One difficulty in accessing the near-by employment opportunities is the low level of public transport across the area as a whole. Although a daily commuter bus links Scotshouse to Cavan in one direction and Clones and Monaghan in the other, this operates only five times per day Monday-Saturday [37], and less than 2% of the working population of the immediate Small Area regularly commute via public transport [35]. This increases the relative importance of local employment, especially for those without access to private transport.

5.3.3.2 Site Employment

The Proposed Development will allow the Applicant to continue to offer local employment opportunities for the estimated 35-year lifespan of the extended Site. The Proposed Development will not increase the employment levels at the quarry. However, without the

Proposed Development, Scotshouse Quarry will eventually become exhausted and be unable to employ the entirety of the current workforce, resulting in a loss of jobs.

5.3.4 Human Health

5.3.4.1 Sensitivity

The population of the immediate Small Area (A177031001) according to the 2022 census data was considered in terms of the categories set out in Figure 5-1 above, with the results set out in Table 5-6 below. Changes in inequalities in the local area over time cannot be assessed at this point due to the above-mentioned changes in the local Small Area boundaries. The over-all sensitivity of the population to any resulting impact is deemed to be 'low'.

Table 5-6: Assessed Health Sensitivity of Local Population

Criteria	Classification	Basis
SA177031001		
Life Stage	Providing some care	The % of people of working age is slightly below the national average and the % of people aged <15 and >64 is slightly above the national average, increasing the care burden on the local population. The dependency ratio is above the national figure. The % of people identifying as carers is below the national figure.
Deprivation	Low/Moderate	The Pobal Description is "marginally below average"
Health Status	Good	The % of the population reporting bad/very bad health is well below the national figure, and the % reporting their health as very good/good is above the national figure.
Daily Activities	Limited a little	The % of people unable to work due to illness/disability is in line with the national average and the % of people identifying as having a disability is well below the national average.
Inequalities	Narrowing	The % of people with only primary-level education is higher than the national average and the % of people with a third-level+ qualification is lower than the over-all County Monaghan figure. However, the local unemployment rate is much lower than the national average and the % of home ownership is much higher than the national average. Comparisons with previous Pobal data sets is not possible due to the change in boundaries.
Outlook Towards Proposal	Supportive to Ambivalent	The Proposed Development has been an important local employer since extractive work began and no known complaints have been lodged with the owner or with MCC.
Capacity of Health Services to adapt	Very High	The Proposed Development is not a health-related project and will not create additional specific demands on the local health infrastructure.
Resource Sharing with Proposal	None Shared	The Site will not have high power or water demands. A high percentage of local residences have private water supplies and oil-fired heating. Traffic impact is outlined in Chapter 14.
Over-all Sensitivity Score	**Low**	
Scotshouse Village		

Life Stage	Providing some care	The population proportion aged 65+ is much lower than the national average, meaning the requirement for support of the elderly is lessened. However, almost one-third of the population (32.5%) is aged 0-15, well above the national average and leading to a greater level of support being needed for this age group.
Deprivation	Low/Moderate	The Pobal Description is “marginally below average”
Health Status	Good	The % of people reporting bad/very bad health is on-par with the national average. However, the % reporting very good/goof health is above the national average.
Daily Activities	Limited a little	The % of the population unable to work as a result of illness/disability is in line with the national average and the % of the local population identifying as having a disability is below the national average. The % of the local population who identify as caring for someone with a disability is lower than the national average.
Inequalities	Narrowing	There is a very high proportion of residents in rented accommodation and the Lone Parent ratio is well above the ratio for County Monaghan as a whole. However, the % of the population with education only to primary school level is below the over-all County figure, and the % of the population with a third-level education is above the County figure. However, MCC has worked with local communities throughout the county to create ‘Visions for the Future’ and ‘Community Plans’ to support communities in developing their potential [37].
Outlook Towards Proposal	Supportive to Ambivalent	The Proposed Development has been an important local employer since extractive work began and no known complaints have been lodged with the owner or with MCC.
Capacity of Health Services to adapt	Very High	The Proposed Development is not a health-related project and will not create additional specific demands on the local health infrastructure.
Resource Sharing with Proposal	None Shared	The Site will not have high power or water demands. A high percentage of local residences have private water supplies and oil-fired heating. Traffic impact is outlined in Chapter 14.
Overall Sensitivity Score	**Low**	

5.4 Characteristics and Potential Impacts of the Proposed Development

This section examines the potential impacts on population and human health that may arise from the Proposed Development during the construction and operational phases and also examines potential impacts that may arise if the Proposed Development did not proceed. This includes the potential for unplanned events.

5.4.1 Population

Scotshouse Quarry has enabled the Applicant to provide valuable local employment in a rural environment. The Proposed Development would enable this employment to continue into the foreseeable future.

5.4.2 Human Health

There is no record of any complaint having been lodged to either MCC or the Applicant in respect of any nuisance arising from or associated with Scotshouse Quarry during its lifetime.

The potential impacts on human health, particularly potential impacts on residents in the immediate locality, are addressed in detail in the following specialist chapters. The conclusions of these chapters are considered here in the context of the low health sensitivity determined in section 5.3.6.1 above. Refer to the specific chapters for further details.

Chapter 8: Water. An assessment of the geology and hydrogeology of the Site was carried out in this Chapter. The conclusion was that it was unlikely that there were any human health effects arising from groundwater contamination due to the Proposed Development once mitigation measures had been appropriately implemented.

Chapter 9: Air Quality. An assessment of potential air pollution arising from the Proposed Development and the processes taking place in the quarry was carried out in this Chapter, with the conclusion of negligible effect on human health arising from ambient dust (i.e. PM_{10}).

Chapter 10: Climate. An assessment of the effect of the Proposed Development on greenhouse gas emissions was carried out with the conclusion that emissions associated with the operations of the Proposed Development likely to have a not significant effect on national GHG emissions and in turn, climate change that can impact human health.

Chapter 11: Acoustics (Noise and Vibration). An assessment of the noise and vibration effects arising from the Proposed Development was carried out in this Chapter, with potential effects on human health being deemed not significant.

Chapter 12: Landscape and Visual. An assessment of the landscape impacts and visual impacts arising from the Proposed Development was carried out in this Chapter, with potential effects on human enjoyment being deemed not significant.

Chapter 13: Cultural Heritage. An assessment of the cultural heritage impacts of the Proposed Development was carried out in this Chapter. The conclusion was that there were no significant impacts arising.

Chapter 14: Material Assets – Traffic and Transport. An assessment of the impacts on traffic and transport arising from the Proposed Development was carried out in this Chapter. No significant effects were determined.

5.4.2.1 Safety

The Health and Safety Authority (HSA) views the quarrying industry as a high-risk sector [38].

The use of on-site explosives to break the quarry faces for processing will be carried out in a carefully controlled manner by expert specialist companies. No explosives will be stored on-site. Before and after blast events, the area around the blast will be cleared of personnel.

The Safety and Health Commission for the Mining and other Extractive Industries (an EU Commission) produced Guidance on the Safe Use of Explosives in Quarries (2001) [39] and this is the guidance document utilised by the HSA to determine safe working practices. Extraction activities at the quarry will continue to take cognisance of this guidance document and any future guidance documents.

The Applicant has confirmed there have been no accidents or incidents associated with Scotshouse Quarry.

5.4.2.2 Unplanned Events

As with all similar developments, there is some risk that accidents or disasters outside the operator's control could result in a risk to the environment. Such incidents could theoretically include fire, flood, explosions and oil/fuel spills arising from vehicle accidents. However, in practice these incidents are unlikely due to the following control measures:

- Fire - the nature of the Site means that there are very few combustible materials or sources of ignition, as the Site's plant and equipment will be maintained to a high

standard of safety. In addition, the distance between the various elements of infrastructure means that there is very little risk of a fire spreading beyond the initial point. Unplanned events therefore may result in a plant or machine being exposed to fire, but not a notable fire event or requirement for fire tender support.

- Flood – as extractive work reaches and passes the water-table, water will be collected in an on-site sump (low point within the Site). The Proposed Development is flood compatible, with the deeper void spaces capable of holding flood waters, while key plant and equipment is moved onto the higher elevation.
- Explosion – as stated in section 5.4.2.1 above, on-site blasting explosions will be planned and carried out by experts and no explosives will be stored on-site.
- Vehicular accidents – staff cars are not permitted beyond the car-park area and mobile plant will only be moved by trained operatives.

It should be stressed that there is no history of any unplanned event at Scotshouse Quarry.

5.5 Proposed Mitigation Measures and/or Factors

Mitigation measures against the potential effects which may impact on human health from the Development are considered in detail within the following chapters:

- Chapter 7: Land, Soil and Geology: Measures to avoid any potential contamination of land soil and geology will be implemented;
- Chapter 8: Water. Measures to avoid any potential contamination of water will be in place;
- Chapter 9: Air. Measures to avoid excess dust will be in place;
- Chapter 10 Climate. Measures will be in place to reduce Greenhouse Gas Emissions;
- Chapter 11: Acoustics (Noise and Vibration). Measures to reduce the noise and vibration arising from the Site will be in place;
- Chapter 12: Landscape and Visual – measures will be implemented to avoid the effects on the landscape and visual experience of the local population; and,
- Chapter 14: Material Assets - Traffic and Transport. Measures to ensure pedestrian safety in regard to Site traffic will be place.

5.6 Cumulative and In-Combination Effects

In combination with other businesses/enterprises in the area, Scotshouse Quarry has contributed to sustaining the local economy and community. In combination with other extractive sites, the quarry also has a strong history of supporting the national supply of aggregates.

There is only one (1No) other working quarry within 10km radius of the Site: Nulty's Quarry, 10km to the south. The distance between the Site and this quarry negates the risk of cumulative and in-combination effects occurring on human health in the local population.

The Proposed Development will not lead to any increase in the annual volume extracted from Scotshouse Quarry beyond the historical maximum rate of 350,000 tonnes, nor will it lead to any increase in traffic levels related to the quarry previously experienced. Therefore, there are no cumulative impacts on the population or human health arising from the extractive industry.

An examination of the EPA's mapping tools showed that there are currently twenty-four (24No.) Industrial Emission Licences and Integrated Pollution Control permits for locations within 10km of the Site. The closest of these is 3km from the Site and the majority are for intensive agricultural businesses such as poultry and/or pig farms. The impacts from these locations are largely odour and noise. The distances involved mean these businesses is unlikely to have cumulative/in-combination effects with the Proposed Development.

In addition to the above, there are seven (7No) Water Discharge Licences within 10km of the Site. However, none of these discharge into the same stretch of water as the Site will under

the Scotshouse Quarry discharge licence. In addition, the discharges are not into the same sub-catchment as Scotshouse Quarry's discharge.

Therefore, there are no significant cumulative/in-combination effects on the environmental that need further consideration.

5.7 Interactions with other Environmental Attributes

Population and human health have the potential to be impacted positively or negatively by a number of environmental issues. The relevant interactions with other key environmental factors are set out in section 5.4.2 above (and more extensively in Chapters 6-14).

5.8 Indirect Effects

The Proposed Development will have a neutral to slight, positive long-term effect in regard to continued indirect local employment such as machinery maintenance and upkeep and professional services such as:

- Health and safety specialists;
- Refuelling;
- Blast specialists;
- Environmental monitoring personnel; and,
- Quality control personnel.

5.9 Residual Effects

The effect of the Proposed Development on the population and local economy in terms of direct employment can be considered as long-term and neutral. The effects on the local and regional aggregate supply can be considered as long-term, positive and moderate.

The residual effect in terms of human health within the local population will be 'imperceptible' to 'not significant' and long-term.

5.10 Monitoring

Monitoring requirements are detailed in the relevant specialist chapters.

5.11 Reinstatement

The restoration phase of the Proposed Development outlines how the site will be restored to an inert state. This phase and potential associated effects have been considered throughout this Chapter.

5.12 Difficulties Encountered in Compiling this Information

No difficulties were encountered.

6 BIODIVERSITY

6.1 Introduction

This chapter provides the Biodiversity Assessment for the likely significant effects arising from the Proposed Development. Where likely significant effects have been identified, appropriate measures to reduce / avoid these effects are outlined.

An Appropriate Assessment (AA) Screening Report was prepared to accompany the application for an extension of the existing quarry at Aghnaskew, Scotshouse, Co. Monaghan [40]. This report is supplied with this application.

Please refer to Chapters 1-3 for a comprehensive overview of the project description and receiving environment.

6.2 Methodology

The assessment methodology section details the relevant guidance, desktop study and field assessment methodologies adhered to in conducting this assessment.

6.2.1 Relevant Legislation and Guidance

The following legislation is relevant to this report:

- The Habitats Directive 92/43/EEC;
- European Communities (Birds and Natural Habitats) Regulations 2011 – 2021;
- Wildlife Acts 1976 to 2021; and,
- Flora (Protection) Order 2022.

In addition, the following guidance was utilised:

- Monaghan County Council County Development Plan 2019-2025 [27];
- Chartered Institute of Ecology and Environmental Management (CIEEM). *Guidelines for Ecological Impact Assessment* (2018) [41];
- Lundy, M.G.; Aughney, T.; Montgomery, W.I. and Roche, N. *Landscape Conservation for Irish Bats and Species-Specific Roosting Characteristics* (2011) [42];
- The Heritage Council *Best Practice Guidance for Habitat Survey and Mapping* (2011); [43]
- Fossit, J. *A Guide to Habitats in Ireland* (2000) [44];
- National Road Authority (NRA, now Transport Infrastructure Ireland) *Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes* (2006) [45];
- NRA *Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes* (2008) [46];
- National Parks and Wildlife Service (NPWS) *National Otter Survey of Ireland* [47];
- Department of Housing, Local Government and Heritage (DoHLGH) *Bat Mitigation Guidelines for Ireland* (2022) [48];
- Collins, J. *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (2016) [49]*;*
- BirdWatch Ireland *Countryside Bird Survey* (2020) [50]*;*
- Draper, A. *Surveying for Amphibians* (2021) [51]*;*
- *NPWS National Frog Survey of Ireland* (2013) [52];
- Irish Wildlife Trust's National Reptile Survey [53], [54];
- Amphibian and Reptile Conservation *National Reptile Survey (UK)* [55]; and,
- BirdWatch Ireland *Birds of Conservation Concern in Ireland* [56].

6.2.2 Local Planning Policy

Monaghan County Council website was accessed for information on relevant planning policy [57] and the Monaghan County Council planning portal [19] was accessed for information on other proposed and permitted developments in the surrounding area.

6.2.3 Zone of Influence

CIEEM [41] defines the Zone of Influence (ZoI) as "… the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities." Each ecological feature will have a different ZoI, depending on its ecological characteristics [41]. Best practice guidance and professional judgement were used to define the ZoI for each ecological feature.

Given the scale and nature of the Development, the ZoI defined for most ecological features was the footprint and immediate surroundings of the Site. A wider ZoI was identified for designated sites aided by the EPA's Appropriate Assessment tool [58] to determine potential pathways e.g., hydrological.

6.2.4 Study Area

In order to evaluate likely significant effects of the Proposed Development on ecological receptors in the receiving environment, a number of survey area extents were required. These comprised the Site plus a wider survey area extent as recommended by specific published best practice guidance for specific ecological receptors.

Where specific published Best Practice recommendations were not available, professional judgement and a review of peer reviewed literature were the primary drivers in calculating survey area extents.

Table 6-1 below outlines the ecological receptors and Study Areas.

Table 6-1: Study Area Extents

Ecological receptor	Study Area	Guidance/ Literature
Designated Sites	Natura 2000 Sites connected to the Site (up to 12km) Natural Heritage Areas within ZoI	Mapping and the conservation interests of identified sites were examined to ascertain whether there could be potential physical or ecological connectivity to the Site and the associated likely impacts [41]
Habitats	The Site plus surrounding land parcels to 50m	Professional judgement and as per Best Practice [41], [43] [44].
Watercourse	Discharge point to Dunsrim Lough and Briscarnagh Stream (where accessible)	Professional judgement and as per Best Practice [41].
Mammals	The Site plus surrounding land parcels up to 100m where connectivity exists and access allowed.	Guidelines for treatment of badger and otter for national road schemes [45] [46]. National Otter Survey of Ireland 2010/12 [47].
Bats	The Site plus immediate habitats where connectivity / access allows	Bat mitigation guidelines for Ireland v2. [48] Bat Surveys for Professional Ecologists: Good Practice Guidelines [49]
Bird	The Site plus surrounding land parcels	Countryside Bird Survey [50]
Amphibians / Reptiles	The Site	Surveying for amphibians. Tips, techniques and skills to help you survey for amphibians [51] National Frog Survey of Ireland [52] National Reptile Survey Irish Wildlife Trust [53] [54] National Reptile survey (ARC) [55]

6.2.5 Desk Study

6.2.5.1 Review of available information

A desk study was carried out to collate the available existing ecological information on the selected study area. The Site and the surrounding area were viewed using available satellite imagery.

The National Parks and Wildlife Service [59], the National Biodiversity Data Centre [60] and the Northern Ireland Department of Agriculture, Environment and Rural Affairs [61] websites were accessed for information on sites designated for nature conservation and information on protected habitats and species known from the 2km grid square N93R within which the Site is located. Only records for the past 10 years are included within this report, as older records are unlikely to still be relevant given their age and possible changes in land management that may have occurred in the intervening period. Environmental Protection Agency maps [28] were accessed for other environmental information relevant to the preparation of this report, such as surface water features.

Birds of Conservation Concern in Ireland [56], published by BirdWatch Ireland and the RSPB NI, is a list of priority bird species for conservation action on the 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 website was accessed for information on birds of conservation concern [62].

The conservation status of mammals within Ireland and Europe is evaluated using one or more of the following documents:

- Wildlife Acts 1976 – 2021;
- Red List of Terrestrial Mammals [63]; and,
- EU Habitats Directive 92/43/EEC.

The desk study found that thirteen (13No.) species listed as invasive / non-native have been previously recorded in the N93R grid square. Of these, ten (10No.) can be classed as ‘invasive’ and are subject to Regulation 49 of the Habitats Directive as listed in Part 1 and Part 2 of the Third Schedule within the Directive. See section 6.3.4.10 below for further information.

Monaghan County Council website was accessed for information on relevant planning policy [57] and the Monaghan County Council planning portal [19] was accessed for information on other proposed and permitted developments in the surrounding area.

The documents reviewed to assist the preparation of this report include the design drawings and project information prepared for this planning application.

Bat Conservation Ireland produced a landscape conservation guide for Irish bat species using their database of species records collated during the 2000-2009 survey seasons [64]. The 2011 analysis of the habitat and landscape associations of all bat species deemed resident in Ireland was also utilised [42].

The degree of favourability ranges from 0 – 100, with 0 being least favourable and 100 most favourable for bats. The values of the grid squares represent the range of habitat suitability values the bat species can tolerate within each individual square.

A caveat is attached to the model that it is based on records held on the Bat Conservation Ireland database; while core areas have been identified, areas outside the core area should not be discounted as unimportant as bats are a landscape species and can travel many kilometres between roosts and foraging areas nightly and seasonally.

6.2.6 Field Survey

The methodologies and survey period details used to assess the various aspects of biodiversity within the study areas are described in the following sections.

6.2.6.1 Habitats and Flora

A site visit to identify habitats and the suitability of the various habitats and other features present to support fauna (protected and/or notable species) was carried out on 22nd September 2022 by Senior Ecologist Maeve Riley of APEM Ireland. Study areas are identified in Table 6-1 above. Weather conditions were bright, ca. 16°C, 4/8 oktas[4] with good visibility and gentle breeze[5].

Habitats were surveyed and classified according to Fossitt [44] (2000) and following best practice [43]. The dominant plant species present in each habitat type were recorded during the field surveys to allow accurate classification of the habitats present. As per best practice, any presence of invasive alien species was noted (see section 6.3.4.10 below for further information).

In addition to habitat identification, each habitat was assessed for its ecological significance, based on standard guidance [41].

6.2.6.2 Mammals

A site visit on 22nd September 2022 assessed the Site for evidence of, and suitability to support, mammals. Any signs of mammal activity (including the presence of setts/holts/dens/dreys, foraging evidence, access runs, hairs caught on wires and bushes, tracks and prints) occurring within the study areas were recorded using field notes and/or digital mapping software and subsequently digitised using GIS.

Surveys were undertaken in accordance with the following best practice guidance as outlined in Table 6-1 above.

6.2.6.3 Bats

A survey for bats was carried out in May and June 2023 by Flynn Furney Environmental Consultants. Methodology for these surveys is outlined in the bat survey report (see Appendix 6-1).

6.2.6.4 Birds

Incidental sightings or evidence of birds were noted as part of the site visit on 22nd September 2022 and the habitats within the study area were evaluated for their potential to support birds.

6.2.6.5 Amphibians / Reptiles

Incidental sightings or evidence of amphibians and reptiles were noted as part of the site visit on 22nd September 2022. A separate watercourse walkover was carried out on 20th January 2023.

Habitats within the study areas were evaluated for their potential to support amphibians / reptiles in accordance with relevant guidance.

6.2.6.6 Other Terrestrial Fauna

Incidental sightings or evidence of Lepidoptera (butterflies and moths), Odonata (dragonflies and damselflies) and any other taxa were noted as part of the site visit on 22nd September 2022 and the habitats within the study area were evaluated for their potential to support other terrestrial fauna.

[4] Cloud cover: see How we measure cloud - Met Office
[5] Force 1 on the Beaufort Scale: see Beaufort Scale - Met Éireann - The Irish Meteorological Service

6.2.6.7 Aquatic Ecology

A visual inspection of the discharge point and drainage ditch was undertaken on 20th January 2023 by Consultant Ecologist Adon McFarlane of APEM Ireland. The watercourse was evaluated for its potential to support aquatic flora and fauna species.

6.2.7 Survey Limitations

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. Interpretation of maps and aerial photography has been conducted in good faith, 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.

The field survey was carried out during suitable weather conditions and the Site was fully accessible. All bat roost features were assessed from the ground only and no trees were climbed for assessment; therefore, a precautionary approach is provided for the assessment of trees in relation to bat roost suitability.

The field survey was carried out outside of the breeding bird season, therefore, an assessment of the potential for birds to breed within the quarry (quarry face) and the wider habitats was given based on the habitats present only.

No other survey limitations were experienced.

6.2.8 Assessment Approach

This assessment was carried out in accordance with the guidance for EIA, as described in Chapter 1 of this EIAR and in the CIEEM guidelines [41].

Ecological features such as sites, habitats, features, assemblages, species or individuals, which occur in the vicinity of a project require assessment. The term 'ecological receptor' is used to describe an ecological resource once it has been determined that the Proposed Development may result in a significant impact.

Relevant guidance states that *"the importance of an ecological feature should be considered within a defined geographical context"* [41]. The following frame of reference has been used in this case, relying on known/ published accounts of distribution and rarity where available, and professional judgement, as per guidance [41]:

- International (European);
- National (Ireland);
- Regional (Ulster);
- County (Monaghan);
- Townland (Aghnaskew);
- Local (Intermediate between the Site and Townland); and,
- Site ("the Site").

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

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.

The approach to impact assessment set out in the guidelines [41] 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.

6.2.8.1 Impact Assessment

As per the relevant guidance [8] [41], the impact assessment approach 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.

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

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

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.

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.; and,
- 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.

6.2.8.2 Significant Effects

The concept of ecological significance is addressed in paragraphs 5.24 through to 5.28 of the CIEEM guidelines [41]. Significance is a concept related to the weight that should be attached to effects when decisions are made. For the purpose of an Ecological Impact Assessment (EcIA), a ‘significant effect’ is 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), 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 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.

6.2.8.3 Cumulative Effects

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.

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.

6.2.8.4 Avoidance, Mitigation, Compensation and Enhancement

Where potentially significant effects have been identified, the mitigation hierarchy has been applied as per the guidance [41]. 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.

It is important for the EcIA 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.

6.3 Receiving Environment

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

6.3.1 Identifying Zone of Influence

The Proposed Development is likely to result in effects beyond the extents of the Site due to the nature of the works.

There is potential for emissions to air or watercourses that could affect ecological features. While effects will be localised to the Site and the immediate surroundings, a conservative approach to selecting the ZoI has been adopted.

Given the scale of the Proposed Development, the potential for hydrological effects, emissions to air and noise impacts; the ZoI has been defined as 12km to account for the potential hydrological connection to a Natura 2000 Site recorded 12km downstream.

6.3.2 Designated Sites

6.3.2.1 Natura 2000 Sites

There are eight Natura 2000 sites within the ZoI of the Site:

- Upper Lough Erne SPA Site Code UK9020071;
- Upper Lough Erne SAC Site Code UK0016614;
- Upper Lough Erne Ramsar Site Code UK12024;
- Lough Oughter And Associated Loughs SAC – Site Code 000007;
- Kilroosky Lough Cluster SAC – Site Code 001789;
- Magheraveely Marl Loughs SAC - Site Code UK0016621;
- Magheraveely Marl Loughs Ramsar Site - Site Code UK12017; and,
- Lough Oughter SPA – Site Code 004049.

Of these, one Natura 2000 site is hydrologically connected to the Site. A connection exists between the Site and Lough Oughter and Associated Loughs SAC. Discharge from the quarry enters a drain/drainage ditch that flows through a wetland which then enters the Dunsrim Lough. This Lough is connected to the Briscarnagh Stream and Gortnana_010 river, which eventually flow into the SAC. Figure 6-1 (present in appendix 6-2) shows the location of the European designated sites in relation to the Site and potential connectivity. Table 6-2 below summarises the details of the Natura 2000 Sites within the ZoI.

Table 6-2: Natura 2000 Sites within the Zone of Influence of the Site

Natura 2000 Site and Code	Direct Distance from Site	Qualifying Interests
Upper Lough Erne SPA UK9020071	4km northwest	Whooper Swan wintering population
Upper Lough Erne SAC UK0016614	4km northwest	Alluvial forests with *Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion alvae*) *Lutra lutra* (Otter) Natural eutrophic lakes with *Magnopotamion or Hydrocharition*-type vegetation Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
Upper Lough Erne Ramsar UK12024	4km northwest	Good representation of a wetland Supports rare, vulnerable or endangered species Special value for maintaining genetic and ecological diversity of Northern Ireland Supports substantial numbers of individuals of waterfowl and internationally important numbers of wintering whooper swan
Lough Oughter And Associated Loughs SAC – 000007	5km west	Natural eutrophic lakes with *Magnopotamion* or Hydrocharition - type vegetation [3150] Bog woodland [91D0] Lutra lutra (Otter) [1355]
Kilroosky Lough Cluster SAC –001786	8km north	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] Alkaline fens [7230]

Natura 2000 Site and Code	Direct Distance from Site	Qualifying Interests
		Austropotamobius pallipes (White-clawed Crayfish) [1092]
Magheraveely Marl Loughs SAC - UK0016621	9km northwest	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] *Austropotamobius pallipes* (White-clawed Crayfish) [1092] Alkaline fens [7230] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210]
Magheraveely Marl Loughs Ramsar Site - UK12017	9km north	Represent a rare wetland type both in Northern Ireland and in the EU's Atlantic region. Support vulnerable vegetation communities and species as specified in section 20 of this RIS
Lough Oughter SPA – 004049	12km southwest	Great Crested Grebe (*Podiceps cristatus*) [A005] Whooper Swan (*Cygnus cygnus*) [A038] Wigeon (*Anas penelope*) [A050] Wetland and Waterbirds [A999]

Natura 2000 Sites would be assessed as important at the European level and are brought forward for further assessment.

An Appropriate Assessment Screening report was created and is supplied as part of the application. In brief, the Appropriate Assessment Screening Report identified that a Natura Impact Statement was not required.

6.3.2.2 Natural Heritage Areas

In Ireland, sites of national importance are termed Natural Heritage Areas (NHA) and proposed Natural Heritage Areas (pNHA). The pNHAs do not have legal protection until the designation process is completed through the enactment of a statutory instrument Wildlife (Amendment) Act, 2000 in relation to the area[6]. There are no NHAs and 10 pNHAs located within the ZoI of the Site (see Table 6-3 below and Appendix 6-2, Designated Sites map).

Table 6-3: Natural Heritage Areas within the Zone of Influence of the Site

Site Name and Code	Distance to Site	Reason for Designation
Drumcor Lough pNHA 001841	1km southwest	Drumcor Lough is a small linear lake located 4km east of Redhills on the Cavan-Monaghan border. The NHA consists of a long linear oligo-mesotrophic lake with fringing reed community and Willow scrub.
Annagheane Lough pNHA 001836	2km west	The lake is surrounded by dense woodland dominated by downy birch (*Betula pubescens*) and purple moor grass (*Molinia caerulea*) which has developed on cutover bog. The open water is fringed by an area of common reedmace (*Typha latifolia*) quaking swamp. At the northern end of the lake the swamp grades into species poor transition mire which subsequently grades into

[6] Proposed Natural Heritage Areas were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. pNHAs are subject to limited protection, in the form of County/ Local Area Plans, Agri-environmental farm planning schemes and recognition of their ecological value by planning and licensing authorities.

Site Name and Code	Distance to Site	Reason for Designation
		marsh dominated by an almost pure stand of *Equisetum fluviatile*. The nationally rare plant species, frogbit (*Hydrocharis morsus-ranae*), occurs in the lake.
Lisabuck Lough pNHA 001835	4km north	The site contains a reed fringed lake with small areas of marsh vegetation behind the red zone among willow and birch scrub, in addition to a wet woodland area in the east of the reserve. The confirmed presence of Carex acuta adds to the ecological interest of the site.
Lough Oughter And Associated Loughs pNHA 000007	5km southwest	See entry for Lough Oughter and Associated Loughs SAC in Table 6-2 above.
Lough Garrow And Lough Gubdoo pNHA 000984	5.7km west	No site synopsis available.
Kilroosky Lough Cluster pNHA 001786	9km north	See entry for Kilroosky Lough Cluster SAC in Table 6-2 above.
Drumgole Lough pNHA 001601	10km northeast	Presence of large areas of reedswamp dominated by common (*Phragmites communis*). In addition to reedswamp there are small areas of wet grassland dominated by soft rush (*Juncus effusus*) and creeping buttercup (*Ranunculus repens*). Although birdlife on the lake is limited, whooper swans frequent the site during the winter months.
Dromore Lakes pNHA 000001	10.5km east	A group of ten main inter-drumlin lakes plus several smaller areas of water stretching along the River Dromore between Cootehill and Ballybay. Nice areas of wet woodland and reed swamp. Important wintering wildfowl population, including Whooper swans, great crested grebe and lapwings.
Cootehill Church pNHA 000003	11km north	No site synopsis available.
Lisarilly Bog pNHA 001781	12km northeast	This is an area of poor fen vegetation occurring on a quaking scraw in a hollow surrounded by drumlins. The poor fen has developed on a cutover raised bog and may be in transition to a raised bog. It is oligotrophic in nature and sensitive to nutrient enrichment from the surrounding farmland.

The two closest pNHAs (Drumcor Lough pNHA 001841, Annagheane Lough pNHA 001836) are not directly hydrologically connected to the Site but have the potential to be impacted indirectly through changes in groundwater.

There is no ecological or landscape connectivity between the Site and any other pNHA.

The pNHAs are considered important at the National level and brought forward for further assessment.

6.3.2.3 Other Designated Sites

There are eight (8No.) sites designated as Areas of Special Scientific Interest (ASSIs) (Northern Ireland) recorded within the ZoI, as outlined in Table 6-4 below.

Table 6-4: Northern Ireland ASSIs within the Zone of Influence of the Site

Site Name and Code	Distance to Site	Reason for Designation
Upper Lough Erne - Crom ASSI	8km northeast	An integral element of the Upper Lough Erne system which is particularly well characterised by the extent of its swamp and fen communities. An integral element of the Upper Lough Erne system which is particularly well characterised by the extent of its swamp and fen communities.
Upper Lough Erne – Galloon ASSI	7km northeast	This area in southern Upper Lough Erne includes the open waters of the lough, in addition to extensive, good quality, traditionally farmed and hence species rich grasslands on base-rich gleyed soils. The nationally rare Frogbit occurs frequently along with other plants which also have a restricted distribution nationally. Otters also frequent the area along with wintering wildfowl and breeding waders.
Finn Floods ASSI	4km east	This site consists of the unmodified mature flood plain section of the Finn River system. It is a mature river, with a marginal alluvial flood plain and interconnecting eutrophic lough which supports a range of associated swamp, tall herb fen and inundated grassland vegetation communities. The site has a rich assortment of rare and notable plant species and is part of the internationally important site network regularly used by the Upper Lough Erne wintering whooper swan population.
Knockballymore Lough ASSI	9km north	Physiographic interest is of the presence of calcium carbonate deposits, or marl, originating from the calcium-rich water. Its associated wetland flora and fauna, includes diverse and extensive submerged beds of stoneworts, the Atlantic stream (or white clawed) crayfish along with a number of locally distributed species of aquatic beetles.
Kilroosky Lough ASSI	9km north	The chemical composition of water in this lake reflects the underlying limestone bedrock and is highly base rich. This, along with calcium carbonate deposits, or marl, and high-water quality and clarity, are characteristic of marl lakes. Kilroosky Lough is one of the best examples of such a lough in Northern Ireland.
Annachullion Lough ASSI	12km north	Physiographical interest of this largely spring - fed lough is related to the presence of calcium carbonate deposits, or marl, which are precipitated out of the calcium - rich water to produce a marl lake. Annachullion is one of the best examples of this lake type in Northern Ireland and is notable for its clear water and very low phytoplankton productivity.
Burdautien Lough ASSI	10km north	Physiographic interest is of the presence of calcium carbonate deposits, or marl, which is precipitated out of the calcium-rich water with its associated wetland flora and fauna including submerged beds of Stoneworts. This is a relatively rare lake type in NI and the water chemistry is a result of the underlying geology.
Summerhill Lough ASSI	10km north	Physiographical interest of this largely spring-fed lough is related to the presence of calcium carbonate deposits, or marl, which are precipitated out of the calcium-rich water to produce a marl lake. This is a relatively rare lake type in Northern Ireland.

Site Name and Code	Distance to Site	Reason for Designation
		Biological interest is related to the presence of vegetation communities which reflect these calcareous conditions, including a limited Stonewort Charophyte community.

Further information on these sites can be viewed from the NI Department of Agriculture, Environment and Rural Affairs [61].

There is a hydrological connection (ca. 6km downstream) from the Site to the Finn Floods ASSI and a more distant connection to the Lough Erne ASSI (Crom and Galloon) ca. 12km downstream.

ASSIs are considered important at the National level and brought forward for further assessment.

6.3.3 Field Surveys

6.3.3.1 Habitats

Habitats within the study area, as recorded during the site visit, are described in this section. The locations of these habitats are illustrated in the Habitat Map in Appendix 6-2.

6.3.3.2 Active Quarries and Mines (ED4)

An active quarry is present within the extension boundary, covering ca.6ha of the total area. It forms part of the existing active quarry working with crushed stone and aggregates.

As it is an active quarry there is little ecological value, since the level of disturbance means flora and fauna cannot colonise. This habitat is, therefore, evaluated as not important and is not brought forward for further assessment.

6.3.3.3 Agricultural Grassland (GA1)

This is the predominant habitat within the greenfield portion of the Site, encompassing ca. 3ha of the total site area. This habitat is currently used as pasture, with evidence of grazing by livestock. Dominant species recorded in this habitat are perennial ryegrass *Lolium perenne*, cock's-foot *Dactylis glomerata*, curled dock *Rumex crispus,* common nettle *Urtica dioica,* red clover *Trifolium pratense* and creeping buttercup *Ranunculus repens.*

This habitat is intensively managed and species poor. It is a commonly occurring habitat that is evaluated as low ecological value.

Agricultural grassland is evaluated as not important at the Site level and is scoped out for further assessment.

6.3.3.4 Scrub (WS1)

There are intermittent areas of scrub within the Proposed Development, encompassing ca. 0.8ha. This habitat is typically recorded on field boundaries and areas left unmanaged and is dense for the most part.

Dominant species within this include gorse *Ulex europaeus*, blackthorn *Prunus spinosa*, bramble *Rubus fruticosus* with rosebay willowherb *Chamerion angustifolium*, colt's-foot *Tussilago farfara*, curled dock, common nettle, immature self-seeded ash *Fraxinus excelsior* and rowan *Sorbus aucuparia* also recorded.

This habitat is dense in places with some species diversity. Although it is commonly occurring throughout Ireland, it is of moderate ecological value and is evaluated as important at the Local level. Scrub is brought forward for further assessment in this report.

6.3.3.5 Dry Meadows and Grassy Verges (GS2)

This habitat comprises ca. 1.4ha and is predominantly recorded to the south of the Site where grassland is less intensively managed. This habitat is species rich and is dominated by creeping bent *Agrostis stolonifera*, annual meadow grass *Poa anna,* fescue species *Festuca* spp., Yorkshire-fog *Holcus lanatus*, crested dog's tail *Cynosurus cristatus* with common knapweed *Centaurea nigra*, cranesbill *Geranium* sp and common birds foot trefoil *Lotus corniculatus*. Where more management is apparent (i.e., grazing) the sward is less diverse and is dominated by ribwort plantain *Plantago lanceolata*, dandelion *Taraxacum vulgaria*, curled dock, spear thistle *Cirsium vulgare* and compact rush *Juncus conglomeratus*. In wetter areas self-seeded willow *Salix* sp. is recorded.

The species mix in this habitat is diverse and is of moderate ecological value. It is evaluated as important at the Local level and brought forward for further assessment.

6.3.3.6 Wet Grassland (GS4)

This habitat is recorded to the west of the Site and encompasses ca. 1.8ha. This habitat is dominated by compact rush with creeping bent also recorded. Herb species recorded here include creeping buttercup, common nettle, gorse and self-seeded willow (<1m high). Spotted-orchid *Dactylorhiza maculate* was infrequently recorded.

Wet grassland is of moderate ecological value. It is evaluated as important at the Site level and not brought forward for further assessment.

6.3.3.7 Hedgerow (WL1)

The boundary habitats at the Site are comprised predominantly of hedgerows, which are for the most part intact. The structure of these hedgerows varies throughout the Site, where some are recorded on earth banks, some with drains and others with stonewalls at the base. They are generally dense and intact although there are a few that are 'gappy'. The height varies from ca. 2m to ca. 4m and width from ca. 1m to ca. 3m.

Dominant species recorded in the hedgerows are blackthorn, hawthorn *Crataegus monogyna,* elder *Sambucus nigra*, rowan and gorse. Few have standard trees and those recorded are mature and semi-mature ash. The understorey vegetation recorded includes ivy *Helix hedera*, bramble, common nettle, and snowberry *Symphoricarpos albus*.

The hedgerow habitat at the Site provides good connective features within the Site and to the wider area. With this in mind and added to the protection status for hedgerows within the County Development Plan 2019-2025 [27], hedgerows within the Site are considered as important ecological corridors, or steppingstones, in the context of Article 10 of the Habitats Directive.

Due to the ecological value of the habitat in accordance with the CDP, Hedgerows were evaluated as important at the Local level and brought forward for further assessment.

6.3.3.8 Treeline (WL2)

Treelines are infrequently recorded at the Site, encompassing ca. 200m in total and standing up to 10m high. These are predominantly recorded to the south of the Site. Dominant species include mature ash, sycamore *Acer pseudoplatanus* and beech *Fagus sylvatica* with immature hawthorn also recorded.

Understorey vegetation recorded includes ivy, bramble, nettle and gorse.

Treelines recorded on Site provide good connective features within the Site and to the wider area. With this in mind and added to the protection status for trees within the County Development Plan 2019-2025 [27], treelines within the Site are be considered as important ecological corridors, or steppingstones, in the context of Article 10 of the Habitats Directive.

Due to the ecological value of treeline in accordance with the CDP, this habitat type is evaluated as important at the Local level and brought forward for further assessment.

6.3.3.9 Recolonising Bare Ground (ED3)

An area of recolonising bare ground is present to the south of the Site comprising ca. 0.3ha. This habitat is present at the top of the quarry face where ground has been used as storage areas, in addition to vehicle access, and so has been disturbed with some quarry spoil evident. Within this area, vegetation is beginning to recolonise in less disturbed areas. Dominant species include common knapweed *Centaurea nigra*, ribwort plantain, greater plantain *Plantago major*, bramble, soft rush *Juncus effusus*, broom *Cytisus scoparius*, cock's-foot *Dactylis glomerata*, colt's-foot *Tussilago farfara* and oxeye daisy *Leucanthemum vulgare*.

This habitat would provide some ecological value as a pollinator area and is evaluated as important at the Site level. It is not brought forward for further assessment.

6.3.4 Species

A desk-based search of the study area revealed that the following numbers of protected species have been recorded within the study area in the last ten years:

- Six (6No.) native mammal species;
- Six (6No.) notable bird species;
- Two (2No.) amphibian species; and,
- One (1 No.) invertebrate protected species.

There are also ten invasive alien species recorded in the study area which are subject to regulations. These are listed in Table 6-5 below, along with several other invasive species which are not subject to regulations.

Table 6-5: Results of Desk Study

Grid square	Species name	Record count	Date of last record	Designation
Bird Species				
H51	Barn Owl (*Tyto alba*)7	2	26/05/2019	Wildlife Acts Birds of Conservation Concern - Red List
H51	Great Crested Grebe (*Podiceps cristatus*)	13	11/04/2018	Wildlife Acts Birds of Conservation Concern – Amber List
H51	Mallard (*Anas platyrhynchos*)	11	26/02/2018	Wildlife Acts EU Birds Directive Annex II, Annex III Section I Bird Species
H51	Mute Swan (*Cygnus olor*)	15	11/04/2018	Wildlife Acts Birds of Conservation Concern - Amber List
H51	Northern Wheatear (*Oenanthe oenanthe*)	1	18/05/2017	Wildlife Acts Birds of Conservation Concern - Amber List
H51	Common Snipe (*Gallinago gallinago*)	2	26/02/2018	Wildlife Acts EU Birds Directive Annex II, Section I Bird Species Annex III, Section III Bird Species Birds of Conservation Concern - Amber List
Mammalian Species				
H41	Pine Marten (*Martes martes*)	16	05/12/2021	EU Habitats Directive Annex V Wildlife Acts
H41	Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	13	30/08/2013	EU Habitats Directive Annex IV Wildlife Acts

Grid square	Species name	Record count	Date of last record	Designation
H41	Daubenton's Bat (*Myotis daubentonii*)	26	20/08/2014	EU Habitats Directive Annex IV Wildlife Acts
H41	Eurasian Badger (*Meles meles*)	89	31/12/2016	Wildlife Acts
H51		72	31/12/2015	
H41	West European Hedgehog (*Erinaceus europaeus*)	2	03/04/2021	Wildlife Acts
H51		4	01/04/2021	
H41	Eurasian Red Squirrel (*Sciurus vulgaris*)	19	17/06/2015	Wildlife Acts
Amphibian Species				
H51	Smooth Newt (*Lissotriton vulgaris*)	1	26/05/2019	Wildlife Acts
H41	Common Frog (*Rana temporaria*)	19	08/03/2020	EU Habitats Directive Annex V Wildlife Acts
H51		2	26/05/2019	
Invertebrate Species				
H41	Marsh Fritillary (*Euphydryas aurinia*)	1	31/05/2020	EU Habitats Directive Annex II
Invasive Species: Flora				
H51	Zebra Mussel (*Dreissena (Dreissena) polymorpha*)	1	10/08/2017	High Impact Invasive Species Regulation S.I. 477 (Ireland)
H41	Canadian Waterweed (*Elodea canadensis*)	43	19/08/2019	High Impact Invasive Species Regulation S.I. 477 (Ireland)
H51		6	29/09/2015	High Impact Invasive Species Regulation S.I. 477 (Ireland)

Grid square	Species name	Record count	Date of last record	Designation
H41	Cherry Laurel (*Prunus laurocerasus*)	11	18/05/2017	High Impact Invasive Species Regulation S.I. 477 (Ireland)
H51		1	29/08/2015	High Impact Invasive Species Regulation S.I. 477 (Ireland)
H41	Giant Hogweed (*Heracleum mantegazzianum*)	10	31/07/2013	High Impact Invasive Species Regulation S.I. 477 (Ireland)
H41	Himalayan Knotweed (*Persicaria wallichii*)	1	13/07/2016	Medium Impact Invasive Species Regulation S.I. 477 (Ireland)
H41	Japanese Knotweed (*Fallopia japonica*)	12	08/05/2022	High Impact Invasive Species Regulation S.I. 477 (Ireland)
H51		7	18/05/2017	High Impact Invasive Species Regulation S.I. 477 (Ireland)
H41	Nuttall's Waterweed (*Elodea nuttallii*)	1	18/05/2017	High Impact Invasive Species Regulation S.I. 477 (Ireland)
H51		2	29/08/2015	High Impact Invasive Species Regulation S.I. 477 (Ireland)
H41	*Rhododendron ponticum*	5	20/09/2016	High Impact Invasive Species Regulation S.I. 477 (Ireland)
H51		2	29/08/2015	High Impact Invasive Species Regulation S.I. 477 (Ireland)
H51	Salmonberry (*Rubus spectabilis*)	1	18/05/2017	Medium Impact Invasive Species Regulation S.I. 477 (Ireland)
H41	Sycamore (*Acer pseudoplatanus*)	32	18/05/2017	Medium Impact Invasive Species
H51		11	29/09/2015	Medium Impact Invasive Species
H51	Black Currant (*Ribes nigrum*)	2	29/08/2015	Medium Impact Invasive Species
Invasive Species: Fauna				
H41	Jenkins' Spire Snail (*Potamopyrgus antipodarum*)	1	18/08/2017	Medium Impact Invasive Species

Grid square	Species name	Record count	Date of last record	Designation
H51	Jenkins' Spire Snail (*Potamopyrgus antipodarum*)	4	19/09/2017	Medium Impact Invasive Species
H41	Sika Deer (*Cervus nippon*)	2	18/11/2014	High Impact Invasive Species Regulation S.I. 477 (Ireland)

6.3.4.1 Badger

There are 161 records of badger *Meles meles* within the last ten years in the wider area. Mammal tracks which may be used by badger were recorded through the Site. These were searched for evidence of badger such as latrines, hairs and prints and were followed to check for setts. Although no recent evidence of badger was found, given the suitability of the habitats at the Site to support sett building, foraging and commuting and the records of badger in the wider area, it is considered likely that this species may be found within the development footprint.

Badger is therefore evaluated as important at the Local level and brought forward for further assessment.

6.3.4.2 Otter

There were no records of otter *Lutra lutra* returned from the desk study. There are no habitats on site considered suitable to support otter, with waterbodies restricted to field drains that do not provide connectivity to the wider area.

Based on this, otter are not considered to be found on site and are not brought forward for further assessment.

6.3.4.3 Hedgehog

There are six records of hedgehog *Erinaceus europaeus* returned from the desk study. Evidence of hedgehog in the form of droppings was recorded during the Site visit. Hedgehogs are crepuscular / nocturnal species, and it is therefore difficult to find evidence of hedgehog during daytime inspections. Given the presence of habitats on the Site suitable to support hedgehog (such as hedgerow, rough grassland and scrub) it is considered likely that this species is present on the Site.

Hedgehog are therefore evaluated as important at the Local level and are brought forward for further assessment.

6.3.4.4 Red Squirrel

There are 19 records of red squirrel *Sciurus vulgaris* returned from the desk study. There was no evidence of red squirrel recorded during the site visit. The habitats on Site are suboptimal to support drey building and / or foraging where red squirrel will prefer open deciduous woodland.

As there is limited suitable habitat on Site and no connectivity from suitable habitats in the wider area it is considered unlikely that red squirrel are to be found on Site and are not brought forward for further assessment.

6.3.4.5 Pine Marten

There are 16 records of pine marten *Martes martes* returned from the desk study. No evidence of pine marten was recorded during the Site visit. The habitats on Site are considered to be suboptimal to support this species which preferences woodland for nest building and foraging.

As there is limited suitable habitat on Site and no connectivity from suitable habitats in the wider area, it is considered unlikely that pine marten are to be found on Site and are not brought forward for further assessment.

6.3.4.6 Bat

A bat survey of the Site was carried out in June 2023 as part of this planning application. This survey comprised a desk study, preliminary bat roost assessment (PRA) and two dusk surveys (carried out in May and June 2023).

The PRA included a derelict building to the southwest of the Site.

The derelict building was assessed for suitability to support roosting bats and was given the assessment of being of low suitability. One emergence survey was carried out as part of the walked transect at this building. This survey found no evidence of roosting bats.

There were no trees on the Site found to be high or moderate roost potential during the PRA. Trees within treelines at the Site were assessed in the PRA as being of low roost potential for bats.

A walked transect was carried out in May and June. Four bat species were recorded during these surveys:

- Common pipistrelle *Pipistrellus pipistrellus*;
- Soprano pipistrelle *Pipistrellus pygmaeus*;
- Leisler's bat *Nyctalus leisleri*; and,
- Nathusius' pipistrelle *Pipistrellus nathusii*.

Bat activity was found to be concentrated at the trees adjacent to the derelict building, and at treelines and hedgerows along the boundary of the existing quarry.

The bat survey report is attached as Appendix 6-1.

The Site has been assessed as being of low conservation value for bats. Bats are considered important at the Local level and brought forward for further assessment.

6.3.4.7 Bird Species

There are six species of protected birds returned from the desk study:

- Two (2No.) records of barn owl *Tyto alba*;
- Thirteen (13No.) records of great crested grebe *Podiceps cristatus*;
- Eleven (11No.) records of mallard *Anas platyrhynchos*;
- Fifteen (15No.) records of mute swan *Cygnus olor*;
- One (1No.) record of northern wheatear *Oenanthe Oenanthe*; and,
- Two (2No.) records of common snipe *Gallinago gallinago*.

All birds and their nests are protected during the breeding season. Common species such as robin *Erithacus rubecula*, wren *Troglodytes troglodytes*, rook *Corvus frugilegus*, jackdaw *Corvus monedula*, pied wagtail *Motacilla alba yarrellii*, white throat *Sylvia communis*, goldcrest *Regulus regulus*, buzzard *Buteo buteo* and wood pigeon *Columba palumbus* were observed feeding over adjacent land parcels and/or using the hedgerow on the boundary of the Site. Rooks were also observed roosting at the quarry face.

There is limited potential for birds recorded from the desk study to be found on Site where many are associated with open waterbodies or upland scrub. Barn owl, if nesting in the wider area, could utilise the greenfield area of the Site to forage.

The hedgerow and treelines present on Site are considered suitable to support nesting birds and the land parcels are suitable to support foraging birds.

The existing quarry face has potential to support nesting birds. As the survey was carried out outside of the nesting season, it cannot be verified whether the quarry is used for breeding birds.

Due to the assemblage of common species identified using the Site and suitable nesting and foraging habitat within the Site, and that the immediate area the Site is considered to be of local importance for bird species, birds are brought forward for further assessment.

6.3.4.8 Amphibians and Reptiles

Two species of amphibian were returned from the desk study: one record of smooth newt *Lissotriton vulgaris* and 21 records of common frog *Rana temporaria.* There were no records of reptiles returned from the desk study.

Wet grassland was identified within the surrounding land parcels to the south of the Site. This habitat is suitable for amphibian species. However, no sightings or evidence of amphibian species were identified during the site visit. There are ponds within the immediate area within the quarry which are not considered suitable to support amphibians as there is very sparse riparian vegetation and no macrophytes recorded. There is one pond in lands adjacent to the Site which is considered suitable to support amphibians. This pond is ca.90m^2 and has suitable macrophyte cover within and riparian vegetation on the boundaries to support amphibian breeding and refuge.

The surrounding fields comprise potential commuting habitat for reptiles and the scrub and recolonising bare ground at the top of the quarry face has potential to support basking and hibernacula for reptiles.

There is suitable habitat to support breeding and non-breeding amphibians within the Site and the immediate area.

Given the suitability of habitats present on Site it is considered that amphibians and reptiles have potential to be present within the Site.

Amphibians and reptiles would be evaluated as important at the Local level and are brought forward for further assessment.

6.3.4.9 Invertebrates

One record of marsh fritillary *Euphydryas aurinia* was returned from the desk study. While the species can be found on habitats present within the Site, such as grasslands, the absence of stands of the required larval foodplant, devil's-bit scabious *Succisa pratensis*, limits the suitability of the Site to support this species. There was no devil's-bit scabious recorded on the Site.

It is not considered likely that this species is found on Site given the absence of larval food plant.

6.3.4.10 Invasive Species

None of the invasive/non-native species noted in the desk study (section 6.2.5 above) were recorded within the Site during the field survey. There is however potential for the terrestrial invasive flora to be spread to the Site during construction and operation phases. There are limited habitats on the Site to support Sika deer *Cervus nippon* and the closest record of this species is ca. 8km from the Site.

The spread of terrestrial invasive species to the Site is considered important at the Local level and brought forward for further assessment.

6.3.5 Summary of Important Ecological Features

Table 6-6 below summarises all important ecological features for which detailed assessment is required. The geographical scale of importance for the ecological features within the Site are summarised along with their legal status and a rationale, where appropriate, for not carrying forward any features for detailed assessment.

Table 6-6: Summary of Important Ecological Features

Ecological Feature	Scale of Importance	Comments on Legal Status and/or Importance
Natura 2000 Sites	European	Statutorily protected sites.
Proposed Natural Heritage Areas	National	Nationally designated sites.
Area of Special Scientific Interest	National	Nationally designated Sites (Northern Ireland).
Scrub WS1	Local	Not statutorily protected. Provides good ecological resource for mammals, reptile and invertebrates.
Dry meadows and grassy verges GS2	Local	Not statutorily protected. Provides good ecological resource for mammals, reptile and invertebrates. Species rich habitat adding to overall biodiversity value of the Site.
Hedgerow WL1	Local	Not statutorily protected. TWP1 and TWP2 of the CDP state to minimise loss of hedgerow and trees in the county. Provides good opportunity for roosting, hibernating and foraging bats, nesting and foraging birds, with ground cover / understorey suitable to support commuting and foraging mammals.
Treeline WL2	Local	Not statutorily protected. TWP1 and TWP2 of the CDP state to minimise loss of hedgerow and trees in the county. Provides good opportunity for roosting, hibernating and foraging bats, nesting and foraging birds, with ground cover / understorey suitable to support commuting and foraging mammals.
Badger	Local	Protected in Ireland under the Wildlife Acts 2021. Badger are recorded in the wider area. There are habitats on Site considered likely to support badger.
Hedgehog	Local	Protected in Ireland under the Wildlife Acts 2021. Evidence of hedgehog is recorded on Site and there are records in the wider area. There are habitats on Site to support hedgehog.
Bats	Local	Bats are protected by law in the Republic of Ireland under the Wildlife Act 1976 and subsequent amendments. In addition to domestic legislation bats are also protected under Annex IV of the EU Habitats Directive (92/43/EEC). Bats and their roosts (whether occupied or not) are protected. Bats are recorded utilising the site for foraging and commuting.
Birds	Local	All bird species, their eggs and nests are protected under Wildlife Acts 1976 – 2021.

Ecological Feature	Scale of Importance	Comments on Legal Status and/or Importance
		The Site provides suitable nesting and foraging habitats for a range of bird species.
Amphibians	Local	Amphibians are protected under Wildlife Acts 1976 – 2021. Suitable habitats present in the site for breeding and non-breeding amphibians.
Reptile	Local	Reptiles (common lizard) are protected under Wildlife Acts 1976 – 2021. Suitable habitats present in the site for breeding and non-breeding amphibians.
Invasive species	Townland	Spread of invasive species is unlawful under Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations 2011 - 2021 listed in Part 1 and Part 2 of the Third Schedule within the Directive. CDP outlines a policy (ISP1) to prevent the spread of any invasive species.

6.4 Characteristics and Potential Impacts of the Proposed Development

6.4.1 Do Nothing Scenario

The potential value of the Site to support biodiversity would continue. The agricultural land and boundary lines (i.e., treeline and hedgerows) would continue to be managed as is with no potential change over time to the current value. Similarly, the quarry and quarry face would continue to be managed as part of the existing quarry works with no change to current ecological value.

The scrub habitat and meadow and wet grassland may further mature providing habitats for birds and mammals.

6.4.2 Potential Impacts on Designated Sites

An AA screening was prepared for and is submitted as part of this application. This information for the competent authority to assess that there are no significant effects from the Proposed Development on any Natura 2000 Site within the ZoI.

There are four other designated Sites that are considered to be hydrologically connected to the Site:

- Drumcor Lough pNHA 001841;
- Annagheane Lough pNHA 001836;
- Finn Floods ASSI; and,
- Lough Erne ASSI.

There is a discharge point located to the north of the quarry, discharging to a drain/drainage ditch that flows north towards Gortnana River. This river connects to the River Finn ca. 5km downstream and to Lough Oughter and Associated Loughs SAC ca. 12km downstream.

The outflow and associated drain / watercourses were surveyed in January 2023. This survey recorded algae in outflow pipe and the water being discharged from the outflow was a grey colour. The gravel and cobble on the stream bed was covered in a fine sediment layer and algae were observed to be growing on numerous large cobbles within the stream downstream of the outflow.

This discharge is monitored by Monaghan County Council. The licence (WP26/15) restricts the discharged water to 360m^3 per day and must not exceed certain parameters relating to:

- Temperature;
- pH;
- Biological Oxygen Demand;
- Suspended Solids;
- Molybdate reactive phosphate (as P); and,
- Total ammonia (as N).

The current discharge licence is sufficient to accommodate the quarry extension and output will continue to be monitored by Monaghan County Council.

Monitoring of the discharge point ensures that outputs from the quarry will not exceed allowable limits and therefore that no potential significant effect is predicted on any designated site hydrologically connected to the Site.

Should any potential pollutants enter the discharge watercourse, the dilution factor of at least 12km stretch of flowing watercourse is considered sufficient to negate significant impacts to the features of the relevant designated Sites.

There is no proposed water abstraction or significant effects on or to groundwater (see Chapter 8). There is, therefore, no predicted impact to designated sites indirectly connected to the Site.

There is no predicted effect from the Proposed Development on any designated site.

6.4.3 Potential Impacts on Habitats

6.4.3.1 Habitat Loss

Construction Phase

The construction phase (detailed in Chapter 3 above) relates to the preparation of agricultural fields for extraction.

There will be a permanent loss of habitats during the construction phase within the removal of overburden and creation of a haul road between Scotshouse Quarry and the Proposed Development. Although it is proposed that ca.220m of treeline and 190m of hedgerow will be retained around the boundary of the Site, the berms are proposed to be erected to the base of these trees, potentially causing damage to the trees which may cause them to fail and be permanently lost via compaction of roots and / or damage during works from machinery.

Habitat removal will be phased (see Chapter 3) as follows:

- Phase 2 – Removal of habitats to the southeast of the Site will largely include removal of agricultural grassland and hedgerows with smaller areas of scrub also to be removed; and,
- Phase 6 – Habitat removal will be required for the preparatory works which will be carried out concurrently with the operational phase of Phase 5. The habitat loss for removal of the overburden will include removal of scrub, hedgerow, dry meadows and grassy verges and wet grassland.

Both Phase 2 and Phase 6 will be carried out over a 3-month period for each, Phase 2 will be carried out first. There is no set proposed time scale for Phase 6, but it is considered that this will be up to 10+ years from planning approval.

The permanent loss of habitat for both Phase 2 and Phase 6 is considered to be a long-term negative effect.

Operational Phase

The operational phase is comprised of all Phases as described in Chapter 3 above. The habitat loss for these areas will be confined to the quarrying (ED4) within the existing quarry in addition to the quarrying of exposed rock from the construction phase.

The habitat loss during the operational phase is not considered to be significant.

6.4.3.2 Habitat Damage or Deterioration

There is potential for the introduction of scheduled invasive species to the Site, as there are records of scheduled invasive species in the wider area that have the potential to be spread to the Site via vehicles and machinery. Such introductions could result in a potential impact on the overall biodiversity of the Site and the further spread of these species to the wider area.

There is a potential impact on those hedgerows and treelines that will be retained during the Proposed Development from tracking of machinery through root compaction and cutting, in addition to instability of ground adjacent to trees / vegetation.

Quarrying activities generate dust that can impact surrounding habitats. Fugitive dust is typically deposited between 10 to 200m from the source depending on local environmental factors.

Large amounts of dust deposited on vegetation can lead to degradation of habitats. There are no sensitive habitats recorded within the Site or in the immediate area. Chapter 9 below looks at dust emissions from the Proposed Development and identified that with the implementation of appropriate mitigation measures, the potential effects from dust would be imperceptible.

6.4.3.3 Pollution

Without mitigation, quarrying operations have an associated risk of pollution from fuel spillages, oil leakages and other accidents. Contamination of groundwater and surface water run-off may lead to the degradation of water quality in the vicinity of the site, consequently impacting the habitats and species present in any affected waterbody.

Without mitigation, ground disturbance, the stripped of vegetation and storage of stripped soils near any watercourse or close to groundwater increases the risk of material being washed into watercourses during flood events or periods of heavy and prolonged rainfall. Resultant increased turbidity levels and sedimentation will potentially impact water quality. There is also the potential mobilisation of a variety of substances that may be contained within the soils.

Quarrying operations also have the potential to cause alterations to localised groundwater levels and surface water flows through extraction activities, dewatering and discharge of water.

6.4.3.4 Summary of Predicted Impact on Habitats

Table 6-7 below outlines the predicted impacts on habitats associated with the Proposed Development and the potential scale of significant effects.

Table 6-7: Predicted Impacts on Habitats and Associated Scale of Significance

Habitat	Indicative Area Affected	Potential Scale of Significance
Scrub WS1	0.8ha	Long-term negative effect
Dry meadows and grassy verges GS2	1.6ha	Long-term negative effect
Hedgerow WL1	1300m *1110m lost*	Long-term negative effect

Habitat	Indicative Area Affected	Potential Scale of Significance
	190m potentially damaged	
Treeline WL2	223m potentially damaged	Long-term negative effect
Water – ground and surface	N/A	Long-term negative effect

6.4.4 Potential Impacts from Invasive Species

No high impact or invasive species recorded in the Third Schedule of the Habitat Regulations were recorded during the field survey.

There is potential for the spread of invasive species from the wider area to the Site, in particular from machinery / equipment brought in acting as vectors. The potential for the spread of invasive species is considered to be a long-term negative impact.

6.4.5 Potential Impacts on Fauna

6.4.5.1 Potential Impacts on Mammals (excluding bats)

Site clearance has potential to result in the mortality of small mammals and will destroy breeding and resting sites. Although there was no evidence of badger setts within the Site, it is considered likely that badger and other larger mammals (e.g., red fox *Vulpes vulpes*) will be found utilising the site for foraging and / or commuting. Site clearance for the Proposed Development will remove foraging and resting places for these mammals.

Site clearance is considered to be a short-term negative effect on mammal species (excluding bats) where there is similar habitat in the immediate area to support displaced animals.

Mortality of small mammals, such as hedgehog, during site clearance is considered to be a long-term negative impact on local populations.

An increase in noise and activity for the Proposed Development has potential to impact mammals in the short- term where mammals will become habituated to any additional noise from the operational phase. A long-term impact is considered to be imperceptible when there are already existing quarry operations in the immediate area to which mammals will be accustomed. The increase will be phased through the extension area and consequently mammals will become habituated as the works progress.

6.4.5.2 Potential Impact on Bats

The Site has been assessed as being of low potential to support bats (see the Bat Survey Report in Appendix 6-1). Four bat species were recorded on Site during field surveys. The potential impact to bats is the permanent loss of low value foraging and commuting habitat. The bat survey report did not find any bat roosts in the survey area. There are suitable habitats for foraging and commuting in the immediate and wider area. From the results of the bat survey, the potential impact on bats is considered to be long-term medium impact.

6.4.5.3 Potential Impact on Birds

Bird species recorded during the field survey are commonly occurring species and are considered likely to use the hedgerows, treeline and scrub habitats as a nesting and foraging resource. The removal of these habitats will have a short-term negative impact on local bird populations. There are suitable habitats in the immediate area that can be utilised in the long-term by displaced birds.

Rooks were recorded roosting on the quarry face and there is potential for birds to use the quarry face for breeding during the nesting season. There is, therefore, potential for quarry nesting bird species to be impacted by the Proposed Development, and this is considered to be a long-term negative effect.

There is potential for birds to be impacted by an increase in noise and activity during the extension works. This is considered to be a short-term imperceptible impact where there are suitable similar habitats in the immediate area that birds can utilise to avoid long-term effects of the increase in disturbance impacts.

6.4.5.4 Potential Impact on Amphibians

There is one pond recorded in the immediate area that has potential to support breeding amphibians. The current site plan indicates that this will not be directly impacted by the Proposed Development. There is potential that the water quality and water levels may be indirectly impacted by the Proposed Development, thereby reducing breeding habitat for local amphibian populations. This is considered to be a short-term negative impact where amphibians have capacity to disperse to other breeding habitats in the wider area.

There are habitats on Site considered suitable to support the non-breeding phase for amphibians. Clearance of these habitats has potential to cause mortality and remove non-breeding habitats. This is, however, considered to be a short-term imperceptible impact where amphibians can re-populate habitats at the potential breeding pond (ca. 200m distant) and away from the proposed work area.

6.4.5.5 Potential Impact on Reptiles

The Construction Phase of the Proposed Development has potential to cause incidental mortality to reptiles, in addition to removing refugia and foraging resources. Potential disturbance to reptile populations is presumed present within scrub and recolonising bare ground habitats.

Common lizards have capability to move away from a potential disturbance and there are habitats within the existing quarry that would support basking, and additionally scrub is found in the wider area that would provide foraging and refugia resource.

The impact on reptile populations is considered to be a short-term imperceptible impact.

6.5 Proposed Mitigation Measures and/or Factors

6.5.1 Current Mitigation Measures

As outlined in Chapter 3 above, the original planning permission (Ref: 83/09) outlines requirements for the working of the site that include:

- Suppression of dust;
- Limits on noise levels;
- Prohibition of surface water flow onto the public road;
- Storage of topsoil against future site restoration; and,
- Planting of native trees / retention of hedges to act as a screen.

Over the history of the quarry these measures have been adhered to with no complaints made to or enforcement notices made by Monaghan County Council.

6.5.2 Mitigation by Avoidance/Reduction (Sensitive Design)

The Proposed Development will be phased starting within Zone A before moving into Zone B1 (see section 3.3.3 above). The overburden removed during the Construction Phase in Zone B1 will be used to create berms on the site boundaries. These berms are proposed to be 4m wide and 2m high and will be planted up with native trees and shrub. The berms will reduce

emission effects to air and provide an area for biodiversity protection for the duration of the operation phase and will form part of the overall restoration plan.

The extraction areas will maintain a buffer with adjoining lands of ca. 9m where the berms will be erected which will minimise disturbance from the works around the Site and to the immediate area. Care will be taken where activities are being completed in proximity to existing hedgerows to avoid potential root damage.

Dust suppression mechanisms are prescribed in Chapter 9 below thereby minimising the potential impact from dust on habitats and species in the wider area.

6.5.2.1 Measures for Pollution Control

There are a number of existing measures in place that will be applied to the Proposed Development to protect ground and surface water from pollution. These include:

- All plant and HGVs are refuelled onsite on a concrete plinth which flows into settlement tanks and via a hydrocarbon interceptor before discharge to any watercourse;
- Fuel is and will continue to be stored within a double skinned tank purpose-built bunded tank inside a covered garage. All on-site mobile plant and equipment are refuelled on the concrete plinth next to the fuel garage by trained personnel, with suitable drip trays and easy access to emergency spill kit;
- Oils and other maintenance liquids are and will continue to be stored in the main site garage, on hard standing, in barrels and other containers;
- Any oil or lubricant changes or routine servicing of wheeled or tracked plant are and will continue to be undertaken outside of the Site boundary;
- All site plant will be inspected at the beginning of each day prior to use. Defective plant shall not be used until the defect is satisfactorily fixed; and,
- Vehicles entering the site will be in good working order, free from leakage of fuel or hydraulic fluid.

It is proposed that summer and winter benching will be carried out within the Proposed Development. This will ensure the availability of dry working should there be increased influx from stormwater or an unexpected increase in inflow in winter. There are no watercourses within the Proposed Development. There is connectivity to flowing drains and watercourses in the wider area, specifically via the discharge to the north of the Site. The existing quarry discharges water under licence (WP26/15) which is monitored by Monaghan County Council. This licence will continue to be used by the quarry for all extension works. The capacity of the licence (360m^3/day) will be adhered to for all extension works.

The discharge licence requires that any discharge from the quarry passes through the hydrocarbon interceptor before discharge.

Currently all surface water is managed through diversion to existing settlement ponds. Surface water in the Proposed Development will be managed similarly. During the Operational Phase, the phasing design will include for a low point on the Site to be maintained, thereby ensuring that water will remain on Site. This low point will act as a sump to hold water that may be encountered, e.g., from stormwater or groundwater faults. Where necessary, water from the sump will be pumped to settlement ponds which will all outflow to the existing discharge point to the north of the Site. Any water that requires to be pumped will be done so within the remit of the existing discharge licence.

Elevated ammonia has been recorded from the discharge during routine monitoring. The primary source of this ammonia is considered likely to be from surrounding farmland. The extension lands cover the majority of the catchment which contributes surface water to the Site from upgradient farmland. As part of the Proposed Development these lands will change

from agricultural use to quarrying, thereby reducing the potential for ammonia entering the quarry and being discharged from the site in the long term.

6.5.2.2 Protection of Stockpiled Soil

During the Construction Phase, the overburden will be stripped and used to create berms around the Proposed Development. These berms will be planted with fast growing native species to minimise the release of sediment.

All stockpiled spoil will be stored in an area designated prior to works commencing. This area will be at least 10m from any open watercourse or waterbody including areas of groundwater recharge.

6.5.2.3 Measures for Bats

The most sensitive habitats for bats have been recorded within Phase 2 and Phase 6.

Site clearance will be carried out in a phased manner, with Phase 2 commencing first and Phase 6 unlikely to start for up to ten years thereafter pending market conditions (not including the derelict stone building – this will be removed during phase 2 preparation works).

The mitigation measures to protect bats during all stages of work are outlined in the bat survey report (see Appendix 6-1). These measures include supervision of mature trees and supervision of the derelict building during demolition. All supervision will be done by a suitably qualified and licensed ecologist.

The mitigation measures outlined in the bat survey report apply if works are to take place within 18 months of the survey. Should demolition works / tree felling be carried out more than 18 months after the survey, a reassessment of these features for suitability to support bats is recommended to confirm absence before works. This recommendation is in line with the CIEEM advice note for survey and report validity [65] and advice will be sought from a suitably experienced ecologist if required.

Other general mitigation measures to minimise/reduce disturbance to bats are described below.

The timing for processing works is proposed to be between 08:00-18:00 on weekdays and shorter at weekends / public holidays. Therefore, during the active bat season (April to October inclusive) quarrying and processing activities will predominantly be undertaken during hours of daylight when bats are typically roosting, thereby reducing the impact of construction and operational phases on foraging and commuting bats.

Any lighting required for the works will be low level spot lighting and will be directed to works areas (i.e., vehicle loading and processing areas). No lighting will be directed on boundary features during either the construction or operational phases.

The proposed landscape and restoration plans will be of benefit to local bat populations as the boundary hedgerow and treelines mature and disused areas revegetate over the long term.

6.5.2.4 Measures for Birds

No vegetation suitable to support nesting birds such as treeline, hedgerow and scrub will be cleared within the breeding bird season (March to August inclusive). If this is, however, unavoidable, a suitably experienced ecologist will be consulted to advise on how to proceed.

No nesting birds were recorded on the quarry face during the field survey. However, the survey was carried out outside of the breeding bird season. Therefore, if works to the quarry face are to be carried out within the breeding bird season, a breeding bird check should be carried out in the appropriate time of year before any works take place.

6.5.2.5 Measures for Invasive Species

There is a wheel wash located at the only entrance to Scotshouse Quarry This is currently in use and will continue to be used by every vehicle, thereby reducing the likelihood of the spread of invasive alien species.

6.5.3 Ecological Enhancement Measures

A restoration plan has been produced for the quarry extension and is supplied as a separate document as detailed in section 3.7 above. The restoration plan outlined will result in the following (approximate) areas:

- Vegetated berm: The sloped side of the 4m x 2m berm will measure ca.2.8m, with the total length of the berms being ca. 1.5km. Both sides of the berm will be planted giving a total area of ca 8,500m^2. These berms will be well established before the cessation of operations;
- Open water: ca. 10ha;
- Vegetated benches: The numbers of benches will vary between and within each extraction area. Each bench will have a width of ca.7 – 8 metres and will be up to 1.5km in length. These benches will be planted as per Figure 3-3 above. The precise area available for restoration phase planting cannot be determined until the benches have been worked; and,
- Side slopes of quarry: During and after the restoration phase, the sides of the quarry will naturally vegetate to a certain degree.

The proposed restoration plans will include allowing the groundwater table to replenish to static levels covering the Site following cessation of operations.

It is proposed that planted berms will be allowed to naturalise and mature providing commuting, foraging, refuge and breeding resource for fauna found in the wider area thereby improving the overall biodiversity in the long term. These berms may also support sett building by badger which are recorded in the wider area, thereby providing, additional resource for reproduction, encouraging genetic diversity necessary for healthy populations.

It is proposed to allow the water levels to reach static levels up to ca103 - 105mOD, with seasonal variation. The slopes of the restored quarry will be allowed to naturally re-vegetate over time.

The passage of fauna from the wider area will be retained via mammal passes in the boundary security fence.

A suitably qualified arborist will be consulted to advise on potential loss of trees/hedgerows within the Site and along the boundary where the berms will be erected. The arborist will visit and monitor the existing treeline/hedgerow and complete supplemental planting if necessary.

The berms will be allowed to naturalise and further mature on cessation of the operation.

Bat and bird boxes are proposed to be erected around the perimeter of the quarry on cessation of operations. These will be erected on advice from a suitably experienced ecologist, informed by site specific surveys.

Once quarrying activities cease in each phase and disturbance (light and noise) dissipate, with vegetation allowed to naturalise and regenerate, connectivity within the Site from the immediate areas will be improved. Any fauna species displaced during the operational phase will re-colonise the extension area.

The restoration plan does not include the active planting of the cliff faces. However, over a period of time the quarry cliff faces will naturally re-vegetate to a degree, providing nesting resources for birds. Foraging and commuting bats will benefit from an increase in vegetation cover.

The open water will attract a range of fauna, particularly amphibians and waterbirds, improving the local biodiversity. The open water body is likely to become part of the network of open waterbodies in the immediate and wider area providing nesting and foraging resources for aquatic fauna, in addition to encouraging genetic diversity for the local aquatic fauna populations.

6.6 Cumulative and In-Combination Effects

The planning portal for Monaghan County Council [19] was reviewed to understand the potential cumulative impacts from the quarry extension. The planning application within the ZoI are largely small-scale single / double storey dwelling upgrades or developments. There are no largescale developments which, when completed, would act in-combination with the quarry extension and thereby have a cumulative impact on the immediate and wider environment and designated sites.

6.7 Interactions with other Environmental Attributes

Biodiversity interacts with the following environmental attributes:

Chapter 7 – Land, Soils and Geology: Any impact or change of land or soil that could negatively impact underlying ecological conditions has the potential to impact local ecosystems via disturbance to both fauna within the soil and local flora. These potential effects have been considered in Chapter 6.

Chapter 8 – Water: Any pollutants or contaminants that enter the local watercourses could impact on local biodiversity. This has been considered in both Chapter 6 and Chapter 8, with the conclusion that no potential significant effect is predicted.

Chapter 9 – Air Quality: Poor air quality can have negative impacts on local ecosystems.

Chapter 10 – Climate: Increases in GHGs and the resulting changes to the climate can negatively impact habitats, surroundings and biodiversity.

Chapter 11 – Noise and Vibration: Fauna are often sensitive to disturbances causes by noise and vibration.

Chapter 12 – Landscape and Visual Impact: The changes to the local landscape arising from the Proposed Development include changes to land cover, which have the potential to impact on local biodiversity. This loss of habitat has been considered in detail within Chapter Six, with the conclusion that there will be no significant impacts.

6.8 Indirect Effects

There have been no significant or likely indirect effects identified outside of those previously assessed throughout the Chapter.

6.9 Residual Effects

Based on the information outlined in this chapter, it is considered that, with suitable mitigation in place, the Proposed Development will not result in adverse effects on the ecological environment in the long term.

There are no habitats on site that are considered to be of significant ecological value and there is no predicted impact on any designated site within the zone of influence.

The phasing of the Proposed Development will help to mitigate any immediate impacts by allowing mobile species that have potential to be found on site to dissipate to similar habitats within the immediate area.

The retention of existing hedgerows and treelines along the quarry boundary will maintain connectivity from the Site to the wider areas.

Restoration plans for the Construction Phase (e.g., vegetated berms) and on cessation of the operation will enhance the Site in the long term.

Negative residual impacts are limited to minor long-term impacts. These are not considered to be ecologically significant. Table 6-8 below outlines the residual impacts and effects on important ecological features recorded in the zone of influence.

Table 6-8: Predicted Impacts on Habitats and Associated Scale of Significance

Ecological Feature	Scale of Importance	Potential Impact	Potential Effect	Potential Significance	Mitigation	Significance of Residual Effect
Natura 2000 Sites	European	No potential impact	N/A	N/A	N/A	N/A
Proposed Natural Heritage Areas	National	No potential impact	N/A	N/A	N/A	N/A
Area of Special Scientific Interest	National	No potential impact	N/A	N/A	N/A	N/A
Scrub WS1	Local	Habitat loss	Loss of cover within the site	Significant at the local level	Planting up of berms and allowing to naturalise	Not significant
Dry meadows and grassy verges GS2	Local	Habitat loss	Loss of cover within the site	Significant at the local level	Planting up of berms and allowing to naturalise	Not significant
Hedgerow WL1	Local	Habitat loss	Loss of cover within the site	Significant at the local level	Planting up of berms and allowing to naturalise	Not significant
		Damage during construction and operation	Loss of cover within the site	Significant at the local level	Consultation with Arboricultural consultant on tree protection measures. Supplemental planting to be completed if deemed necessary during the operational phase.	Not significant
Treeline WL2	Local	Damage during construction and operation	Loss of cover within the site	Significant at the local level	Consultation with Arboricultural consultant on tree protection measures. Supplemental planting to be completed if deemed necessary during the operational phase.	Not significant
Mammals	Local	Habitat loss / disturbance	Loss of cover for foraging	Significant at the local level	Planted areas within the Site will provide foraging, refuge and commuting resource.	Not significant

Ecological Feature	Scale of Importance	Potential Impact	Potential Effect	Potential Significance	Mitigation	Significance of Residual Effect
Bats	Local	Removal of potential foraging and commuting habitat	Potential disturbance / displacement to foraging and commuting bats	Significant at the local level	Erection of bat boxes as part of restoration plans Planting up of berms and allowing to naturalise. Retaining boundary treeline and hedgerows	Not significant
Birds	Local	Habitat loss / disturbance	Loss of cover for nesting and foraging	Significant at the local level	No vegetation suitable to support nesting birds will be removed during the active breeding bird season. Planted areas within the Site will provide foraging, refuge and nesting resource.	Not significant
Amphibians	Local	No potential impact	N/A	N/A	N/A	N/A
Reptile	Local	No potential impact	N/A	N/A	N/A	N/A
Invasive species	Townland	Potential for the spread to the Site from the wider area.	Spreading of invasive species would be detrimental to native species found within the Site.	Significant at the local level	Wheel wash at entrance to quarry to be used by all vehicles.	Not significant

6.10 Monitoring

An arborist should visit the Site at appropriate intervals during the operational phase of the Proposed Development to monitor the success of the planting on the proposed berms. The arborist will also monitor the existing hedgerow and treeline for effects from onsite activities. If necessary, supplemental planting or other measures to safeguard these features will be implemented.

A habitat management plan is recommended to be prepared by a suitably qualified ecologist to outline key areas for monitoring. Post restoration, ideally two (2No.) years on, the Site should be visited by suitably qualified ecologists to report on the effectiveness of the restoration plan and provide any advice to the client should any parts of the plan require modification. Following this initial visit, a qualified arborist will visit as necessary to assess the planting in the berms and the existing hedgerows.

6.11 Reinstatement

The restoration phase of the Proposed Development outlines how the site will be restored to an inert state. This phase and potential associated effects have been considered throughout this Chapter.

6.12 Difficulties Encountered in Compiling this Information

No difficulties were encountered in compiling this information.

7 LAND, SOILS & GEOLOGY

7.1 Introduction

This chapter of the EIAR provides a description and assessment of the likely effects of the Proposed Development on land, soils and geology within and in the vicinity of the Site.

7.2 Methodology

7.2.1 Legislative Context

The importance / sensitivity of the geological receptors within the Site was assessed on completion of the desk study as set out in Table 3-4 of the EPA's 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports'. The Guidelines are formally adopted and published by the EPA [8].

In addition to the EPA Guidelines, the assessment was carried out in accordance with the following guidance and tailored accordingly based on professional judgement:

- Institute of Geologists Ireland (IGI) Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements [66];
- National Roads Authority (NRA) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes [67];
- Department of Environment, Heritage and Local Government Quarries and Ancillary Activities - Guidance for Authorities [12];
- EPA Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [14]; and,
- Institute of Environmental Management & Assessment (IEMA) Guide: A New Perspective on Land and Soil in Environmental Impact Assessment [68].

7.2.2 Desk-based Study

A desk-based study of the Site was conducted using available geological information held by the Geological Survey of Ireland (GSI) for the general area and any available site-specific information, including the findings from onsite drilling of boreholes. The following sources were reviewed for this purpose:

- Geological Survey of Ireland (GSI) Public Data Viewer [69];
- Environmental Protection Agency (EPA) Online Mapping [28]; and,
- Petersen Drilling Services Ltd. Rotary Drilling logs.

7.2.3 Site Investigations

An intrusive site investigation was undertaken to characterise the geological and hydrogeological environment in November 2022. Seven groundwater monitoring wells (GW2 - GW6, GWB, GWD) were installed within the Land Ownership Boundary. The monitoring wells were installed at depths ranging from 10mbgl (GW4) to 82mbgl (GW3). During the installation works the MOR consultant noted changes on the lithological profile and evidence of water present within the bedrock. The borehole logs are shown in Appendix 7-1. An observation of the quarry faces was undertaken by the MOR specialist to record and log any visible water seepages.

An initial topographical site survey was undertaken in June 2022. Following the installation of the boreholes, follow up surveys linking all borehole locations to Ordnance Datum were supplied on 16th December 2022 and 13th July 2023 by Earth Science Partnership.

7.2.4 Impact Assessment Methodology

The importance / sensitivity of the geological receptors was assessed on completion of the desk study. Using the 2008 NRA Guidance [67] an estimation of the importance / sensitivity of the geological environment within the study area is set out in Table 7-1 below.

Table 7-1: Estimation of Importance of Geology Attributes

Importance	Criteria	Typical Example
Very High	Attribute has a high quality, significance or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and / or soft organic soil underlying route is significant on a national or regional scale.	• Geological feature rare on a regional or national scale (NHA). • Large existing quarry or pit. • Proven economically extractable mineral resource.
High	Attribute has a high quality, significance or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and / or soft organic soil underlying site is significant on a local scale.	• Contaminated soil on site with previous heavy industrial usage. • Large recent landfill site for mixed wastes. • Geologically feature of high value on a local scale (County Geological Site). • Well drained and / or high fertility soils. • Moderately sized existing quarry or pit. • Marginally economic extractable mineral resource.
Medium	Attribute has a medium quality, significance or value on a local scale. Degree or extent of soil contamination is moderate on a local scale. Volume of peat and / or soft organic soil underlying site is moderate on a local scale.	• Contaminated soil on site with previous light industrial usage. • Small recent landfill site for mixed wastes. • Moderately drained and / or moderate fertility soils. • Small existing quarry or pit. • Sub-economic extractable mineral resource.
Low	Attribute has a low quality, significance or value on a local scale. Degree or extent of soil contamination is minor on a local scale. Volume of peat and / or soft organic soil underlying site is small on a local scale.	• Large historical and / or recent site for construction and demolition wastes. • Small historical and / or recent site for construction and demolition wastes. • Poorly drained and / or low fertility soils. • Uneconomically extractable mineral resource.

7.3 Receiving Environment

7.3.1 Current Land Use and Site Description

The Site can be divided into Zone A and Zone B. Zone A is comprised of lands in the northern portion of the Site previously subjected to extraction and is currently the subject of an application for substitute consent (A full description of the history of the Site is provided in Section 2.2). Zone B is comprised of agricultural land in the southern portion of the Site.

7.3.2 Topography

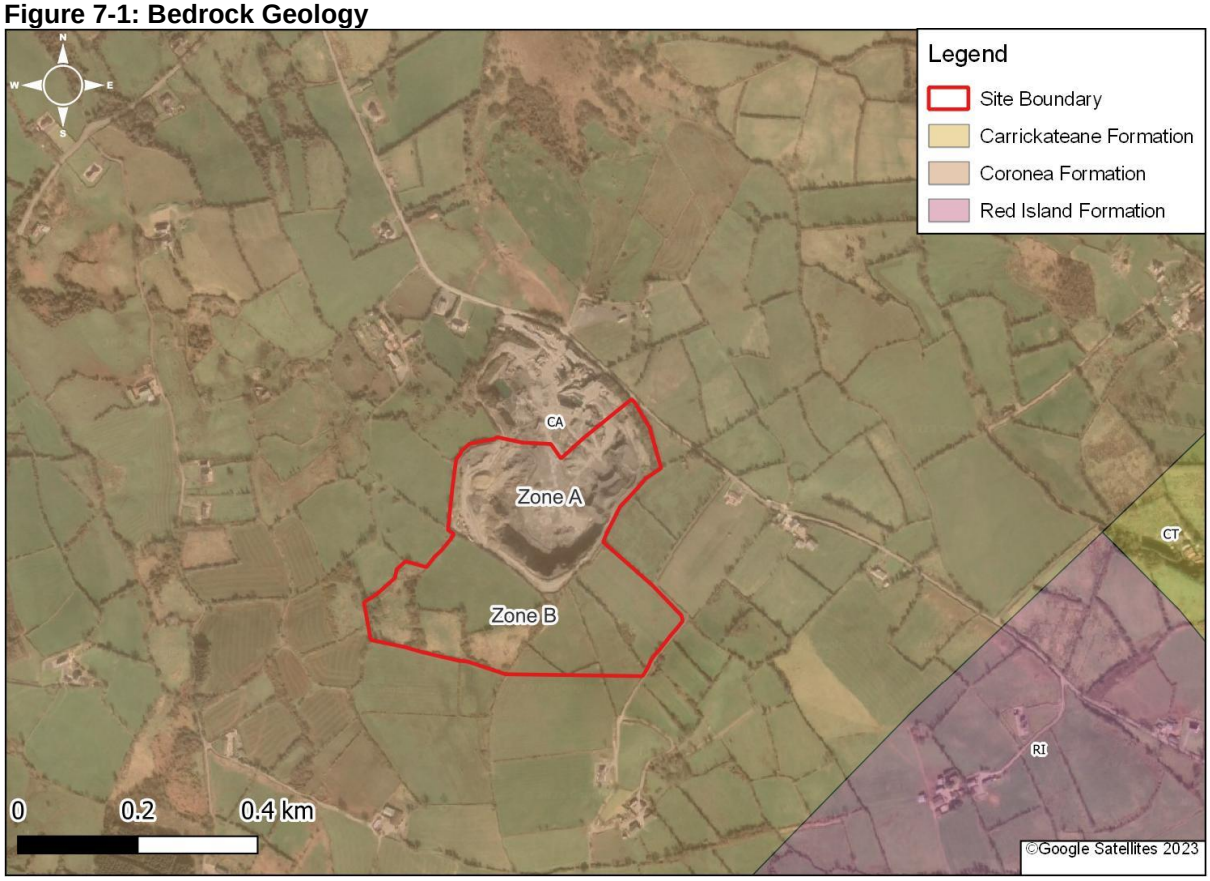
Based on the topographic survey, the lands within Zone A have been extracted to a depth of approximately 105mOD, at the lowest point. Topography around the periphery of Zone A varies between 115-135mOD.

The extension comprising Zone B of the Site are approximately 130mOD, with an increase in topography generally to the south, the highest point being in the southeast at 151mOD.

7.3.3 Bedrock Geology

According to GSI mapping, the bedrock beneath the Site comprises of pale to dark green, non-calcareous greywackes with beds of red shale known as the Coronea Formation as shown in Figure 7-1 below. This is mainly consistent with the geology encountered during the installation of groundwater monitoring wells. However, red shale was not observed during the drilling process. The greywacke bedrock was interbedded with shale/mudstone layers of darker colour and consistency. This was also observed at the quarry faces.

Figure 7-1: Bedrock Geology



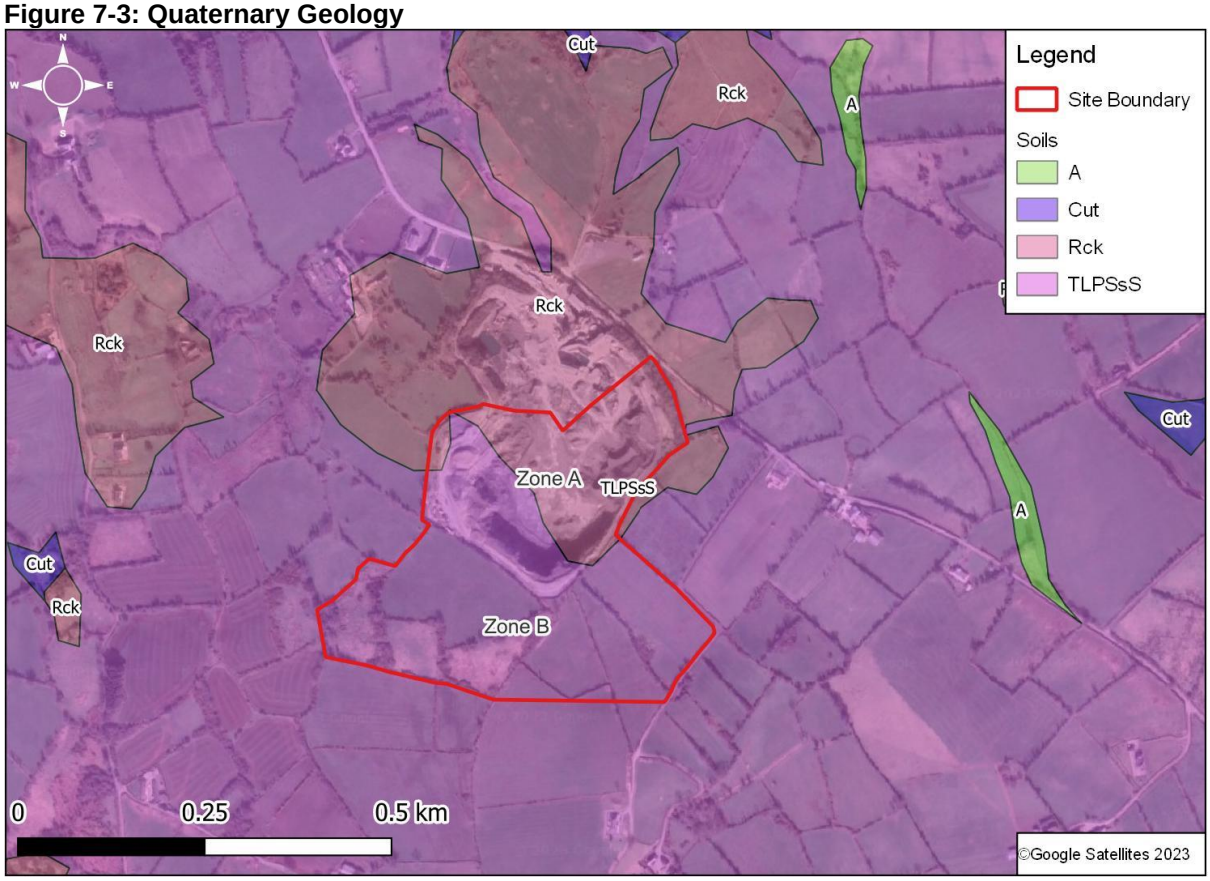
Water was observed within the wells during the drilling process. Water seepage from the quarry walls was not observed during Site visits. The locations of the newly installed groundwater wells are shown in Figure 7-2 below.

Figure 7-2: Groundwater Monitoring Wells

7.3.4 Quaternary Geology

According to the GSI database [69], the Site is located within a region of near surface bedrock outcrop/subcrop (Rck), with the north-eastern section of the Site being situated over an area of near surface bedrock outcrop/subcrop (Rck). From the site inspection and aerial photographs, it can be confirmed that the entirety of Zone A includes the existing Scotshouse Quarry as extraction activities have removed soils and subsoils in that area. Till derived from Devonian and Carboniferous sandstones and shales (TLPSsS) comprise the southern region (Zone B) of the Site, forming southern agricultural fields that the Proposed Development seeks to extend into. See Figure 7-3 below.

Figure 7-3: Quaternary Geology



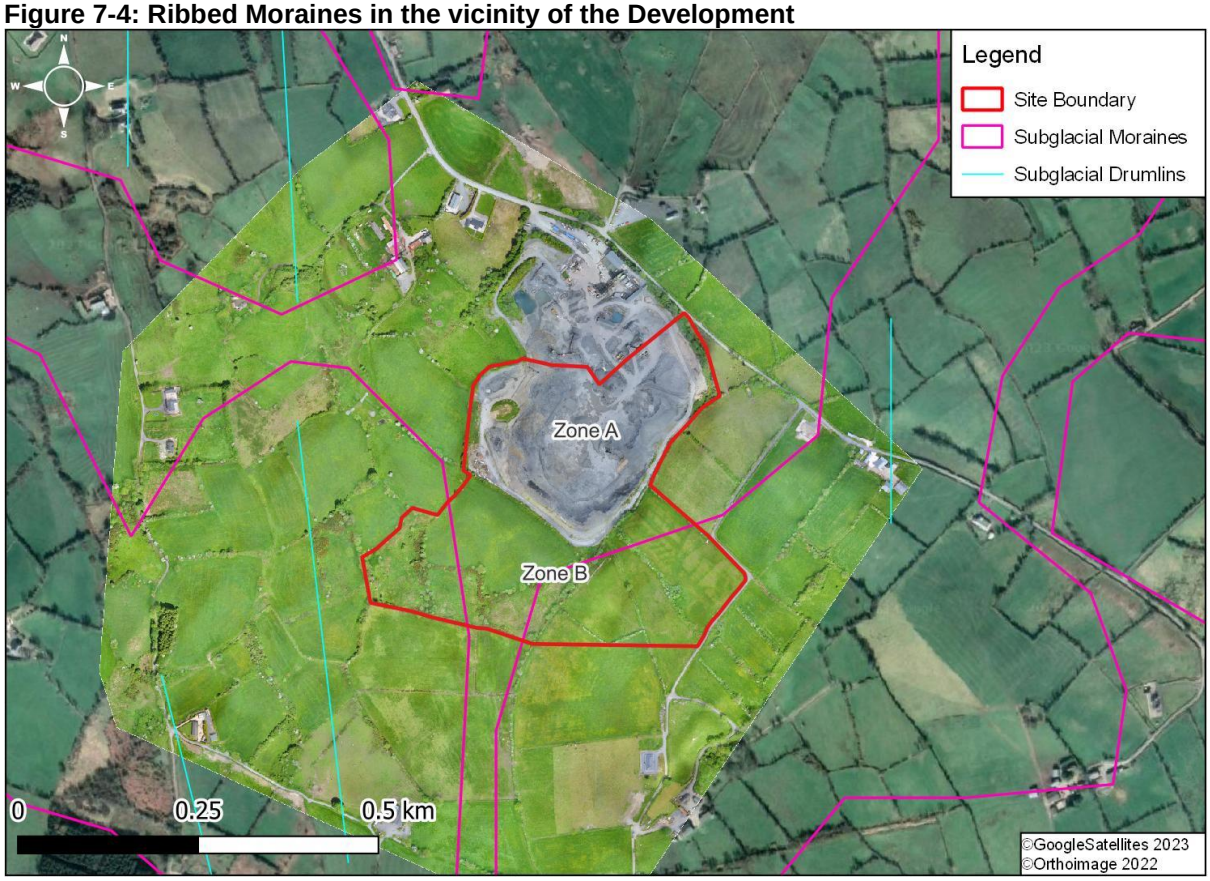
7.3.5 Glacial Landforms

The Site is located within a region of glacial landforms and is surrounded by multiple mapped ribbed moraines, with two moraines intersecting within Zone B of the Site.

Drumlins with a north-south trend lie within some surrounding moraines, with the closest ca. 50m to the west, as shown in Figure 7-4.

Moraines are glacial till deposits consisting of material eroded and/or transported through glacial activity before deposition occurs. Ribbed moraines specifically have multiple theories on the specific mechanics of their formation, but no consensus has been reached. Such moraines are occurring often in regularly spaced groups and have large, wavy ridges on each moraine [70] [71]. Drumlins are elongated hills in the shape of an inverted spoon, formed from glacial reworking of underlying till or moraine.

Figure 7-4: Ribbed Moraines in the vicinity of the Development



7.3.6 Geological Heritage

The Site lies within a Monaghan County Geological Site (CGS) – the Scotshouse-Redhills Cross-cutting Ribbed Moraines, covering approximately 4,280ha over an area covering ca.12km east-to-west point and ca.6.5km north-to-south and sitting partly within County Monaghan and partly within County Cavan. The Quarry Site itself lies close to the north-eastern edge of the CGS.

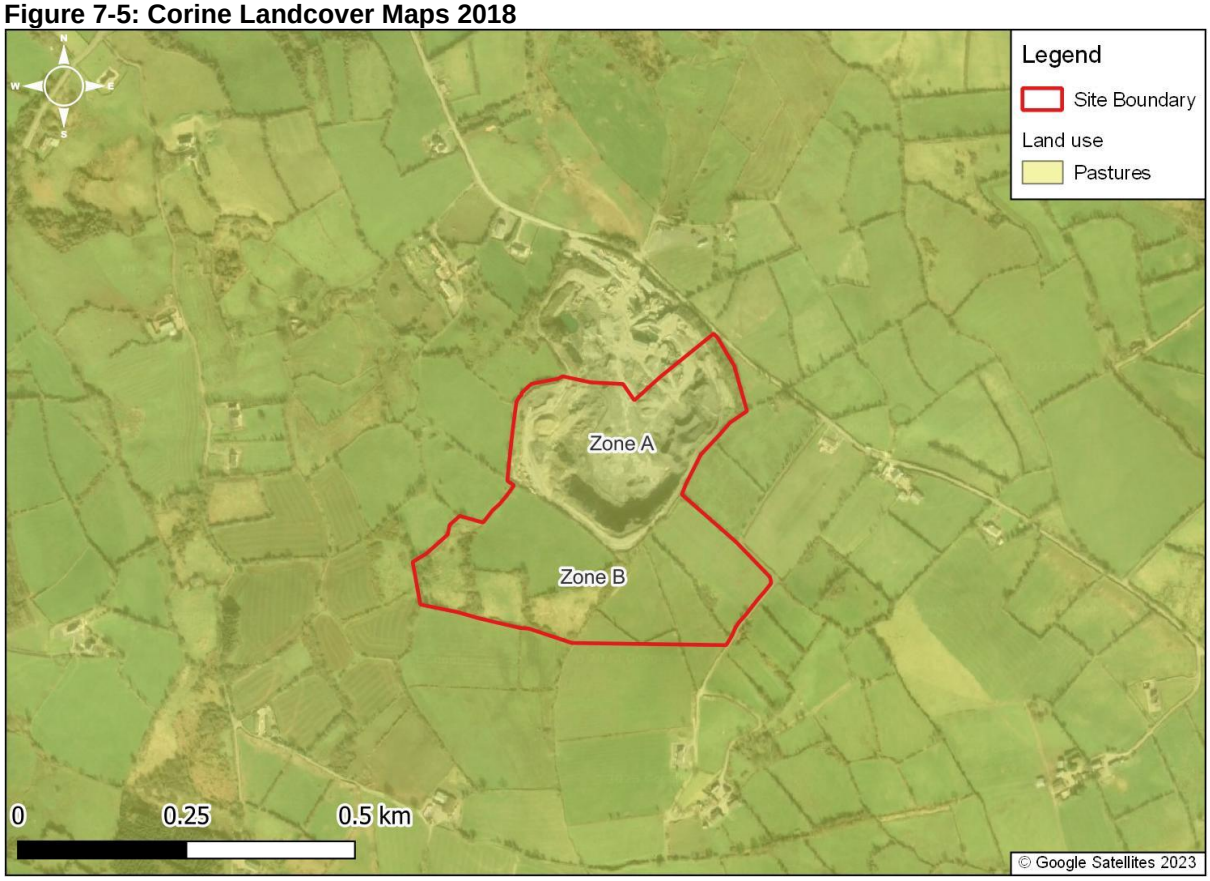
According to "*The Geological Heritage of Monaghan, 2013*" [72], this forms part of the larger Rockcorry-Cootehill ribbed moraine field – the largest field of ribbed moraines in the world. The Scotshouse-Redmills moraines are unique in that they are the only moraine field in the world to record two separate ice-flows, having been deposited by ice sheets moving in a south-westerly direction during the early part of the last glaciation and then in a south-easterly direction during the peak of the last Ice Age [72]. The report states [72]:

> *"These are the largest individual ribbed moraine features anywhere in the world and therefore one of the most important geological terrains in Ireland."*
>
> *"The features are too large to undertake any conservation efforts on their part, but the landscape itself is noteworthy and should be promoted as unique amongst landscape elements within both the Monaghan County Development Plan, and in Landscape Characterisation."*

7.3.7 Economic Geology

Land use within the Site has transitioned from agricultural usage as pastures, as shown in Figure 7-5 below, to a mineral extraction site in Zone A, though the Corine Land Cover inventory [73] has not yet changed to reflect this. The extension lands in Zone B are agricultural pasture.

Figure 7-5: Corine Landcover Maps 2018



The GSI database [69] shows that the Site is mostly in an area of Very High Potential for crushed-rock aggregate, with a small region of high and moderate aggregate potential in the southeast corner of the Site.

7.3.8 Soils

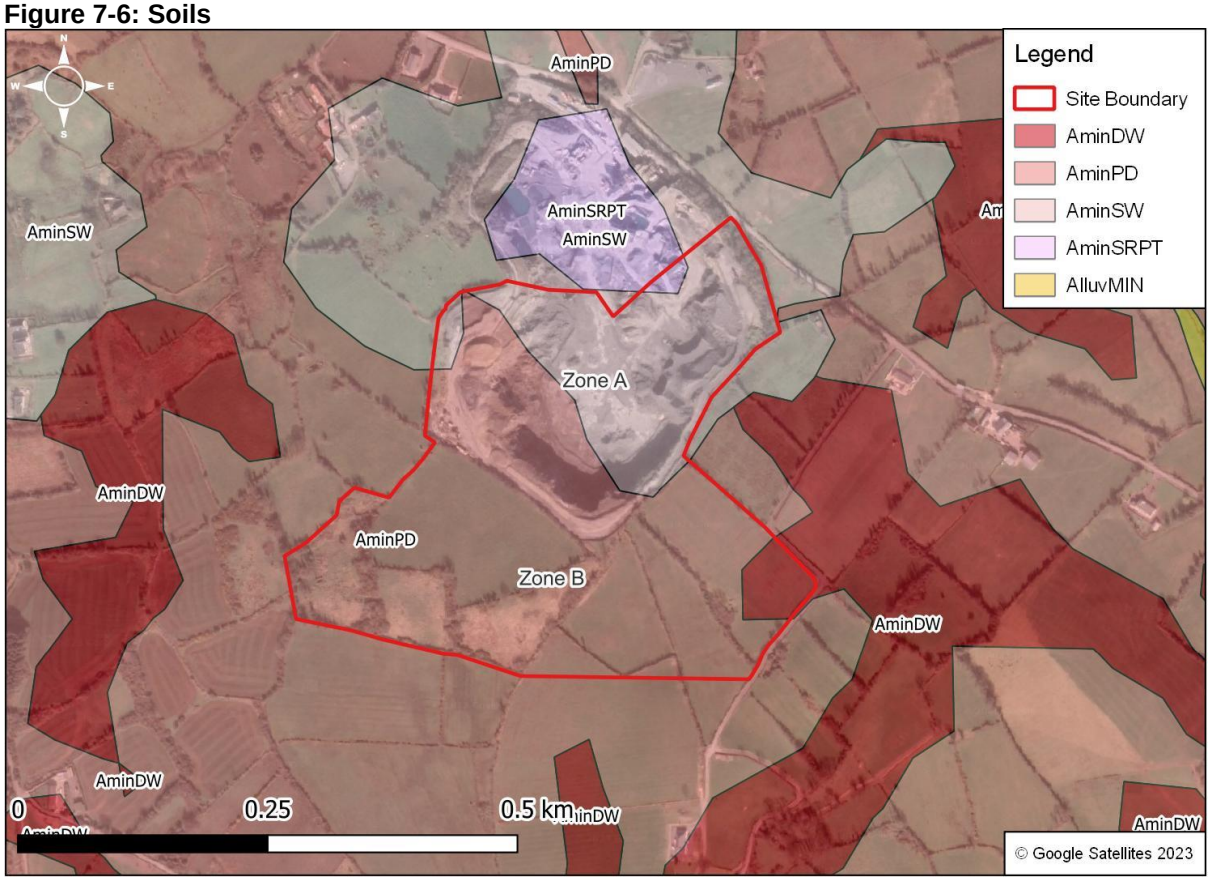
According to the GSI database [69] soil map, Zone A is characterised by AminSW soil (shallow well drained mineral (mainly acidic)) present in its north-eastern region and AminPD soil (Mineral poorly drained (mainly acidic)) comprises the south-western region. Additionally, there is a small section of AminSRPT soil (Shallow, rocky, peaty/non-peaty mineral complexes (mainly acidic)) in the northeast of Zone A. Past quarrying within Zone A has removed these soils, exposing bedrock for extraction.

Borehole logs of GW2 and GW6 within Zone A confirm that the original soils are no longer present. Instead a layer of made ground comprised of hardcore gravel (aggregates from site) sits atop bedrock. The depth of the hardcore material is to 0.5mgbl at GW2 and 0.6mbgl at GW6.

Zone B is characterised by AminPD soil (Mineral poorly drained (mainly acidic)), which comprises the majority of the zone. There is a small section of AminSW soil (shallow well drained mineral (mainly acidic)) in the northeast of Zone B and a small section of AminDW soil (Deep well drained mineral (mainly acidic)) in the east of Zone B. Refer to Figure 7-6 below.

Within Zone B, the heights of boreholes ranges from 133.6mAOD (GWB) to 138.8mAOD (GWD). All boreholes (GW3, GW4, GW5, GWB and GWD) show a brown clayey topsoil to a depth of 0.15mgl underlain by a brown boulder clay. The thickness of the boulder clay ranges from 0.15-0.60mgl (GW3) to 0.15-1.90mgl (GW4 and GW5). Beneath the boulder clay is greywacke bedrock.

Figure 7-6: Soils



7.4 Characteristics and Potential Impacts of the Proposed Development

In order to extract the bedrock within Zone B of the Proposed Development, the stripping and removal of soils and topsoil above the bedrock will be required. These soils would then be utilised in the construction of perimeter berms around the peripheries of the stripped areas. These berms will be vegetated to aid screening, with the vegetation providing stabilisation that will help prevent erosion from the berms. However, during the restoration stage of the Proposed Development, no reinstatement of soils is planned, and they will remain within the planted berms following completion of restoration and closure of the Site. As a result, the, Proposed Development represents a slight permanent negative effect on the local soils as original soil conditions will be altered and original soil topographies will not be restored. This effect will only be restricted to the soils within Zone B.

The Proposed Development is within a CGS, which, based on NRA Guidance [67], is of high importance as a geological attribute. The reworking of the soils in and around the moraines and drumlins intersecting the Proposed Development will have a slight but irreversible negative effect on the local geological heritage and glacial landforms as a result of the loss of the internal structures of the moraines which cannot be reinstated. However, the proposed extracted area within the Site constitutes <0.5% of the total area of the CGS (see Section 7.6) and as such represents a not significant negative effect on the CGS.

Additionally, the Proposed Development will result in changes in land use in both Zone A and Zone B. Zone B will change from agricultural pasture to a mineral extraction site during the operations of the Proposed Development. Following the closure and restoration of the Site, both Zone A and Zone B will change land use from a mineral extraction site to vegetated area with an open waterbody (comprised of groundwater and collected rainwater). Overall, these changes in land use represent neutral effect, with the land providing different benefits dependent on use. Considering the size of the Site relative to the availability of agricultural

pasture in Ireland, there will be an imperceptible negative effect on the available agricultural pasture following restoration.

In order to carry out the works at the Proposed Development, heavy machinery will be required. As such, fuels and hydrocarbon oils utilised by this machinery will pose a risk to land and soils, with hydrocarbon release resulting in a significant negative effect on soils and geology exposed, and, as such mitigation will be required.

7.5 Proposed Mitigation Measures and/or Factors

The employment of good environmental management practices serves to minimise the risk of pollution from the extraction activities at the Site in line with the EPA (2006) Environmental Management Guidelines: Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [14].

Mitigation measures for prevention of soil contamination during all stages of the quarry are stated below. Specifically with regard to soils, the following should be adhered to:

- All plant and HGV will be refuelled on a concrete plinth in the existing quarry. This plinth flows into settlement tanks before reaching the interceptor prior to discharge;
- Items of plant unsuitable for travelling to the refuelling area (dry screening plant), will be refuelled utilising adequately sized and positioned drip trays;
- Spill kits will be available adjacent to all refuelling and fuel storage operations;
- Fuel will be stored in a double skin tank in the existing quarry and will be appropriately bunded. No fuel will be stored within the Site;
- Fuels, lubricants and hydraulic fluids for screening equipment used on the site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to best practice codes. These will be stored at the existing quarry;
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or recycling;
- Drip trays will be used under plant which has the potential for hydrocarbon or chemical leakage when located on permeable ground; and,
- Any spillage of fuels, lubricants, hydraulic oils or other chemicals will be immediately contained, and the contaminated soil will be removed from the site and disposed of in accordance with the relevant waste regulations.

7.6 Cumulative and In-Combination Effects

The potential cumulative effect of the extraction onsite is the degradation of the Scotshouse-Redhills Cross-Cutting Ribbed Moraines CGS, which contains large areas of high aggregate potential, through combined extractive activities across the CGS. A study of the planning permission records of both County Cavan and County Monaghan shows that the only currently active quarry within the Scotshouse-Redhills CGS is Scotshouse Quarry. The total area covered by the Proposed Development is ca. 14.6ha, which represents ca.<0.4% of the Scotshouse-Redhills moraine area. The total area within the Scotshouse Quarry, including the Proposed Development area is ca. 17.9ha, which represents ca.<0.5% of the Scotshouse-Redhills moraine area. Given the extensive nature of Scotshouse-Redhills moraines, the wider Rockcorry-Cootehill moraines and the scale of the Proposed Development it is considered that the cumulative effect is negative and irreversible in nature, but “not significant”.

7.7 Interactions with other Environmental Attributes

Land and soils interact with other environmental attributes as follows:

- Chapter 6 - Biodiversity: The alteration of soil conditions onsite through the removal of topsoil and extraction of bedrock are key element to the viability of this project,

however this may affect biodiversity. The effects on biodiversity are addressed in Chapter 6 in more detail;

- Chapter 8 - Water: The removal of the soils will alter the sensitivity of the underlying groundwater. Further assessment is provided within chapter 8 Water. Additionally, soil reworking and bedrock extraction could release suspended solids and other material into the on-site drainage system and thereby to the on-site discharge. The effects on water quality are addressed in Chapter 8;
- Chapter 9 - Air Quality: the mobilisation of dust from land, soils and geology through extraction processes such as blasting and crushing can impact air quality. The effects on air quality are addressed in Chapter 9; and,
- Chapter 12 – Landscape & Visual: the modification of local glacial landforms and topology through the extraction of bedrock onsite will likely impact the visual and landscape character of the area. The effects on visual and landscape character are addressed in Chapter 12.

7.8 Indirect Effects

No indirect effects are observed as part of historic onsite activities.

7.9 Residual Effects

Provided that the mitigation measures and factors listed in Section 7.4 above are followed, the residual effect on soils as a result of the onsite extraction are likely to be slight irreversible long-term negative effects. This is due to the permanent alteration of the original soil character from the baseline conditions to a new character derived from reworking and mixing of soils and subsoils during overburden stripping. Additionally, the quarry areas of the Site will be without soils and will develop "soils" comprised from quarry source material, that even when covered over with the mixed overburden represents different subsoil conditions than before.

As remediation will not restore the topography of the Site to conform with the glacial landforms of the area and internal structures of the glacial landforms cannot be reinstated, a slight negative effect will remain, though the overall effect on the CGS will be not significant due to the relative scale of the proposed and existing development to the CGS.

The final condition of the Site following restoration will be a water body surrounded by vegetated regions. As such, the land will not be suitable for agricultural purposes. Considering the size, the relative availability of agricultural pasture in Ireland, restoration will result in an imperceptible negative effect on the available agricultural pasture. However, the proposed restoration will present an alternative mix of water, bench and boundary planting and the natural re-vegetation of the cliff face over time, which will be a valuable non-anthropogenic land use (refer to Chapter 6 Biodiversity).

7.10 Monitoring

No monitoring of geology and soils is planned during the Proposed Development.

7.11 Reinstatement

The restoration phase of the Proposed Development outlines how the site will be restored to an inert state. This phase and potential associated effects have been considered throughout this Chapter.

7.12 Difficulties Encountered in Compiling this Information

No difficulties were encountered when compiling this information.

8 WATER

8.1 Introduction

This chapter of the EIAR provides a description and assessment of the likely effects of the Proposed Development on surface water and groundwater quality in proximity to/beneath the Site.

8.2 Methodology

8.2.1 Legislation Context

The EU Water Framework Directive (2000/60/EC) (WFD) established a framework for the protection of both surface and groundwater. The European Communities Environmental Objective (Surface Water) Regulations 2009, as amended (S.I. No. 792 of 2009,) transposes this EU legislation into Irish law. It outlines the water protection and water management measures required in Ireland to maintain good or high status of waters where they exist and prevent any deterioration in existing water status. Water bodies comprise both surface and groundwater bodies, and the achievement of a good status for these depends on the achievement of 'good' status in terms of chemistry and by dependent ecosystems.

The first cycle of the River Basin Management Plan (RBMP) ran from 2009-2015, plans were devised for all the River Basin Districts (RBDs) with the objective of achieving at least 'good' status for all waters by 2015. The second cycle of the River Basin Management Plan covered the period 2018-2021 and merged the multiple RBDs to form one national RBD [74].

Public consultation on the draft third cycle of the RBMP 2022-2027 has closed. A final version has not yet been published. During the development of the third cycle, cooperation with the Northern Ireland (NI) authorities occurred to support an all-island approach to water resource management. As a result, the island has been divided into four RBDs – one national RBD falling fully within the Republic of Ireland (ROI), two RBDs, with territory both within ROI and NI and one RBD that falls fully within NI [75].

The assessment was carried out in accordance with the following guidance and tailored accordingly based on professional judgement:

- Institute of Geologists Ireland (IGI) Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements [66];
- National Roads Authority (NRA) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes [67];
- CIRIA C532 - Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors [76];
- Department of Environment, Heritage and Local Government: Quarries and Ancillary Activities - Guidance for Authorities [12]; and,
- EPA Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [14].

8.2.2 Desk-based Study

A desk study of the Site and surrounding area was carried out to collate all available and relevant geological, hydrogeological, hydrological and meteorological data for the study area, using the following data sources:

- Geological Survey of Ireland (GSI) [69];
- Environmental Protection Agency (EPA) Maps soil database [77];
- Environmental Protection Agency (EPA) Catchments [78]; and,
- Office of Public Works (OPW) 'Flood Maps' [79].

8.2.3 Site Investigations

An intrusive site investigation was undertaken to characterise the geological, hydrogeological, and hydrological environment between November 2022 and April 2023. The investigations included the following:

- Installation of seven (7 No) groundwater wells at specific locations within the quarry void (GW2, GW6 - Zone A) and the extension lands locations (GW3, GW4, GW5, GWB and GWD – Zone B) located south of the quarry void in the extension lands;
- A topographical site survey was undertaken after the installation of the boreholes in order to survey all locations to Ordnance Datum; and,
- Groundwater monitoring was carried out at the Site at GW2, GW4, GW5 and GW6 on 5th December 2022, GW2 - GW6 on 11th January 2023, GWB on 10th February 2023 and GWD on 14th February 2023. A well from a private dwelling north of Scotshouse Quarry was sampled on 25th January 2023.

Each groundwater monitoring event included the following:

- The monitoring wells were installed at depth ranging from 10mbgl (GW4) to 82mbgl (GW3). During the installation works the MOR geologist noted changes on the lithological profile and evidence of water (the borehole logs are shown in Appendix 7-1);
- Water level measurements at each monitoring well;
- Field hydrochemistry measurements for groundwater, (electrical conductivity, pH and temperature);
- Laboratory analysis of groundwater samples for a broad range of parameters – refer to Appendix 8-1;
- Slug tests were performed at GW2, GW3, GW4, GW5 and GW6 on 25th January 2023 and at GWB and GWD on 10th February 2023 to assess the permeability of the greywacke bedrock; and,
- Pumping tests were performed at GW3, GW4, GW5, GW6 and GWB between the 21st to the 27th April 2023 to assess the volume of water that would pass through the rock and dewatering potential for the Site.

Surface water monitoring was carried out at the Site historically between May 2016 and November 2019 by Monaghan County Council, with more recent monitoring occurring between October 2022 to present. This included the following:

- Field measurements for surface water (pH and temperature); and,
- Laboratory analysis of surface water samples for parameters listed as emission limit values from their Discharge Licence – refer to Section 8.3.2.3 Surface Water Monitoring below.

Refer to Appendix 8-2 for tables showing both the historic and recent surface water monitoring results.

8.2.4 Impact Assessment Methodology

The importance / sensitivity of the hydrogeological and hydrological receptors was assessed on completion of the desk study. Using the NRA Guidance [67], an estimation of the importance / sensitivity of the hydrogeological and hydrological environments within the study area is set out in Table 8-1 and Table 8-2 below.

Table 8-1: Estimation of Importance of Hydrology Attributes

Importance	Criteria	Typical Example
Extremely High	Attribute has a high quality or value on an international scale	• River, wetland or surface water body ecosystem protected by EU legislation, e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very High	Attribute has a high quality or value on a regional or national scale	• River, wetland or surface water body ecosystem protected by national legislation – NHA status. • Regionally important potable water source supplying >2500 homes. • Quality Class A (Biotic Index Q4, Q5). • Flood plain protecting more than 50 residential or commercial properties from flooding. • Nationally important amenity site for wide range of leisure activities.
High	Attribute has a high quality or value on a local scale	• Salmon fishery locally important potable water source supplying >1000 homes. • Quality Class B (Biotic Index Q3-4). • Flood plain protecting between 5 and 50 residential or commercial properties from flooding. • Locally important amenity site for wide range of leisure activities.
Medium	Attribute has a medium quality or value on a local scale	• Coarse fishery. • Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2-3). • Flood plain protecting between 1 and 5 residential or commercial properties from flooding.
Low	Attribute has a low quality or value on a local scale	• Locally important amenity site for small range of leisure activities. • Local potable water source supplying <50 homes. • Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1 residential or commercial property from flooding. • Amenity site used by small numbers of local people.

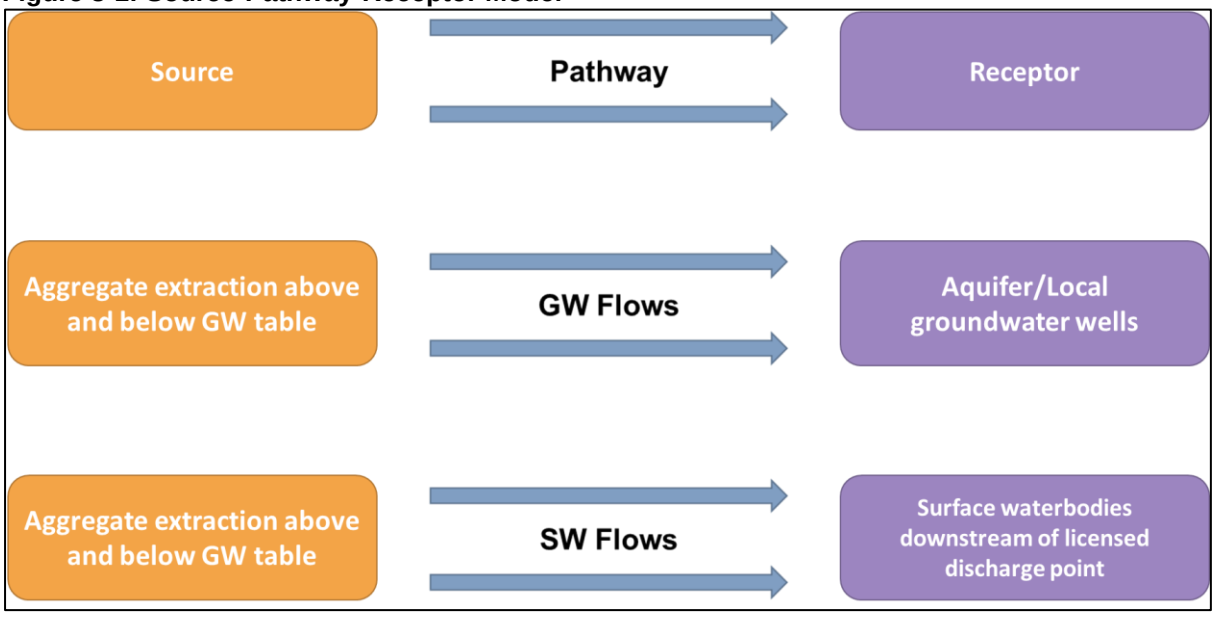
Table 8-2: Estimation of Importance of Hydrogeology Attributes

Importance	Criteria	Typical Example
Extremely High	Attribute has a high quality or value on an international scale	• Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation, e.g. SAC or SPA status.
Very High	Attribute has a high quality or value on a regional or national scale	• Regionally Important Aquifer with multiple wellfields. • Groundwater supports river, wetland or surface water body ecosystem protected by national legislation - NHA status. • Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source.
High	Attribute has a high quality or value on a local scale	• Regionally Important Aquifer Groundwater provides large proportion of baseflow to local rivers. • Locally important potable water source supplying >1000 homes.

Importance	Criteria	Typical Example
		• Outer source protection area for regionally important water source. • Inner source protection area for locally important water source.
Medium	Attribute has a medium quality or value on a local scale	• Locally Important Aquifer. • Potable water source supplying >50 homes. • Outer source protection area for locally important water source.
Low	Attribute has a low quality or value on a local scale	• Poor Bedrock Aquifer Potable water source supplying <50 homes.

Once the importance and sensitivity of the hydrological and hydrogeological attribute is established, the conventional source-pathway-receptor model for groundwater / surface water protection was applied to assess impacts on groundwater and surface water specifically on downstream sensitive ecological receptors and local groundwater supplies. When applied to the Proposed Development's activities, the following source-pathway-receptor (SPR) linkage below is produced:

Figure 8-1: Source-Pathway-Receptor Model



Sources

The primary potential hazards to water from onsite activities are contaminants such as hydrocarbons used onsite, suspended solids produced during the extraction the bedrock aggregates and nutrients such as ammonia from agricultural run-off entering the Site and explosive residues from blasting. Further potential hazards include reductions in groundwater availability due to groundwater discharge at the Proposed Development and surface water flood risk increased from increased discharge volumes.

Pathway

The pathway in terms of groundwater flow is through the underlying bedrock exposed during blasting and extraction, and for surface water this would be the licensed discharge point, which discharges directly into an open roadside drain which subsequently acts as a pathway to Dunsrim Lough, north of the Site.

Receptor

The primary receptors are the underlying bedrock aquifer quality and water availability and the quality of surface water downstream of the discharge point (Dunsrim Lough). The secondary groundwater receptors are groundwater quality and availability in downgradient bedrock aquifers, groundwater source protection areas (Clones Scotshouse PWS) and local groundwater wells in the vicinity of the Site. The secondary surface water receptors are water quality in the sections of the GORTNANA_010 surface waterbody downstream of Dunsrim Lough and any areas affected by a potential increase in flood risk.

8.3 Receiving Environment

8.3.1 Hydrogeology

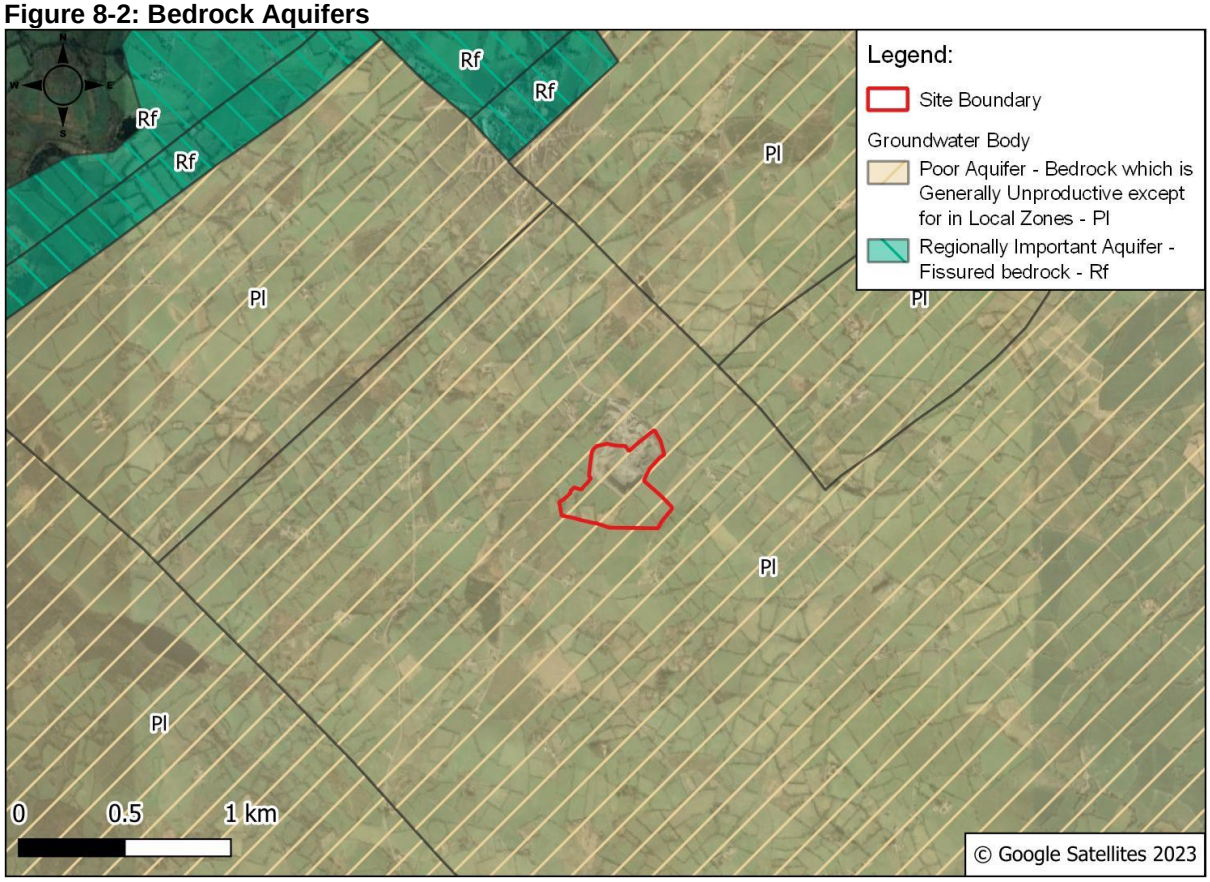
This section describes the groundwater features in the area and those which are potentially relevant to the assessment.

8.3.1.1 Bedrock Aquifer

The GSI bedrock aquifer indicates that the entire Site is underlain by a *"Poor Aquifer (Pl) – Bedrock which is Generally Unproductive except for Local Zones"* (see Figure 8-2 below). From the methodology set out in Table 8-2, this classifies it as of "Low" importance. Based on the County Monaghan Groundwater Protection Scheme – Main Report (2002) [80], this aquifer is comprised of a grouping of unproductive Lower Palaeozoic rocks, with groundwater flow occurring through fractures and faults. Permeability is limited due to an occurrence of high clay content shale units in the aquifer, limiting clean fractures and restricting flow to the upper few metres of the bedrock. Permeability is further impaired by dolerite intrusions in the Ordovician rocks that act as groundwater flow barriers. A *"Regionally Important Aquifer (Rf) – Fissured Bedrock"* is located approximately 1.4km north of the Site, with Table 8-2 categorising this feature as of "Very High" importance.

There is no sand and gravel aquifer in the vicinity of the Site. There are no karst features mapped within 5km radius from the Site.

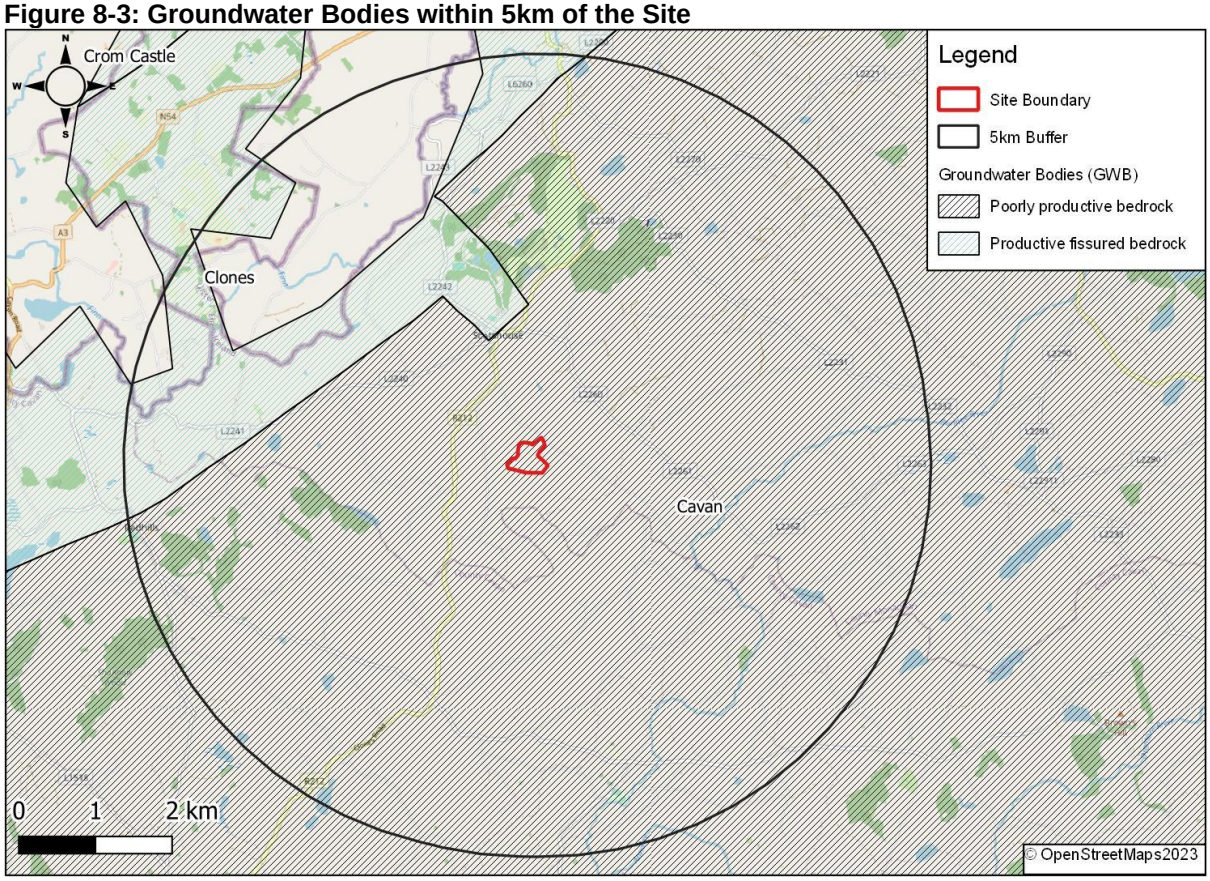
Figure 8-2: Bedrock Aquifers



8.3.1.2 Groundwater Body (GWB) Status

2023 EPA Maps places the Site within the groundwater body of Cavan (IE_NW_G_061). The Cavan GWB is assigned a “Good” status under the WFD 2016-2021 monitoring round [78]. The groundwater body risk is currently considered “not at risk” of meeting its environmental objectives. The Cavan GWB onsite and the Clones GWB, shown in Figure 8-3 below, correspond to the Poor Aquifer (PI) and Regionally Important Aquifer (Rf) respectively, as discussed in Section 8.3.1.1 above.

Figure 8-3: Groundwater Bodies within 5km of the Site



8.3.1.3 Groundwater Vulnerability

Groundwater vulnerability provides a measure of the ability of contaminants to migrate vertically to an aquifer and is a function of the subsoil permeability and its thickness [81]. From the GSI dataset, the south-western portion of Zone A is classified as having Extreme (E) vulnerability, whereas the north-eastern section, along with a small section in the north-western corner of Zone A, is classified as having Rock at or near Surface or Karst (X).The majority of Zone B is classified as having Extreme (E) vulnerability, but has a region to the south-east with High (H) trending to Low (L) groundwater vulnerability towards the south-eastern corner of the Zone B.

It should be noted that Zone A, has been extracted to bedrock since the last issuing of this dataset. As such, areas that are within the Zone A quarry void should be classified as having Rock at or near Surface or Karst (X) instead of the GSI classification.

Figure 8-4: GW Vulnerability

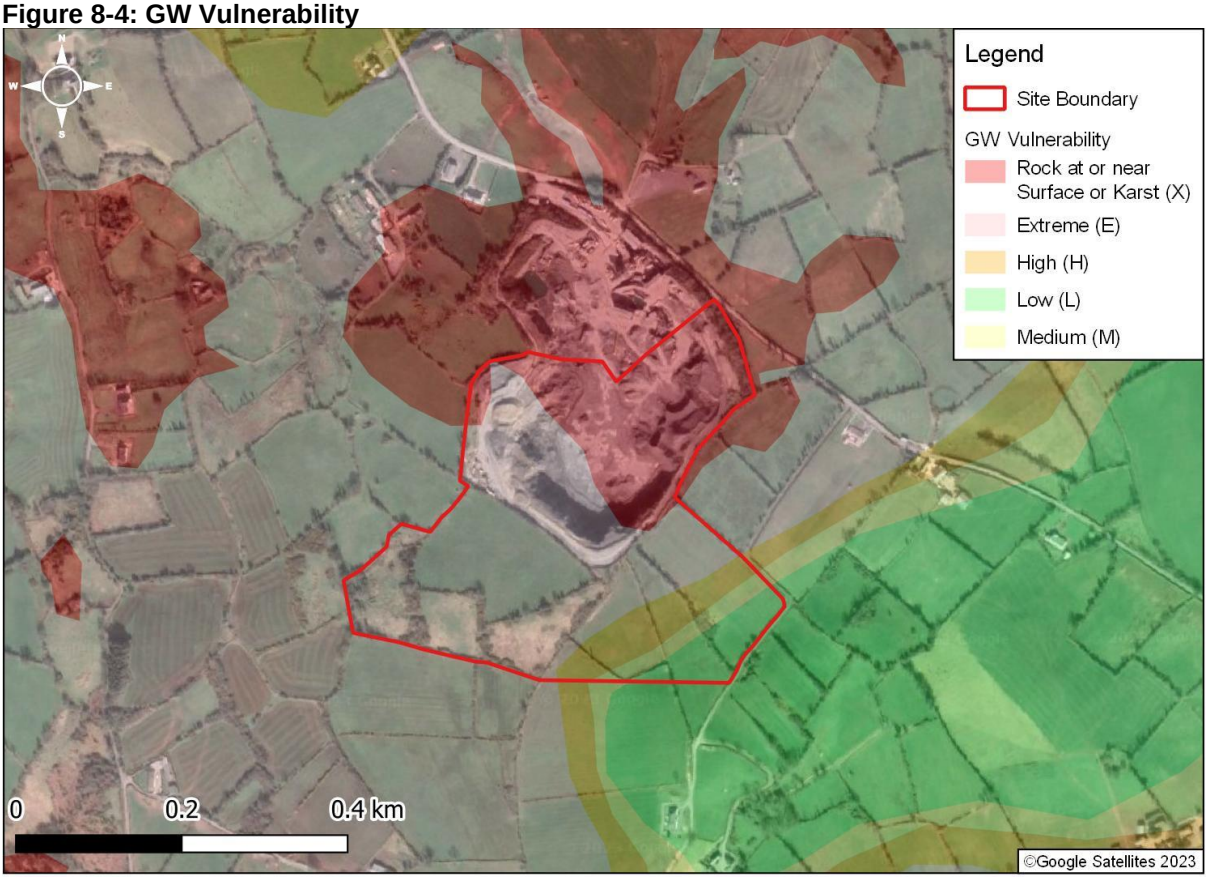


Table 8-3: Groundwater Vulnerability Rating

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) and Thickness and Thickness			Unsaturated Zone	Karst Features
	High Permeability (sand/gravel)	Moderate Permeability (e.g. sandy subsoil)	Low Permeability (e.g. clayey subsoil, clay, peat)	(Sand/gravel aquifers only)	(<30m radius)
Extreme (E)	0 – 3.0m	0 – 3.0m	0 – 3.0m	0 – 3.0m	-
High (H)	> 3.0m	3.0 – 10.0m	3.0 – 5.0m	> 3.0m	N.A.
Moderate (M)	N.A.	> 10.0m	5.0 – 10.0m	N.A.	N.A.
Low (L)	N.A.	N.A.	> 10.0m	N.A.	N.A.

Notes:

1 - N.A. = not applicable

2 - Precise permeability values cannot be given at present

3 - Release point of contaminants is assumed to be 1-2m below ground surface

8.3.1.4 Groundwater Levels and Flow Direction

Groundwater levels measured at the on-site monitoring wells are shown in Table 8-4 below. Based on the groundwater levels measured as part of this investigation, the groundwater gradient (flow direction) across the Site is generally southeast to northwest.

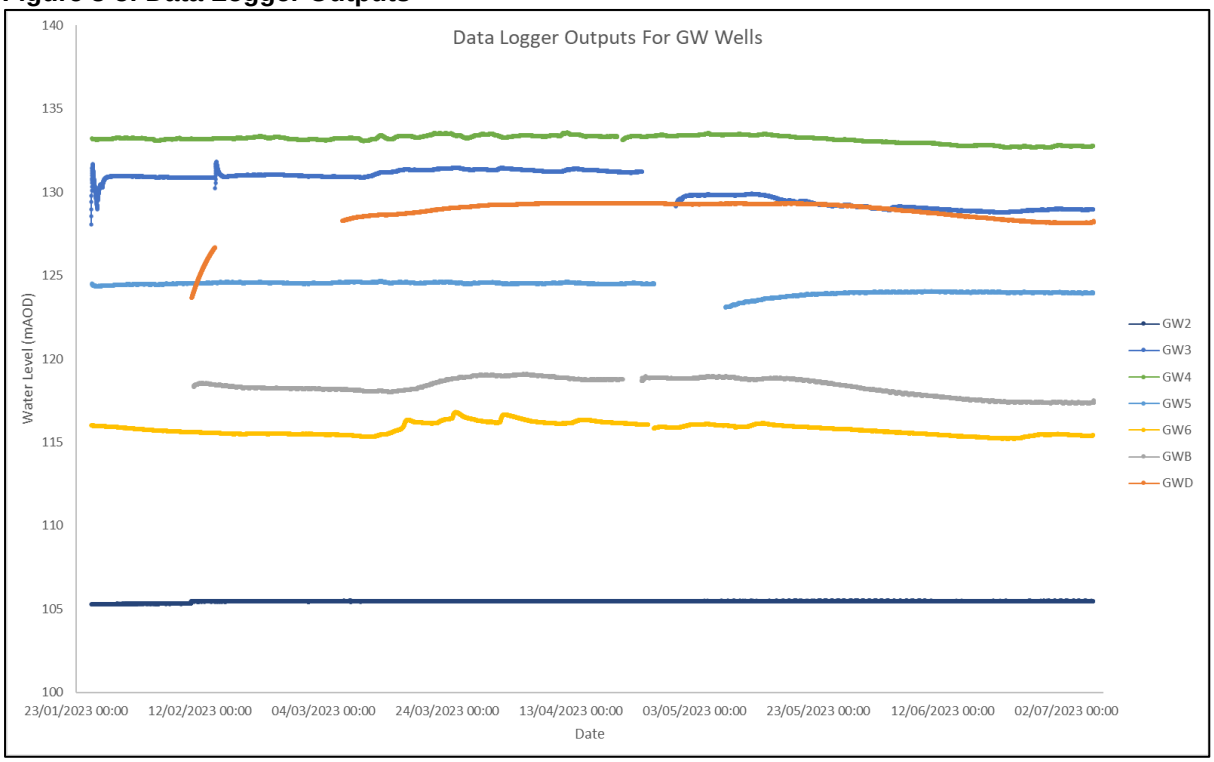
Table 8-4: Site Groundwater Level Measurements

Monitoring Well No.	Elevation of Reference (Top of Casing)	Total Depth	Water Level							
			05/12/2022		11/01/2023		25/01/2023		10/02/2023	
	mAOD	mbtoc	mbtoc	mAOD	mbtoc	mAOD	mbtoc	mAOD	mbtoc	mAOD
Zone A Wells										
GW2*	105.29	51	0.1	105.19	0	105.29	0	105.29	0	105.29
GW6	130.85	42	14.05	116.80	14.52	116.33	14.8	116.05	15.14	115.71
Zone B Wells										
GW3	137.17	82	9.79	127.38	9.21	128.00	6.82	130.35	3.34	133.83
GW4	136.61	10	3.66	132.95	3.38	133.23	3.44	133.17	3.37	133.24
GW5	136.69	79	13.1	123.59	12.42	124.27	12.44	124.25	12.28	124.41
GWB	133.55	53	-	-	-	-	11.53	122.02	12.13	121.42
GWD	138.77	56	-	-	-	-	-	-	14.51	124.26

*GW2 has been extracted to/below the groundwater table.

In addition to the on-site monitoring measurements, data loggers were installed within the groundwater wells which collected total pressure measurements in the form of metres of water (mH_2O) between 25th January 2023 and 6th July 2023. Additionally, barometric pressure measurements were collected in mH_2O. This unit expresses pressure as metres of water above the measuring depth but requires correcting total pressure using barometric pressure to correlate to water level (higher pressure correlates to a higher water level). This data, following compensation to water level in mOD is presented in Figure 8-5 below.

Figure 8-5: Data Logger Outputs



It should be noted that the gaps in trends occur during well pumping/slug tests and following recovery periods, which do not reflect to normal groundwater levels. Additionally, the fluctuations in GW3 and increasing trend in GWD initial measurements reflect a recovery period of water levels associated with the purging of groundwater wells before datalogger installation.

The following interpretations can be drawn from this data:

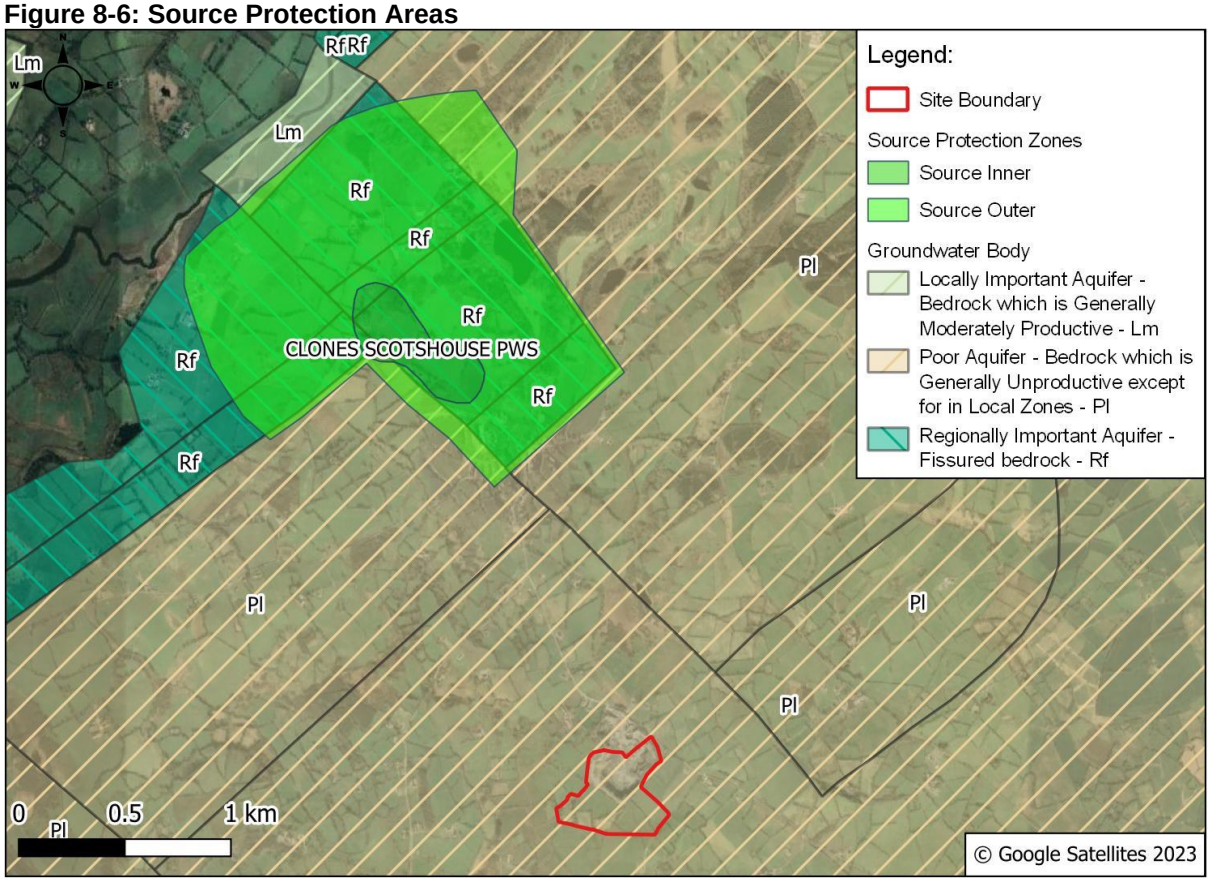
- Overall, after pumping tests, level show a decline that recovers to a relatively constant baseline that, in some cases, is slightly below the starting baseline before the test; and,
- No strong seasonality influence is observed in terms of water level.

8.3.1.5 Groundwater Protection and Use

Groundwater Protection Schemes provides a framework for the protection of groundwater source zones (i.e. areas of contribution to water supply bores). The Source Protection Areas of these schemes are divided into Source Inner (SI) and Source Outer (SO) areas, with Table 8-2 defining their importance as hydrogeological attributes “Very High” and “High” respectively.

The Clones Scotstown Public Water Supply (PWS) Source Protection Areas are downflow of the Site, based on the groundwater flow direction predicted in Section 8.3.1.4 above, with the SI and SO areas are respectively ca.1.74km and 1.34km to the northwest of the Site. The Clones PWS Source Protection Area is predominantly located within the Productive Clones GWB, with only a minimal amount of the SO and SI within the Unproductive Cavan GWB (See Figure 8-6 below).

Figure 8-6: Source Protection Areas



It is noted that groundwater within public supplies associated with the Cooldaragh Limestones, which form part of a regionally important aquifer north of the Site, contain evaporitic lenses that result in naturally high levels of sulphate within the groundwater, as noted in the *Clones Source Protection Report Draft (2002)* [82]. Further mention of natural sulphate elevations occurs in *An Assessment of the quality of public, group scheme, industrial and private groundwater supplies in county Monaghan (Draft) (2002)* [83] and are accounted for by the same source.

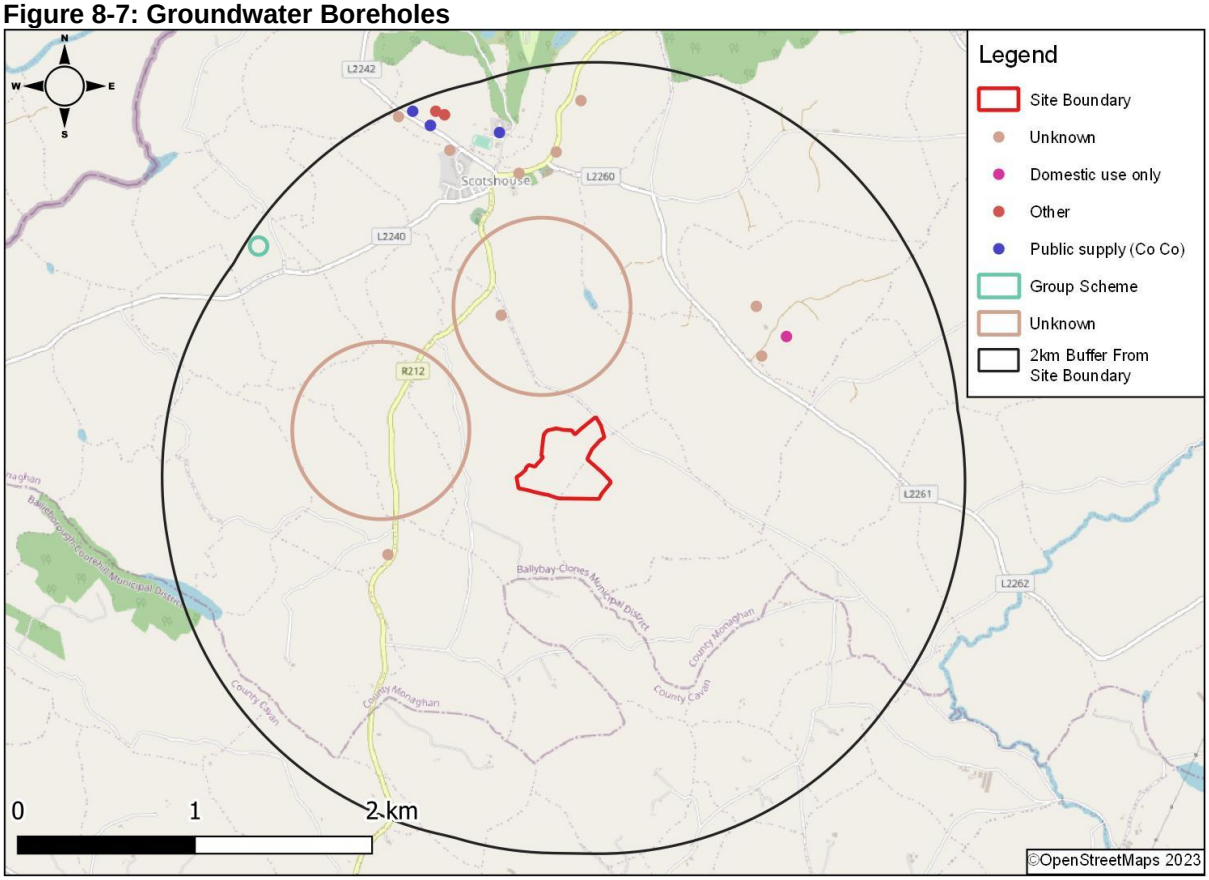
A search of the GSI groundwater well database was conducted to identify registered wells within a 2km radius of the Site. There are nineteen (19 No) registered wells within 2km of the Site. Refer to Table 8-5 and Figure 8-7 below for details.

Table 8-5: Available Groundwater Well Information

Borehole ID	Centre Distance from Site	Grid Reference (Irish Grid)	Well Type	Total Depth (m)	Townland	Yield (m^3d)
2331SEW001	1.67km NW	248920 319680	Dug well	3	Aghnahola	34.6
2331SEW002	1.96km NW	248630 319870	Borehole	14	Cavanreagh	34.6
2331SEW004	0.70km NW	249210 318750	Dug well	3	Aghnaskew	34.6
2331SEW005	1.45km N	249310 319550	Borehole	20	Killyfargy	-
2331SEW012	1.11km NE	250650 318800	Dug well	5	Cavany	17.3
2331SEW013	1.00km NE	250680 318520	Dug well	6	Cavany	8.6
2331SEW014	1.79km N	249660 319960	Spring	-	Killyfargy	25.9

Borehole ID	Centre Distance from Site	Grid Reference (Irish Grid)	Well Type	Total Depth (m)	Townland	Yield (m^3d)
2331SEW015	1.51km N	249520 319670	Dug well	4	Killyfargy	25.9
2331SEW019	0.83km SW	248570 317400	Unknown	18	Skerrick West	25.9
2331SEW030	0.69km N	249440 318800	Dug well	3.7	Dunsrim	21.8
2331SEW034	0.81km W	248530 318100	Dug well	3.7	Corrackan	38.2
2331SEW039	1.94km NW	247840 319140	Borehole	91.4	Drumaveale	218
2331SEW040	1.88km NW	248890 319880	Borehole	3.2	Cavanreagh	-
2331SEW041	1.91km NW	248840 319900	Borehole	3.2	Cavanreagh	-
2331SEW042	1.84km NW	248810 319820	Borehole	10.5	Cavanreagh	-
2331SEW047	1.18km NE	250820 318630	Borehole	158.5	Cavany	3.3
2331SEW048	1.95km NW	248710 319900	Borehole	67	Cavanreagh	1000
2331SEW049	1.70km N	249200 319780	Borehole	67	Cavanreagh	350
2331SEW050	1.84km NW	248810 319820	Borehole	70	Cavanreagh	1221

Figure 8-7: Groundwater Boreholes

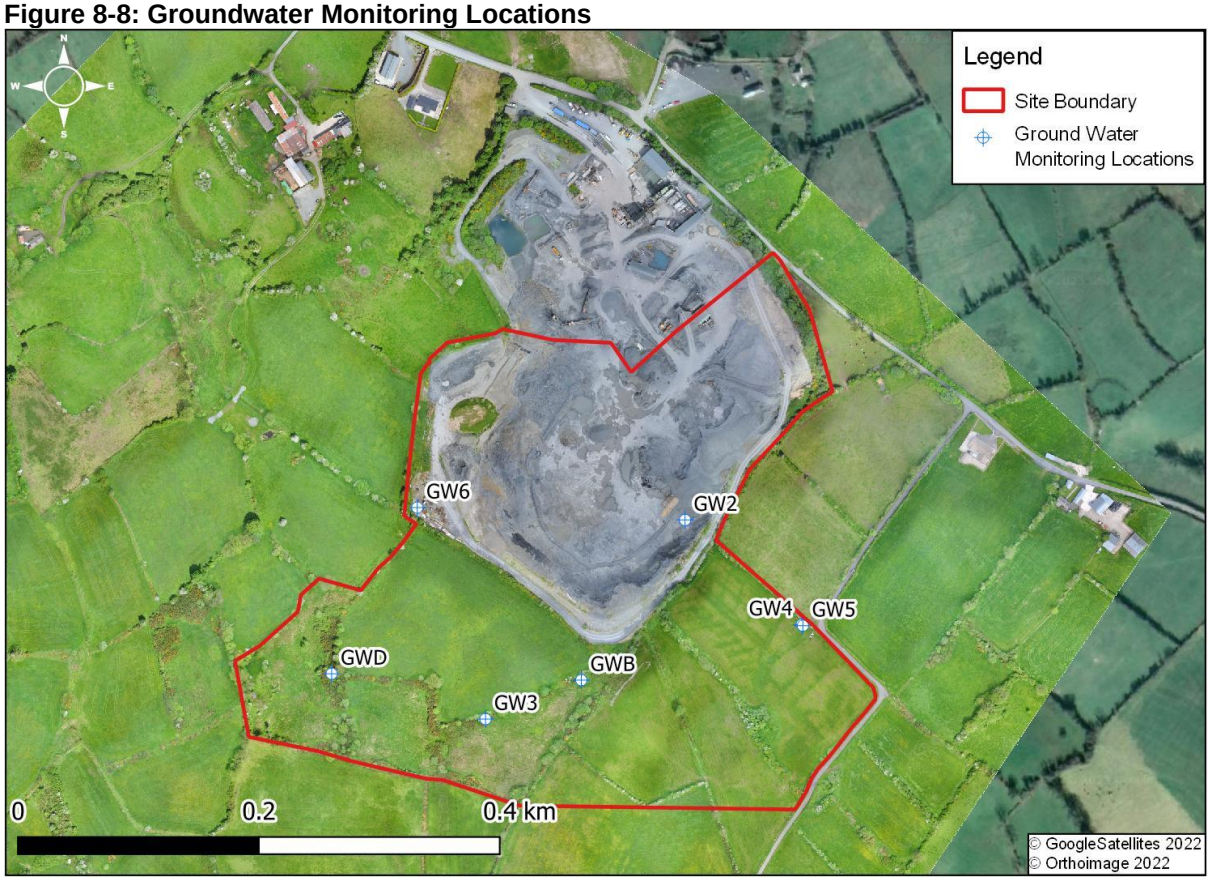


8.3.1.6 Groundwater Monitoring

No historic groundwater monitoring data was available for the Site. Groundwater sampling for the onsite wells occurred between December 2022 and February 2023. GW3, GWB and GWD were sampled once during this period and GW2, GW4, GW5 and GW6 were sampled twice.

Figure 8-8 below shows the groundwater monitoring locations. Field hydrochemistry measurements were taking during the sampling of the wells.

Figure 8-8: Groundwater Monitoring Locations



The laboratory results are presented in Appendix 8-1 and compared with the relevant Groundwater Regulation Values (S.I. No. 9 of 2010 as amended) (GAC). The samples were analysed for pesticides as part of the general suite for the Site - there were no detections of screened pesticides above laboratory detection limits.

Five (No. 5) exceedances of GAC limits were detected during the 5th December 2022 monitoring event; total ammonium as N (0.065mg N/l) at GW4 (0.08mg N/l), sulphate (187.5mg/l) at GW2 (219.2mg/l) and GW6 (231.7mg/l) and hardness (as $CaCO_3$) (200mg/l) at GW2 (279mg/l) and GW6 (325mg/l). No exceedances of the GAC limits were detected for GW5 during this monitoring event.

Three (No. 3) exceedances of GAC limits were detected during the 11th January 2023 monitoring event; total ammonium as N (0.065mg N/l) at GW4 (0.07mg N/l) and GW6 (0.09mg N/l) and hardness (as $CaCO_3$) (200mg/l) at GW6 (272mg/l). No exceedances of the GAC limits were detected for GW2, GW3 and GW5 during this monitoring event.

One (No. 1) exceedance of GAC limits were detected during the 10th February 2023 monitoring event; total ammonium as N (0.065mg N/l) at GWB (0.09mg N/l). No other exceedances of the GAC limits were detected for GWB during this monitoring event.

Two (No. 2) exceedances of GAC limits were detected during the 14th February 2023 monitoring event; hardness (as $CaCO_3$) (200mg/l) at GWD (276mg/l) and total aliphatics and aromatics (C5-44) (7.5µg/l) at GWD (210µg/l). No other exceedances of the GAC limits were detected for GWD during this monitoring event.

In addition to the sampling of onsite wells, a groundwater sample was taken from a private well located north of the site on 25th January 2023. This sample showed one (1 No.)

exceedance of GAC limits for hardness (as $CaCO_3$) (200mg/l), with a concentration of 315mg/l. No other exceedances of the GAC limits were detected.

Based on the direction of groundwater flow noted in Section 8.3.1.5 above, groundwater flows from Zone B to Zone A. Therefore, the exceedances noted in the Zone B wells GW4, GWB and GWD are not associated with quarry activities, instead reflecting external pressures on groundwater quality or local aquifer characteristics.

The noted exceedances in total ammonium as N occurred only once within the quarry but three times in the upgradient wells, indicating that these elevations in ammonia are not associated with quarry activities, however related to a potential offsite source. Exceedances in water hardness are reported in both Zone A and B wells, along with the private/external well north of the Site, indicating the elevated water hardness are local characteristic of the groundwater or be associated with other, upgradient pressures. Additionally, high water hardness ("hard" water) is not considered to cause human health risks.

Given the location of the hydrocarbon detection in groundwater, the current Site activities likely did not result in the observed total aliphatics and aromatics (C5-44) exceedance at GWD. The only exceedances observed within Zone A not noted in Zone B or outside the Site are the sulphate exceedances noted in both Zone A wells (GW2 and GW6), indicating it is associated with onsite activity. The most likely source of sulphate onsite is dissolution or leaching of sulphate from minerals within crushed rock and dust generated onsite. However, this exceedance only occurred once during the monitoring period and so is not a consistent pressure on groundwater. Therefore, it likely has a brief to temporary, not significant negative effect on local groundwater as it is impacting groundwater quality, though not in a persistent manner.

8.3.1.7 Slug Tests

Seven (7 No) monitoring wells were installed as shown in Figure 7-2 above, and as described below:

- GW2 – This well was installed in the quarry floor at the Site, to assess potential effects on groundwater quality/availability from Zone A;
- GW3 – This well was installed at the extension lands in Zone B to assess the presence of groundwater as well as to assess potential effects on water quality during the future extraction;
- GW4 - This shallow well was installed at the extension lands in Zone B, due to the presence of perched shallow groundwater during the installation of GW5, to assess the potential volume of groundwater present in the overburden deposits;
- GW5 - This well was installed at the extension lands to assess the presence of groundwater as well as to assess potential impacts on groundwater quality during the future extraction;
- GW6 - This well was installed at the extension lands to assess the presence of groundwater as well as to assess potential impacts on groundwater quality during the future extraction; and,
- GWB & GWD - These wells were installed at the extension lands to further investigate the nature and volume of groundwater present in the bedrock.

Previous groundwater level measurements at GW2 have demonstrated that quarrying activities within the quarry void have likely taken place below the water table (refer to section 8.3.1.4). Therefore, the extraction of the greywacke at the extension lands would intersect the groundwater table – refer to Table 8-4 above.

The slug tests were conducted as a first approach to provide useful values of hydraulic conductivity to assess the permeability of the immediate vicinity of the existing wells.

The Hvorslev method was used to analyse the slug test data as follows:

$$K = \frac{A}{F(t_2 - t_1)} ln\left(\frac{H_1}{H_2}\right)$$

K = hydraulic conductivity (m/min)

A = cross-sectional area of borehole casing or standpipe where water level is changing (m^2)

t_1 = Initial time at H_1

t_2 = Time at some point during the test at H_2

H_1 = Initial displacement at time t_1

H_2 = Displacement at time t_2

F = intake factor

Due to the slow recovery expected at GW2, GW3, GW5 only one slug test was performed at these wells. One test was also performed at GW4, and two tests were performed at GW6 due to the fast recovery of this well. Two tests were also performed at GWB. The slug test data from GWD was not suitable for analysis.

The calculated hydraulic conductivity is presented in Table 8-6 below and Appendix 8-3 for the slug test data and calculations.

Table 8-6: Calculated Hydraulic Conductivity – Slug Tests

Well ID	Test 1 – K (m/day)	Test 2 – K (m/day)
GW2	9.98E-04	-
GW3	7.06E-03	-
GW4	1.55E-02	-
GW5	1.83E-03	-
GW6	1.44E-01	3.62E-01
GWB	8.42E-03	5.21E-03
GWD	-	-

The results show that GW2, GW3, GW5 and GWB have a similar very low hydraulic conductivity (< 0.001 – 0.008m/day) and indicate that the bedrock is unlikely to be conveying significant quantities of groundwater. GW6 (also screened in the competent bedrock) shows a higher hydraulic conductivity than the other wells, as does GW4 which is screened within the upper weathered bedrock where perched groundwater is present.

Prior to quarrying operations, the hydraulic gradient is unlikely to have exceeded topographic gradient 0.074 ([135 mAOD (higher elevation at the quarry) - 101mAOD (lower elevation at the quarry)]/460m). Using Darcy's Law, which is as follows:

Q=K*i*w*b, where;

Q= rate of groundwater flow (m^3/day) – discharge to the quarry floor during quarrying activities

K= hydraulic conductivity (m/day)

i= hydraulic gradient

w= length of the quarry (m)

b= estimated saturated thickness of the aquifer (m)

Groundwater flow rate through what is now the southern face of Zone A is estimated to have been no greater than 0.42m^3/day (0.001 m/day x 0.074 x 190m [width of quarry face in south] x 30m [approximate height of quarry face in south], i.e. <420 litres per day. During quarrying of the existing quarry, this groundwater would have been intercepted by the quarrying operations and may be expected to be encountered at Zone B.

The quarrying operations would therefore have resulted in an average of no more than 0.42m^3/day groundwater discharging to the site drainage system which is negligible relative to average incident rainfall on the quarry of 288m^3/day (based on approximately 180,000m^2 area x 0.0016m/day average daily rainfall from the GSI mapping). Thus, the quarrying operations taken place at GW2 would have had imperceptible effect on surface water flow rates. As GW2 presents similar hydraulic conductivity as GW3, GW5 and GWB, similar groundwater discharge is expected in Zone B. Higher discharge rates are expected in the area where GW6 is present.

8.3.1.8 Pumping Tests

Pumping tests were performed at GW3, GW4, GW5, GW6 and GWB to provide more accurate estimates of hydraulic conductivity and potential rate of groundwater ingress which may occur during the operational phase of the Proposed Development. These wells were chosen to represent the range of hydraulic conductivities of the bedrock to allow best and worst-case estimates of groundwater ingress rates to the quarry.

The pumping rate for each well was chosen prior to the tests being conducted using Logan's approximation, whereby:

$Q=(T*s)/1.2$

Also, $T=K*b$, where

Q= discharge rate (m^3/day)

K= hydraulic conductivity (m/day)

b= thickness of saturated screen in well (m)

T= transmissivity (m^2/day)

s= target drawdown in well (m)

The hydraulic conductivity for each well was obtained from the slug test estimates and the target drawdown was set as the difference between the standing groundwater level and the top of the screened section in the well. Theoretically, this would mean that pumping at the calculated discharge rate would result in the water level in the well reaching the top of the screen.

The estimated calculated rates are shown in Table 8-7 below.

Table 8-7: Discharge Rates – Logan's Approximation

	GW3	GW4	GW5	GW6	GWB
Q (l/min)	5.29	0.03	1.14	20.0	1.13

The constant rate pumping tests (pumping test) were conducted for a period of 2 to 7 hours at each well following a period of overnight recovery after the pumping test at each well. The pumping tests started on the 20th April at GW4 followed by overnight recovery and on the 21st April 2023 at GWB followed by two days of overnight recovery (i.e. weekend) until the 24th

April 2023. Pumping tests continued on the 24th April 2023 at GW3 followed by overnight recovery, on the 25th April 2023 at GW6 followed by overnight recovery and on the 26th April 2023 at GW5 also followed by overnight recovery.

The pumping tests were performed utilising an MP1 pump which is an electric impeller-driven pump that can extract water at different rates. The initial discharge rates were set as per Table 8-7 above, however, these had to be increased in some wells due to the low drawdowns achieved. The discharge rate from the discharge pipe attached to the pump was also measured at intervals during the pumping tests to ensure that the required discharge rate was maintained during the tests. The MP1 would run out of fuel during the pumping tests and so there would be a rest period whilst the generator was refuelled. This resulted in some recovery in the water levels in the pumped well, with the amount of recovery being related to the hydraulic conductivity at that well. For wells with relatively high hydraulic conductivity (GW6), almost 100% recovery happened whilst the pump was stopped for refuelling, whereas for wells with low hydraulic conductivity (such as GW3), the recovery was minor. These recovery periods during pumping had to be accounted for in the pumping test analysis.

Table 8-8 shows the actual average pumping and recovery rates used to calculate transmissivity (T) and hydraulic conductivity (K). It was possible to analyse three (3 No) pumping tests at GW3 due to the changes in the flow rate undertaken during the tests.

Table 8-8: Average Flow – Pumping Tests and Recovery Tests

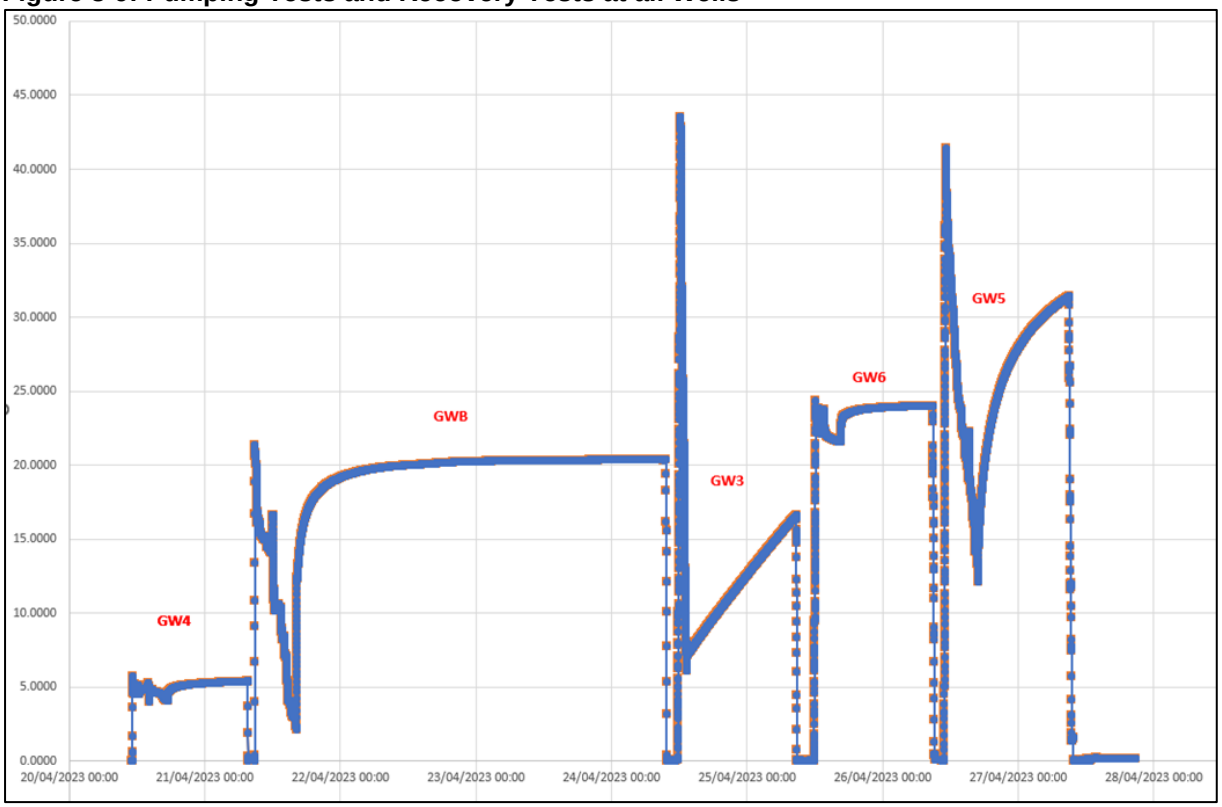
Parameter	GW3 (A)	GW3 (B)	GW3 (C)	GW4	GW5	GW6	GWB
Flow Rate - Pumping(l/min)	5	2.75	3.03	-	1.07	7.42	2.52
Average Flow Rate during pumping test used for Recovery analysis (l/min)	3.6			0.34	1.07	7.42	1.81

Figure 8-9 below shows the changes in water level (y axis) versus time (x axis) for each of the groundwater wells through the pumping and recovery periods.

The initial water level was manually measured at each individual well prior to starting the pumping test and was also measured at different intervals during the pumping tests. In addition, data loggers were submerged into the pumping well at the time of the pumping test and removed after the recovery period. Data loggers were set to record every 5 seconds to accurately measured changes in water level during the tests.

The data from the pumped well and the monitoring wells from the pumped period have been analysed using the Jacob-Cooper Method. This method involved plotting drawdown versus log time and fitting a straight line to the data to estimate aquifer transmissivity, refer to Appendix 8-4 for the data and graphs. Hydraulic conductivity is then estimated by dividing the aquifer transmissivity by saturated aquifer thickness (assumed to be equal to the length of the saturated screen for each test).

Figure 8-9: Pumping Tests and Recovery Tests at all Wells



Hydraulic conductivity and transmissivity values were calculated for each of the monitoring wells during the pumping test. However, due to the changes in the flow rate during the pumping test and the refuelling of the pump, it was not possible to identify any usable data for the analysis for GW4.

The calculated values are presented in Table 8-9 below.

Table 8-9: Transmissivity and hydraulic conductivity values – Pumping test

Parameter	GW3 (A)	GW3 (B)	GW3 (C)	GW4	GW5	GW6	GWB
Transmissivity (m^2/day)	0.07	0.021	0.01	-	0.013	1.6	0.018
Hydraulic Conductivity (m/day)	0.00089	0.00027	0.00013	-	0.0002	0.058	0.00049

The estimated transmissivity based on the pumping test data ranges from 0.013 to 1.6m^2/day and average of 0.29m^2/day and the estimated hydraulic conductivity ranges from 0.00013 to 0.058m/day and an average of 0.01 m/day.

Recovery Test

The recovery data from the monitoring wells have been analysed using the Theis Recovery Method. Refer to Appendix 8-5 for the data and graphs.

Hydraulic conductivity (K) and transmissivity (T) values were calculated for each of the monitoring wells during the recovery test. The calculated values are presented in Table 8-10 below.

Table 8-10: Transmissivity and Hydraulic Conductivity Values – Recovery Tests

Parameter	GW3	GW4	GW5	GW6	GWB
Transmissivity (m^2/day)	0.0094	0.26	0.017	3.6	0.085
Hydraulic Conductivity (m/day)	0.00012	0.038	0.00026	0.13	0.0022

The estimated transmissivity and hydraulic conductivity values are similar to those obtained for the pumping test.

The estimated transmissivity based on the recovery test data ranges from 0.0094 to 3.6m^2/day and an average of 0.79m^2/day and the estimated hydraulic conductivity ranges from 0.00012 to 0.13m/day and an average of 0.034 m/day.

Dewatering Calculations

The hydraulic conductivity estimates derived from the pumping and recovery tests analysis were used to estimate dewatering needs for quarrying of the extension lands. Darcy's law was utilised to estimate the rate of groundwater flow through the greywacke bedrock at different heights (i.e. different benches).

Q=K*i*w*b, where:

Q= rate of groundwater flow (m^3/day) – discharge to the quarry floor during quarrying activities

K= hydraulic conductivity (m/day)

i= hydraulic gradient

w= width of the quarry (m)

b= estimated saturated thickness of the aquifer (m)

To calculate the dewatering volume of water, the average pumping and recovery hydraulic conductivity (K) values of all tests performed at each well (refer to Table 8-11 below for the average values) have been used to estimate groundwater flow rate through the aquifer that will be encountered during the operational phase of the Proposed Development.

Table 8-11: Estimated Hydraulic Conductivity - Average

Parameter	GW3	GW4	GW5	GW6	GWB
Hydraulic Conductivity (K) (m/day) – average	0.00035	0.038	0.00023	0.094	0.0013

In the case of GW4, only the recovery data was utilised for the calculation and the saturated thickness of the aquifer has been taken as 6.5m deep (length of the saturated screen), as this well is only a shallow well. Refer to Table 8-12 below for the estimated parameters used to estimate the dewatering needs.

Table 8-12: Estimated Site-specific Parameters

Variable	GW3	GW4	GW5	GW6	GWB
Width of quarry (w)	580	580	580	200	580
Saturated thickness of the aquifer (b)	20 / 40 / 80	6.5	20 / 40 / 80	40	20 / 40 / 80

A hydraulic gradient (i) of 0.061 has been calculated for the wells as ([135 mAOD (higher elevation at the quarry) - 110mAOD (lower elevation at the extension lands)]/407m (distance between contours 135 and 110mAOD).

The estimated saturated thickness of the aquifer has been estimated for each of the potential benches (i.e. 20m, 40m) to be excavated at the Site and for an estimated thickness of 80m as a potential worst-case scenario (80m is greater than any thickness that will be encountered as part of the Proposed Development). Refer to Table 8-13 for the different benches (i.e. thickness).

The width of the aquifer has been estimated to be 580m at GW3, GW4, GW5 and GWB as it is assumed that similar conditions will be encountered within the Site with the exception of GW6. For GW6, as conditions are different to those encountered at the other wells, it is expected that those conditions are isolated in nature and unlikely to be representative of the Site. Consequently, for GW6, the estimated flow rate is based on an assumed width of the aquifer of 200m and saturated thickness of 40m.

Table 8-13: Dewatering Calculation (m^3/day)

Benches (m)	Estimated Q (m^3/day) values				
	GW3	GW4	GW5	GW6	GWB
6.5m	-	8.8	-	-	-
20m	0.25	-	0.16	-	0.96
40m	0.50	-	0.33	46	1.92
80m	1.00	-	0.65	-	3.83

Based on the K estimates for GW3, GW5 and GWB, the groundwater ingress rate to the quarry to excavate to 20m is < 1 m^3/day. For 40m it is < 2 m^3/day and for 80m it is < 4 m^3/day. Using the higher K estimates for GW4 and GW6 (which are limited in extent) it is estimated that there could be up to a further approximately 50 m^3/day groundwater ingress to the quarry from these high K areas.

The level of dewatering (volume) required at GW2 in the quarry floor while excavating down to one bench (i.e. 20m) is anticipated to be similar to that determined using the hydraulic conductivity estimates for GW3, GWB, and GW5. However, it is possible that greater flows could occur if the higher hydraulic conductivity (possibly fractured) bedrock encountered at GW6 extends beneath the quarry floor (which, based on the available information, is considered unlikely).

8.3.2 Hydrology

This section describes the surface water features in the area and those which are relevant to the assessment.

8.3.2.1 Surface Waterbodies

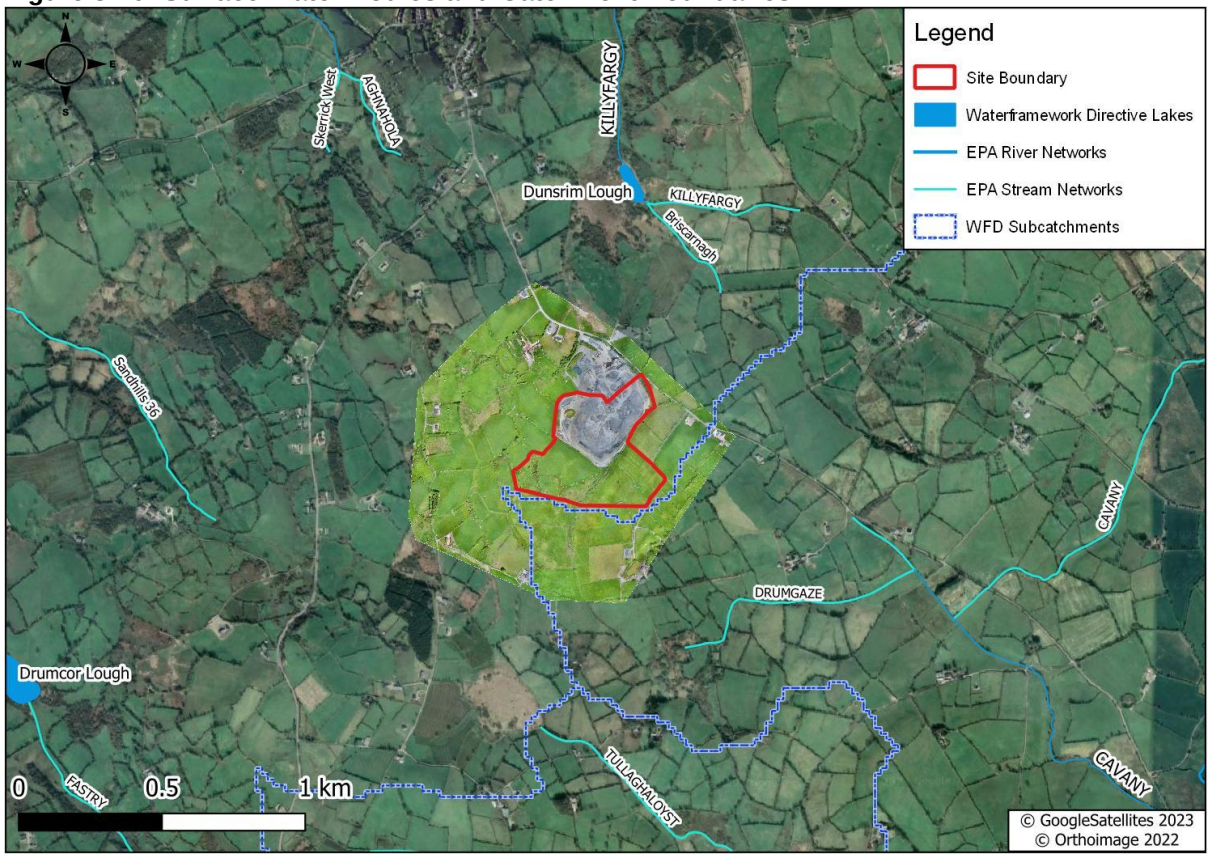
The Site is within the Erne hydrometric area and the Subcatchment Finn[Monaghan]_SC_020 [78] A subcatchment divide is located ca.5m to the southeast of the Site. The GORTNANA_010 waterbody is located ca.400m northeast of the Site within the Finn[Monaghan]_SC_020 catchment (Figure 8-10 below). A Water Framework Directive report has been prepared to assess the effects of the Proposed Development on water quality objectives. See Appendix 8-6.

There are a large number of lake/lough waterbodies located to the west and southeast of the Site, with the majority of the western lakes being recurring in nature. The closest of these lakes is Dunsrim Lough, located north of the Site. Dunsrim Lough lacks its own distinct data page on the EPA Catchments website [78] and is accounted for within the River GORTNANA_010 dataset. As a result, there is no direct data referring to water quality on the EPA database for Dunsrim Lough.

Dunsrim Lough is downstream of the licensed discharge point (WP26/15) (see Figure 8-10 below) for Scotshouse Quarry and is connected via open roadside drain/drainage ditches feeding into local wetland that connects to Dunsrim Lough. The lough, preceding wetlands and drainage are the main receptors for potential surface water effects that may occur as a result of onsite activities, which, if significantly impacted could act as a secondary source of impacts on the River GORTNANA_010 downstream.

There are two other surface water bodies, located within different subcatchments (36_5 Annalee_SC_030 and Bunnoe_SC_010) within 2km of the Site: the River ANNALEE_080 (ca. 788m south) and the River BUNNOE_030 (ca. 455m southeast) [78].

Figure 8-10: Surface Water Bodies and Catchment Boundaries



8.3.2.2 Surface Water Monitoring

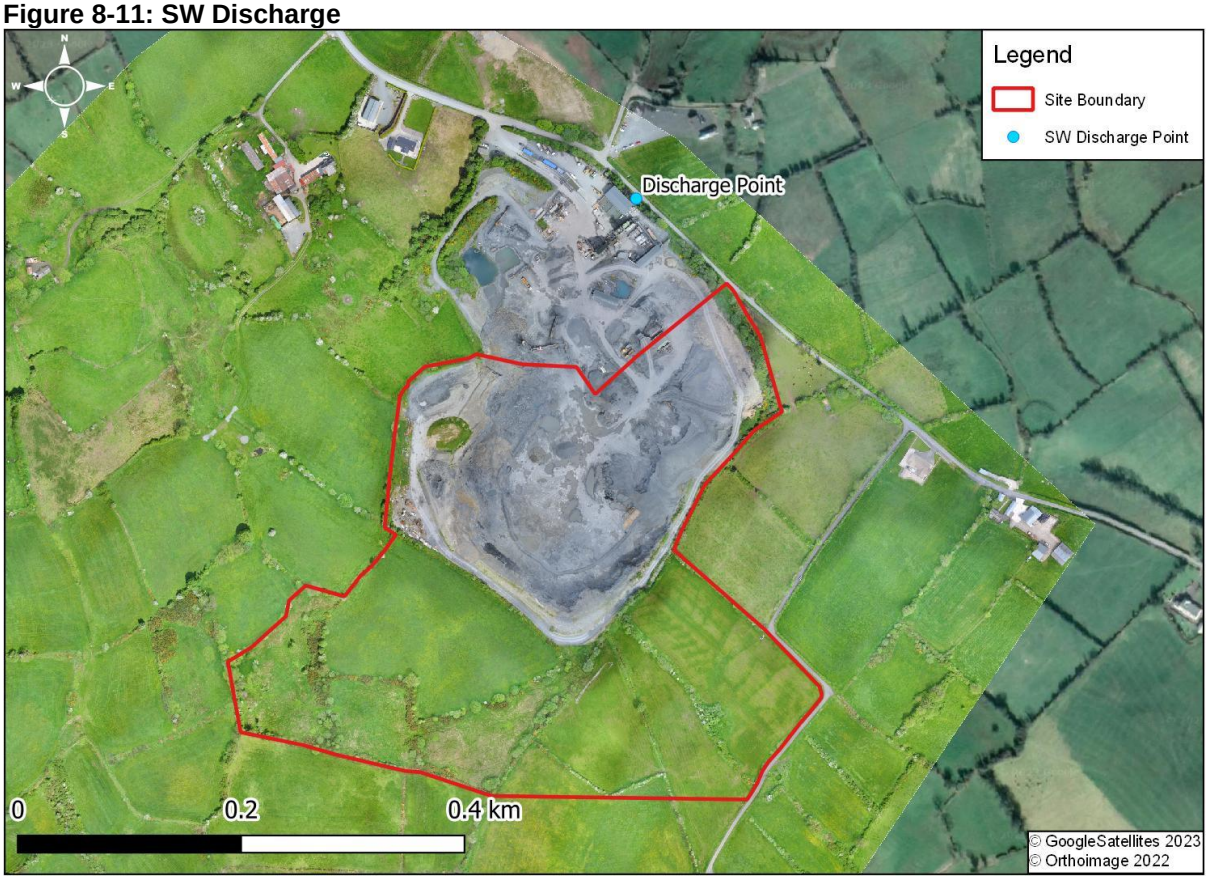
Scotshouse Quarry was granted a discharge licence from MCC in respect of trade effluent (WP26/15) following the granting of planning ref 14/124. The discharge consent permits the trade effluent and stormwater drainage as outlined in Section 3.6 above and requires it to be passed through a hydrocarbon class interceptor before the discharge to the adjacent drainage ditch at the northern boundary of Scotshouse Quarry (Refer to Figure 8-11 below). The water is then carried via an open roadside drain to the drainage ditch through two underground culverts before discharging to a wetland prior to entering Dunsrim Lough.

As part of this licence, Emission Limit Values (ELVs) were established for:

- Temperature (25°C);
- pH (6-9);
- BOD (5mg/l);
- Suspended solids (20mg/l);
- Molybdate Reactive Phosphorus (0.3mg/l); and,
- Total Ammonia (as N) (0.3mg/l).

Additionally, a limit on the volume of discharge at 4l/s or 360m^3 per day was set, along with the requirement that discharge does not contradict the objectives set out in European Communities Environmental Objectives (Surface Water) Regulations, 2009 (as amended).

Figure 8-11: SW Discharge



Based on five (No.5) flow monitoring events in January, February, June and July 2023, there is an average discharge rate of ca. 89m^3/day, with a range in discharge between 34-123m^3/day. These results indicate a relatively small volume of water leaving the Site during winter months when compared to the permitted discharge volume (i.e. 360 m^3/day).

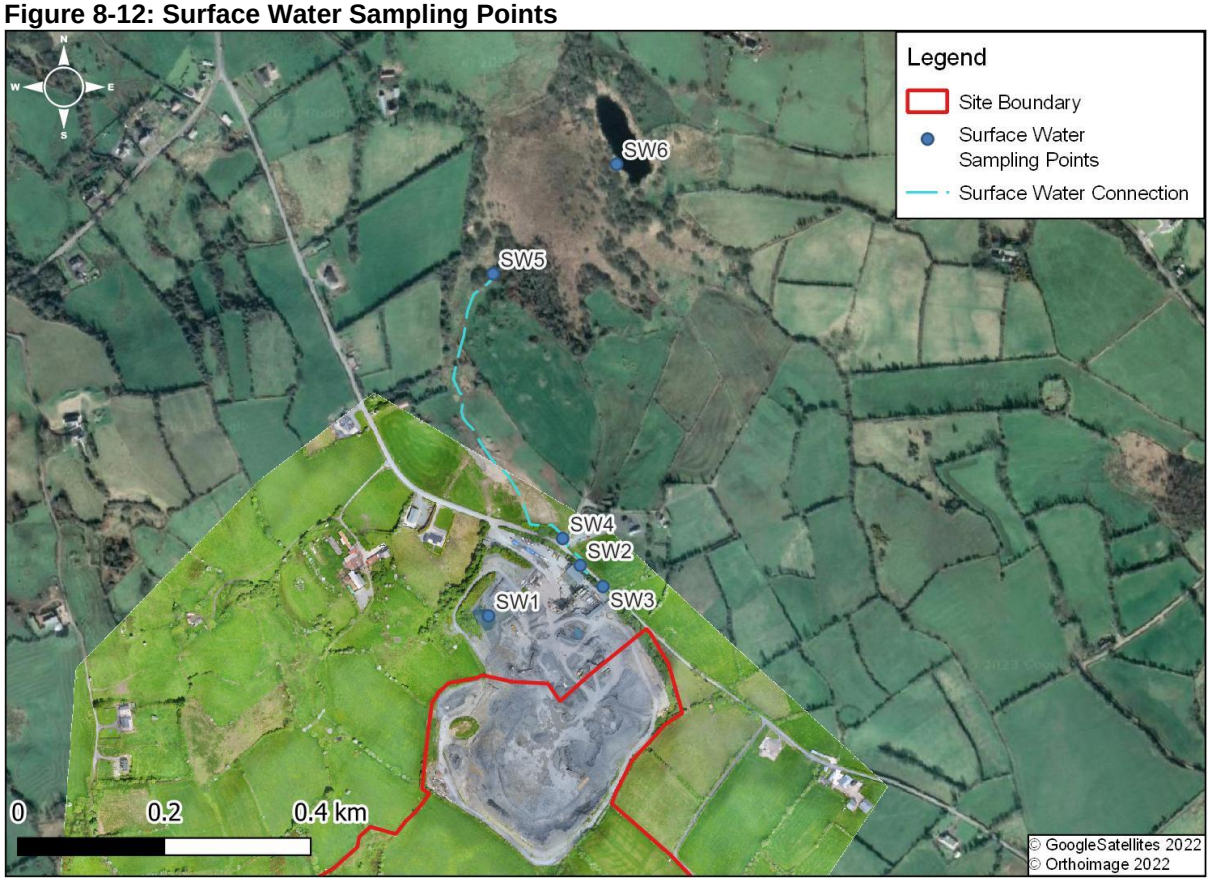
Historic surface water monitoring was carried out by MCC onsite between May 2016 to November 2019 on water discharging from onsite. Eight (No.8) monitoring events were carried out for surface water discharge, occurring in:

- May 2016;
- October 2016;
- June 2017;
- September 2017;
- September 2018;
- November 2018;
- July 2019; and,
- November 2019.

Four (No.4) exceedances of the Suspended Solids ELV (20mg/l) are noted to have occurred during this monitoring period – September 2017 (25mg/l), November 2018 (49mg/l), July 2019 (30mg/l) and November 2019 (30mg/l). Five (No.5) for exceedances of the Total Ammonia (as N) ELV (0.3mg/l) are noted to have occurred during this monitoring period - May 2016 (0.75mg/l), October 2016 (0.92mg/l), September 2018 (0.53mg/l), July 2019 (1.06mg/l) and November 2019 (1.06mg/l). All other parameters and monitoring dates were found to be compliant with the ELVs.

More recent monitoring was completed onsite between October 2022 and October 2023 at the discharge point and at various points along the drainage ditch. Twelve (No.12) monitoring events were carried out for surface water on a monthly basis during this period. Sampling took place at six (No.6) locations – SW1 sampled the settlement lagoons, SW2 sampled the discharge point, SW3 sampled the drainage ditch upstream from the discharge point, SW4 sampled the drainage ditch downstream of the discharge, SW5 sampled the drainage ditch before the wetlands adjacent to Dunsrim Lough (after January 2023) and SW6 sampled the water flowing from the wetlands adjacent to Dunsrim Lough (after January 2023).

Figure 8-12: Surface Water Sampling Points



Three (No.3) exceedances of the suspended solids ELV (20mg/l) was noted at SW2 during the December 2022 (34mg/l), March 2023 (21mg/l) and April 2023 (21mg/l) monitoring events. Two (No. 2) exceedances of the total ammonia (as N) ELV (0.3mg/l) were recorded during monitoring in 2022 at SW2 in October 2022 (0.31mg/l) and in November 2022 (0.32mg/l). All discharges (SW2) exceeded surface water acceptance criteria (SWACs) for “Good” quality total ammonia as N (≤0.065mg/l N annual mean), excluding the February 2023 monitoring event (<0.1mg/l N) and the October 2023 event (where no sample was taken), with concentrations ranging between <0.1 - 0.32mg/l N.

When comparing drainage ditch measurements (SW3 – SW6) taken in 2022 and 2023 to S.I. No.272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended) [84], the surface water body directly downstream of the

discharge (SW4) exceeds the SWAC for "Good" quality total ammonia as N (≤0.065mg/l N annual mean) during all 2022 monitoring events and the March – October 2023 monitoring events, with concentrations ranging between <0.1 - 0.2mg/l N. Upstream (SW3) shows exceedance of the SWAC for total ammonia as N during the April, May and October 2023 monitoring events. Downstream of SW3, SW5 shows three (No.3) exceedances above the SWAC for total ammonia as N during the May 2023 (0.11mg/l N), July 2023 (0.14mg/l N) and September 2023 (0.12mg/l N) monitoring events. Further downstream, SW6 shows five (No. 5) exceedances of the SWAC for total ammonia as N during the February – May 2023 and the August 2023 monitoring events. Elevated suspended solid concentrations at SW2 map consistently onto the detection of suspended solids at SW4 downstream. However, during a single event of 130mg/l suspended solid concentrations upstream (SW3) of the discharge location during the May 2023 monitoring event no suspended solids were detected at SW4.

The average of the BOD measurements between October 2022 and October 2023 (2.25mg/l) at SW6 exceeds the SWAC for BOD (1.5mg/l annual average). Additionally, there are exceedances of the SWAC for molybdate reactive phosphate (as P) (≤0.035mg/l P annual mean) at SW6 during all monitoring events at that location (January – May 2023) (0.054 – 0.15mg/l P range). These exceedances are likely unrelated to onsite activities as no exceedances of BOD or molybdate reactive phosphate (as P) occur within or around the discharge.

The discharge from the Site is made up of storm water carrying overflow from the mineral crushing plant, vehicle and wheel washings and general run-off from the Site. The suspended solids from the Site are sourced from sediment and other material carried in this run-off and can be sourced actively (washings) and passively (run-off) from Site activities. The Site may be acting as a pathway for agricultural land run-off from Zone B and other adjoining agricultural lands, which may be contributing to ammonia within surface water discharges, given the offsite ammonia source identified from groundwater monitoring (see section 8.3.1.6). Additionally, residues of explosives from onsite blasting entering run-off and washings to reach the discharge are likely contributing to ammonia in the discharge. However, as noted from monitoring data for SW3, there are elevations above SWAC limits for ammonia and elevations in suspended solids within waters in the drainage network upstream of the discharge, indicating that the Site is not the sole contributor for these elevations locally.

Whilst the elevated concentration of suspended solids and total ammonia of the discharge can be correlated to concentrations directly downstream of the discharge at SW4, elevated concentrations at the discharge do not directly correspond to concentrations above the SWAC limits further downstream at SW5 and SW6 in all cases. As such, the negative effect of current Site activities is localised, temporary and not significant, with the transport and the wetland attenuating effects before they enter surface waters at Dunsrim Lough.

8.3.3 Wastewater

There is a portable toilet stationed just inside the Scotshouse Quarry entrance gate (within the Land Ownership Boundary). There is a septic tank opposite the site office within the Land Ownership Boundary. This is gravity-fed via underground pipes which takes foul water from the hygiene facilities inside the office and from the canteen. Both tanks are emptied on an as-needed basis by appropriate qualified waste contractors.

8.3.4 Flood Risk Assessment (FRA)

The OPW's Catchment Flood Risk Assessment and Management (CFRAM) maps [79], Flood Hazard Mapping, along with historical mapping (i.e. 6" and 25" base maps) were reviewed to assess flood risk in the area of the Site.

CFRAM mapping has been completed for the Site and shows that the Site is not located within any fluvial or pluvial flood zones. There is no identification of areas that are "prone to flooding" on the available historical 6" or 25" (inch) within the Site boundary [79].

No flood events or recurring flood incidents were identified at the Site or in its vicinity from the OPW's Flood Hazard Mapping (see Appendix 8-7 for a copy of the Past Flood Event Local Area Summary Report for the Site). The closest mapped flood events are located to the north and southeast of the Site, the majority of which are recurring in nature. The closest of these recurring flood events is 2.76km southeast of the Site, resulting from the Mill Race and River overflowing after heavy rain.

The area up to 2km surrounding the Site is not located within any predicted flood extents or areas at elevated risk of flood for both current and predicted future scenarios on the OPW datasets. This applies for pluvial, fluvial and groundwater flooding. Currently, discharges range from 34-123m^3/day, with an average rate of 89m^3/day measured. Given the minimal flood risk within the vicinity and downstream of the discharge it is not considered that proposed increases to discharge volume from Site will contribute to surface water flooding offsite.

However, the Site area itself is to be extracted below the groundwater table and as such natural intrusion and flooding of groundwater will occur, which will be allowed to collect, along with any run-off or rainfall, in sumps formed from low points onsite produced during extraction. Water from these sumps will be pumped offsite through the surface water discharge at rates compliant with the limits of the discharge licence. This pumping will be phased dependent with the project design creating sump low points in extraction zones for each phase, and pumping occurring when necessary, during changes in extraction area/phase and in order to prevent the sump overflowing from water input. Based on the information in Section 8.3.1.4 on groundwater levels, there is limited seasonality in the groundwater levels across the Site area, with slight drops in summer elevations. As such this phased design may help reduce the amount of operations within the limited seasonal groundwater elevations onsite.

In the instance of a storm event, the areas within the Site below the groundwater table will be prone to inundation. This is the result of the stormwater elevating the groundwater profile onsite and stormwater becoming trapped within areas below the groundwater table as a result of the exposure of the groundwater table. The current design phasing leaves low points not currently under extraction as sumps for groundwater and storm inputs to be retained to prevent a breach of discharge limits in the licence.

Based on the categorisation of storms by Met Eireann [85], rainfall associated with a "Status Red Storm" is "greater than 80mm in 24hrs or less". Using this as a model storm event, the volume of stormwater entering the Site and existing quarry, and thus accumulating in any sumps for discharge, can be estimated. Additionally, using a High-End Future Scenario from the OPW [18], rainfall increases of 30% can be used to model a worse-case-scenario accounting for climate change. Therefore, a worst-case model storm would input greater than 104mm of rainfall in 24hrs or less over an area of 17.9ha (the area of Scotshouse Quarry, including the extension lands), or 179,000m^2. This equates to a minimum of 18,616m^3/day of stormwater directly entering the Site, which is a net input of 18,256m^3/day, when a maximum discharge of 360m^3/day is considered. The minimum sump height during any given phase of the development is 15m, hence, to accommodate the minimum storm inputs in a worst-case scenario and a sump of 1241m^2 is required with no discharge and a sump of 1217m^2 is required with discharge. Accounting for predicted maximum groundwater inputs of 50m^3/day from pumping tests, this necessary minimum area is 1244m^2 with no discharge and 1220m^2 is required with discharge. This calculation is based on a number of assumptions:

- Storm inputs relate directly to the rainfall onto the Site area and do not account for inputs from increased offsite runoff or groundwater entering the site as a result of the storm;
- The storm inputs cease after 24hrs at the stated rate;
- There is no water loss to groundwater transport, evaporation, etc.; and,
- The minimum capacity assumes that the sump area is empty before the storm inputs.

The calculated minimum areas equate to approximately 0.7% of the area of Scotshouse Quarry, including the extension lands. Given the area of the Site, and the phases to be implemented it is estimated that there will be sufficient space to withhold water from a storm event/groundwater intrusion.

Based on this information it can be concluded that the Proposed Development will not contribute to surface water flooding, however the Proposed Development will be naturally prone to groundwater flooding due to extraction below the groundwater table, with this flooding worsening during storm events. The Applicant will maintain sumps across the operational phase to ensure this flooding is concentrated in a desired area and pumped off at rate to maintain compliance with existing discharge limits.

8.3.5 Designated Ecological Sites

The Site is not located within 5km of a SAC or SPA. The nearest SAC is a section of the Lough Oughter and Associated Loughs SAC located 5.1km to the southwest. However, the Site is hydrologically connected to a different section of the same SAC approximately 14.6km downstream of the licensed discharge point, resulting from the nature of surface water flow in the area. Further discussion of the ecological sites in the vicinity of the Site can be found in Chapter 6 of this report.

8.4 Characteristics and Potential Impacts of the Proposed Development

8.4.1 Groundwater

The removal of soils, subsoils and bedrock from Zone B during the Proposed Development will increase the vulnerability of groundwater to contamination. This increase in vulnerability occurs both from the direct exposure of groundwater in areas of the Site extracted below the water table and with the exposure of bedrock resulted in a potential pollution pathway to groundwater through fractures in exposed bedrock. This increased vulnerability will occur over only small area of the Cavan GWB. Therefore, this represents a permanent and not significant negative effect to the vulnerability of local groundwater.

The Proposed Development will likely result in brief to temporary negative effects on groundwater quality associated with sulphate concentrations exceeding the Groundwater Acceptance Criteria as activities are expected to remain relative consistent with current Site operations. Groundwater monitoring from Site investigations shows the elevated sulphate concentrations are non-persistent onsite, naturally declining below the acceptance criteria in the monitoring events following the exceedance. Up-flow groundwater wells do not show exceedances in sulphate concentrations and as such these exceedances are likely linked to activities within Scotshouse Quarry instead of natural sulphate occurrences noted to occur within aquifers in the region. Elevated sulphate sourced from pumped groundwater within the surface water discharge is not of concern as no SWAC limits are set out for sulphate in relation to water quality and there is no licensed requirement to monitor or control sulphate discharge offsite. In addition to sulphate, ammonia exceedances were detected in the groundwater of Zone B, but not in Zone A, indicating the presence of an ammonia source infiltrating groundwater up flow from Zone A/the existing quarry. As no ammonia exceedances are noted in the existing quarry or Zone A, it is predicted that the effects of the Proposed Development on groundwater quality in relation to ammonia will be not significant.

The pumping and discharge of groundwater from the Site to offsite drainage is expected to have ‘not significant’ negative effects on the surrounding wells and nearby PWS. The PWS abstracts from the Clones GWB rather than the Cavan GWB under the Site and as such a reduction in water availability at the PWS from onsite pumping is not expected. The poor productivity/low importance of the aquifer means any change in availability is predicted to be not significant and as such nearby downflow wells within the Cavan GWB are not expected to experience a significant reduction in available water. This not significant effect is also only temporary as groundwater ponding within the Proposed Development will only be discharged

when necessary for extraction, with continuous active abstraction of groundwater for onsite use not occurring. Phasing of the Proposed Development is designed to leave low points on the Site to act as sumps to collect groundwater for discharge as extraction occurs elsewhere in the quarry. Additionally, the discharge will be formed from process water, runoff and pumped groundwater combined and must remain below 360m^3 to be compliant with the discharge licence. Based on pumping test data, the minimum daily ingress of groundwater is <1m^3/day and the maximum ingress is 50m^3/day. Therefore, groundwater removed from the aquifer will comprise only a small portion of the discharge volume at maximum (~14%) and will remain below 360m^3 at maximum.

In order to carry out the works at the Proposed Development, there will be a requirement for heavy machinery and controlled blasting. As such, fuels and hydrocarbon oils utilised during these operations will pose a risk to both groundwater with a spill or release resulting in a significant negative effect on waterbodies. As such mitigation will be required to reduce the risk to an acceptable level.

8.4.2 Surface Water

The main pathway from the Proposed Development to surface waters is through the discharge point into the local drainage network. The discharge acts as a potential pathway for suspended solids from onsite activities and ammonia from the run-off of neighbouring agricultural land and onsite blasting activities to enter into the connected drainage network that joins the GORTNANA_010 waterbody at Dunsrim Lough, and other surface waterbodies (FINN (MONAGHAN)_050) downstream. Current surface water monitoring data indicates that whilst there are exceedances in ammonia and suspended solid concentrations in the offsite drainage network, the effects do not extend consistently downstream, with ammonia concentrations at Dunsrim Lough not coupled to those recorded at the discharge location. The exact ratio of agricultural run-off to explosive residue sourced ammonia is unconstrained, however the removal of overburden during the operational phase activities in Zone B will push the Proposed Development to the edge of the Finn[Monaghan]_SC_020 sub-catchment boundary. As such it will reduce the amount of run-off sourced from agricultural lands surrounding the Site through a change in land use, potentially reducing ammonia inputs from this source. Therefore, negative effects associated with ammonia discharging from the Proposed Development are predicted to be not significant to slight and limited locally.

It is likely that there will be an increase in the discharge rate when compared to current measured levels, however, the discharge rate will remain within the 360m^3/day limit within the discharge licence. This increased discharge is sourced from the dewatering of areas of the quarry extracted below the groundwater table, however, there is no indication that the increase will result in flooding downstream of the discharge. There remains a potential for increased suspended solid within the discharge and this is unaffected by the change in land use in Zone B as the suspended solids are sourced from onsite activities and not offsite run-off. As such the Proposed Development could result in a slight negative impact on surface waterbodies due to increases in suspended solids.

In order to carry out the works at the Proposed Development, heavy machinery will be required and blasting is planned. As such, fuels and hydrocarbon oils utilised during these operations will pose a risk to surface water with a spill or release resulting in a significant medium to long-term negative effects localised to downstream of the discharge. As such mitigation will be required to reduce the risk to an acceptable level.

8.5 Proposed Mitigation Measures and/or Factors

The employment of good environmental management practices serves to minimise the risk of pollution from the extraction activities at the Quarry Site in line with the EPA (2006) Environmental Management Guidelines: Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [14].

Mitigation measures for prevention of groundwater and surface water contamination during all stages of the quarry are stated below. With regard to water, the following should be adhered to:

- All plant and HGV will be refuelled on a concrete plinth in the existing Scotshouse Quarry. This plinth flows into settlement tanks before reaching the interceptor prior to discharge;
- Items of plant unsuitable for travelling to the refuelling area (dry screening plant), will be refuelled utilising adequately sized and positioned drip trays, outside of areas of the quarry below the groundwater table;
- Spill kits will be available adjacent to all refuelling and fuel storage operations;
- Fuel will be stored in a double skin tank in the existing quarry and will be appropriately bunded. No fuel will be stored within the Site;
- Fuels, lubricants and hydraulic fluids for screening equipment used on the Site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to best practice codes. These will be stored at the existing quarry;
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the Site for disposal or recycling;
- Drip trays will be used under plant which has the potential for hydrocarbon or chemical leakage when located on permeable ground;
- Any spillage of fuels, lubricants, hydraulic oils or other chemicals will be immediately contained, and the contaminated soil removed from the Site and disposed of in accordance with relevant legislation;
- It is recommended that items of plant will not be left within sumps or water retention areas within the quarry overnight or periods before forecasted storm events;
- Ensure blasting practice minimises the risk of occurrence of nitrate/ammonia residues by proper blast design and implementation, appropriate disposal of any excess explosives, and selection of the appropriate type of explosives;
- Water to be discharged will be collected in existing settlement ponds and onsite sumps before discharge to allow solids to settle out and reduce the suspended solids within the discharging waters; and,
- It is recommended that a penstock valve and flow monitor be installed at the existing discharge point. The penstock valve would be an emergency measure capable of shutting off flow from the discharge point if discharge flow limits were to be exceeded.

Additionally, the phased design approach for extraction within the Proposed Development contributes to mitigation for water effects, by allowing the low points not being extracted from in each phase of operation to act as sumps for onsite water retention. This allows for:

- Additional sediment settlement, which removes suspended solids from the water column, limiting any increases in suspended solid entering the drainage network from increased discharge volume; and,
- Increased capacity for the retention of onsite water in the case of storm events, preventing a breach of licence limits and limiting any contributions to potential flooding at offsite surface waters linked to discharge from the Site.

A permanent effect of the Proposed Development is an increase to the groundwater vulnerability across the Site, following Site closure. Measures taken during the Restoration phase will limit the risk associated with this increased vulnerability:

- The retention and vegetation of onsite screening berms will limit the run-off from surrounding lands into the groundwater within the quarry; and,
- The retention of security fencing constructed as part of the Proposed Development for safety purposed will limit unauthorised access to the Site.

8.6 Cumulative and In-combination Effects

With the implementation of mitigation measures, it is not envisioned that the Proposed Development will contribute strongly to existing local pressures on ground or surface water. Minimal effects predicted for groundwater and the surface water effects from suspended solids and explosive residues are predicted to be temporary. With standard management procedures and controls in place, the risk of fuel spillage is minimised. No significant cumulative or in combination effects are expected.

8.7 Interactions with other Environmental Attributes

Water (Hydrogeology and Hydrology) interacts with other environmental attributes as follows:

- Chapter 5 (Population and Human Health). Potential effects on human health can occur through the contamination of water and reduction in water availability for abstraction. This assessment has indicated that the Proposed Development will have a not significant negative effect on these factors;
- Chapter 6 (Biodiversity). Potential effects on hydrology can also impact on ecological conditions and ecologically designated sites. Based on discharge and downstream of discharge monitoring, the discharge from the Site is likely undergoing natural attenuation prior to reaching Dunsrim Lough, the potential for effects on biodiversity through water are reduced. Nevertheless, these effects on biodiversity are assessed in detail in Chapter 6;
- Chapter 7 (Land, Soils and Geology). Effects on soils/bedrock can result in related effects on surface water and groundwater. These effects on the bedrock are discussed in Chapter 7; and,
- Chapter 10 (Climate Change). Climate change can give rise to more frequent extreme weather events. The potential risks associated with these weather events have been considered in both Chapter 8 (Water) and Chapter 10.

8.8 Indirect Effects

No indirect effects were noted to have occurred as a result of the onsite works.

8.9 Residual Effects

In relation to groundwater, restoration works onsite will not include a reinstatement of previous ground levels, with the quarry void planned to be left open. As such, following the restoration of the Site, the increased groundwater vulnerability associated with the open void will remain. This represents a permanent but not significant negative effect to the Cavan groundwater body as the Site only represents a small area of the overall groundwater body.

The mitigation provided by the sumps for water retention at Site low-points within the phased design of the Proposed Development allow for additional settlement of suspended solids before discharge through the settlement tank. As such, the effects of increasing discharge volumes resulting in increased suspended solids noted in Section 8.4. are mitigated against by the increased capacity for water retention allowing for increased sediment settlement. Therefore, the effects associated with suspended solids from the Proposed Development are predicted to be similar to current effects - not significant to slight and limited locally. Long-term effects on surface waters in the vicinity of the Proposed Development during operations will be not significant. Following Site restoration and closure, effects on surface water quality will be negligible.

8.10 Monitoring

The trade effluent discharge licence by MCC (WP26/15) stipulates conditions on the monitoring and reporting on discharge to surface water onsite. In order for the Proposed Development to remain compliant with this licence, the following measures should be followed:

- Samples of final effluent prior to discharge to the receiving watercourse should be taken on a monthly basis. These should be analysed for BOD, Suspended Solids, pH, Temperature, Total Ammonia and Molybdate Reactive Phosphorus;
- Samples of the receiving watercourse at agreed locations upstream and downstream of the site to be taken on a quarterly basis. These should be analysed for BOD, COD, Suspended Solids, pH, Conductivity, Temperature, Total Ammonia, Nitrate and Molybdate Reactive Phosphorus;
- Records of daily flow rate monitoring, recorded in m^3/day, should be maintained, with detection above limits resulting in the shut-off of discharge and retention of excess water onsite, and,
- Results of monitoring should be submitted electronically to Monaghan County Council on a quarterly basis, with an Annual Environmental Report (AER) submitted before 30th November each year.

No groundwater monitoring is stipulated as part of the licence. However, with the increased groundwater vulnerability associated with activities within the Proposed Development, it is recommended that groundwater monitoring is recommended in two groundwater wells biannually – one up flow and one downflow of the Proposed Development.

8.11 Reinstatement

The restoration phase of the Proposed Development outlines how the site will be restored to an inert state. This phase and potential associated effects have been considered throughout this Chapter.

8.12 Difficulties Encountered in Compiling this Information

No difficulties were encountered when compiling this information.

9 AIR QUALITY

9.1 Introduction

This chapter of the EIAR provides a description and assessment of the likely effects of the Proposed Development on air quality in the vicinity of the Site.

9.2 Methodology

The following standards and guidance documents were used to assess the baseline conditions and in the assessment of potential effect:

- Department of Environment, Heritage and Local Government (DEHLG) – Quarries and Ancillary Activities: Guidelines for Planning Authorities (2004) [12];
- Institute of Air Quality Management (IAQM) - Guidance on the Assessment of Mineral Dust Impacts for Planning (2016) [86];
- EPA - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (2006) [14];
- Irish Concrete Federation (ICF) Environmental Code (2005) [87];
- EPA - Air Quality in Ireland 2018 – Indicators of Air Quality [88];
- EPA - Air Quality in Ireland 2019 – Indicators of Air Quality [89];
- EPA - Air Quality in Ireland 2020 – Indicators of Air Quality [90];
- EPA - Air Quality in Ireland 2021 – Indicators of Air Quality [91];
- EPA - Air Quality in Ireland 2022 – Indicators of Air Quality [92];
- EPA – Air Dispersion Modelling from Industrial Installations Guidance (AG4) (2019);
- Transport Infrastructure of Ireland – Air Quality Assessment for specified infrastructure projects – overarching technical document (2022) [93]; and,
- Federal Government of Germany - Technical Instructions on Air Quality Control (TA-Luft) (2002) [94].

Given the nature of activities associated with the Proposed Development, the IAQM Guidance on the Assessment of Mineral Dust for Planning [86] for completing a disamenity dust risk assessment was used, see Appendix 9-1 for further information.

The main potential impacts on air quality from the Proposed Development are airborne particulate matter (PM_{10}) and nuisance dust deposition. The potential impacts caused by the release of NO_2, from plant and HGV movements, were screened out of this assessment. This is based on the guidance relating to these emissions from the IAQM [86] and the Transport Infrastructure of Ireland [93]. Section 9.4.2 below provides further details on this screening for NO_2.

9.2.1 Policy context

The following sections will review and highlight relevant policies relating to the Proposed Development in the context of national, regional and local climate and air quality objectives.

9.2.1.1 Clean Air Strategy

The Department of Communications, Climate Action and Environment (DCCAE) are prepared a Clean Air Strategy and published in 2023 [95]. The aim outlined indicates the effort to reduce certain specific sources of emissions that are having the greatest impact, whilst also identifying cost effective approaches to emission reductions [95].

The Clean Air Strategy outlines key strategic priorities relating to air quality in Ireland, including:

- Ensure continuous improvements in air quality across the country;
- Ensure the integration of clean air considerations into policy development across Government;

- Enhance regulation and enforcement; and,
- Promote and increase awareness of the importance of clean air.

Emissions of PM_{10} in Ireland amounted to ca.28.28kt in 2020. The main source of PM_{10} emissions is from agriculture, which accounted for a 31.3% share of the national total in 2020, with combustion in the combined sectors of residential and institutional accounting for 25.4% of the shared total [95].

9.2.1.2 Monaghan County Development Plan 2019- 2025

The Monaghan County Development Plan 2019-2025 [27] details various aims and objectives relating to Air Quality, relevant to the Proposed Development:

Air Quality

> ***AQP 1:*** *Quality and Cleaner Air For Europe (CAFE) Directive (2008/50/EC) and ensure that all air emissions associated with new developments are within Environmental Quality Standards as out in the Air Quality Standards Regulations 2011 (SI No. 180 of 2011) (or any updated/superseding documents). Promote the preservation of best ambient air quality compatible with sustainable development in accordance with the EU Ambient Air.*
>
> ***AQP2:*** *To contribute towards the compliance with air quality legislation; greenhouse gas emission targets; management of noise levels; and reductions in energy usage.*

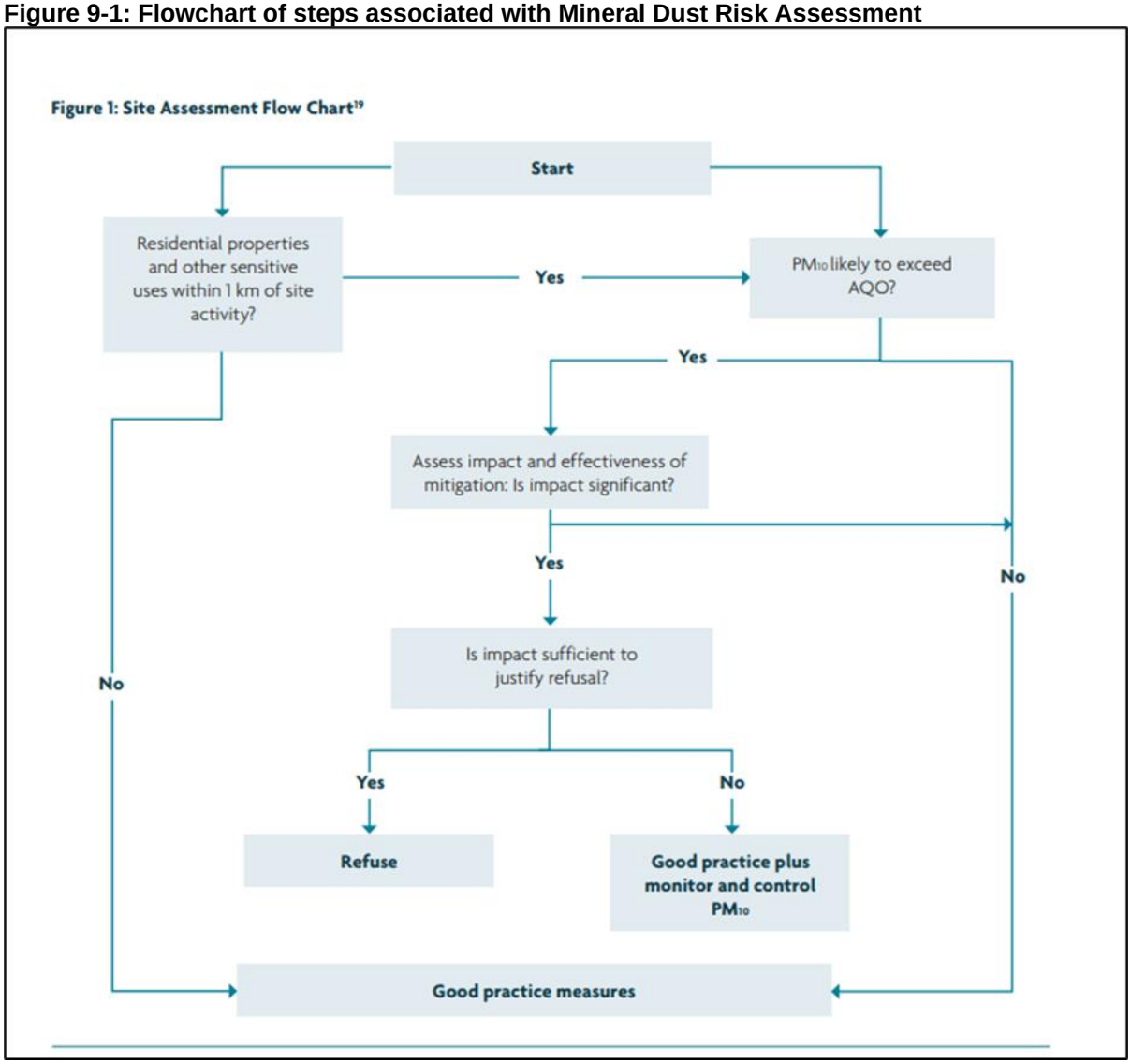
9.2.2 Mineral Dust Risk Assessment

A risk assessment of dust emissions arising from activities associated with the Proposed Development was completed in accordance with the IAQM Guidance [86]. A flow chart outlining the various steps associated with the preparation of a dust risk assessment are outlined in Figure 9-1 below, with full details presented in Appendix 9-1.

The definition of mineral in this chapter is taken from Statutory Instrument (S.I) No. 600 of 2001 (Planning and Development Regulations 2001 (as amended)):

> *"All minerals and substances in or under the land of a kind ordinarily worked by underground or by surface working for the removal but does not include turf".*

Figure 9-1: Flowchart of steps associated with Mineral Dust Risk Assessment



9.3 Receiving Environment

9.3.1 Air Quality Standards

Air Quality Standards within Ireland are laid down by the Clean Air for Europe (CAFE) Directive 2008 (2008/50/EC), which was transposed into Irish law as the Air Quality Standards Regulations 2011 (S.I. 180 of 2011).

Air Quality Standards (AQSs) are typically based on the effects of the relevant pollutants on human health, although effects on other receptors such as vegetation are sometimes considered. The relevant limit values for particulate matter are laid out in Table 9-1 below.

Table 9-1: EU and Irish Limit Values for Relevant Pollutants

Pollutant	Objective			
	Concentration (µg/m^3)	**Maximum No of Exceedances Permitted/Annum**	**Exceedance as %**	**Measured as**
Particular Matter PM_{10}	50	35	90.4th percentile	24-hr mean
Particulate Matter PM_{10}	40	N/A	N/A	Annual mean (calendar year)

The above AQSs are applicable to the air quality in the locality of the Site.

9.3.2 Background Air Quality

EU legislation on air quality requires that all Member States divide their territory into zones for the assessment and management of air quality. The current trends in air quality in Ireland are reported in the EPA publication Air Quality in Ireland (Key Indicators of Ambient Air Quality) – Annual Report 2022 [92] which is the most up to date report on air quality in Ireland.

For ambient air quality management and monitoring in Ireland, the AQS Regulations (S.I. No. 180 of 2011) defines four zones, set out as follows:

- Air Zone A – Dublin Conurbation;
- Air Zone B – Cork Conurbation;
- Air Zone C – A total of 24 cities and large towns: Athlone, Balbriggan, Bray, Carlow, Celbridge, Clonmel, Drogheda, Dundalk, Ennis, Galway, Greystones, Kilkenny, Leixlip, Letterkenny, Limerick, Mullingar, Naas, Navan, Newbridge, Portlaoise, Sligo, Tralee, Waterford and Wexford; and,
- Air Zone D - Rural Ireland i.e., the remainder of the country excluding Zones A, B and C.

According to the above classification, the Proposed Development is located within Zone D. Table 9-2 below shows the baseline air quality data monitored by the EPA in stations across towns located in Zone D.

Table 9-2: Annual Mean Concentrations of PM_{10} Measured at Zone D Stations

Monitoring Stations	Total Particulates PM_{10} Annual Mean (µg/m³)				
	2018	2019	2020	2021	2022
Castlebar	11	16	14	9.8	11.2
Cobh	15	13	13	12	13.2
Claremorris	12	11	10	9.5	7.9
Kilkitt	9	7	8	7.8	8.5
Roscommon Town	12	12	11	10.3	11.2
Enniscorthy	-	18	15	13.7	15.0
Macroom	-	28	15	14.6	16.1
Tipperary Town	-	9	12	12.7	13.9
Carrick-on-Shannon	-	-	10	9.4	9.4
Birr	-	-	10	12.2	14.5
Askeaton	-	-	7	8.7	-
Cavan	-	-	9	10.6	11.0
Edenderry	-	-	-	17.8	17.7
Mallow	-	-	-	14.8	13.5
Longford	-	-	-	13.9	16.0
Cobh Cork Harbour	-	-	-	13.4	14.4
Average Zone D	**11.8**	**14.3**	**11.2**	**11.9**	**12.7**

The maximum concentration recorded in Zone D for PM_{10} was recorded at the Macroom Station in 2019 (28µg/m^3). Annual concentrations recorded across Zone D from 2018 to 2022 range between 7 and 28µg/m^3.

The closet EPA station to the Proposed Development is Cavan Town (Station 78), ca.15km to the south. According to the EPAs Guidance on Air Dispersion Modelling (AG4), when determining background concentrations, a minimum of two-consecutive years are to be used [96]. As a conservative estimate the average of the 5 most recent years of available data for Zone D was used (2018-2022). The mean concentrations for Zone D between 2017 and 2021 was 12.4µg/m^3.

9.3.3 Dust Deposition Limits

According to the EPA's Guidelines for Extractive Industries and the DEHLG, Quarries and Ancillary Activities [12], quarries, by their nature, generate dust, with the main impact being

disamenity due to dust deposition. However, there are currently no Irish Statutory limits or Guidelines relating specifically to dust deposition thresholds for inert dust. The Bergerhoff Method specified in the German TA Luft Air Quality Standards is presented in both the EPA [14], DoEHLG [12] and ICF [97] guidance for monitoring of dust deposition in quarries. Also, the TA Luft dust deposition limit value of 350mg/m^2/day (when averaged over a 30-day period) is typically set as a limit along all site boundaries associated with quarry and infill developments [94]. There is an existing dust monitoring program implemented at the Scotshouse Quarry.

9.3.4 Other Sources of Emissions to Air

Notable sources of emissions to air in the vicinity of the Proposed Development include:

- Traffic associated with the regional R212 road and local roads;
- Agricultural activities; and,
- Residential dwellings in the vicinity of the Site and from the nearby town of Scotshouse.

Table 9-3 below gives further information on licensed facilities in the surrounding area of the Proposed Development.

Table 9-3: IEL and IPC licences associated with the Proposed Development

Licence Number	Name of Organisation/ Person Responsible	Activities Associated	Distance to Proposed Development	Licence emission limit
P1034	Mr S Hall	Intensive Agriculture	ca. 3.4 km SE	NA
P1047	Mr G Smyth	Intensive Agriculture	ca. 3.2 km E	NA
P1049	Serkin Farms Ltd	Intensive Agriculture	ca. 4.8 km NE	NA
P0962	Franceys Farm Limited	Intensive Agriculture	ca. 4.8 km NE	NA

According to the EPA AG4 Guidance on Air Dispersion Modelling [98], a cumulative assessment is carried out if it is expected that impact of two or more installations will overlap significantly. This represents the best available Irish guidelines for determining cumulative effects of potential pollutants to air quality. Consideration is also given for nearby installations that emit similar pollutants to a significant level [98].

According to the IAQM Guidance on mineral dust [86], potential effects caused by quarry activities on $PM_{10,}$ or nuisance dust can be recorded up to 400m from a limestone quarry.

Considering a 400m buffer as a conservative estimation of potential impacts of dust, there is no EPA licensed sites within 3km of the Site. In addition, none of the facilities have an ELV for dust or total particulates. As a result, the potential for cumulative effects on sensitive receptors on local air quality from licensed facilities is determined as not likely and not significant.

9.3.5 Historic Dust Monitoring

Between November 2022 to present, monthly Bergerhoff monitoring was conducted at four to six locations located around the Site. Monitoring was managed and conducted by BHP laboratories. Sample results from November 2022-November 2023 have been reviewed below. These results are presented in Table 9-4 and Table 9-5 below.

Table 9-4: Historic Bergerhoff monitoring results.

ID	November – December 2022 Dust Deposition Value (mg/m²/day)	December 2022- January 2023 Dust Deposition Value (mg/m²/day)	January – February 2023 Dust Deposition Value (mg/m²/day)	February – March 2023 Dust Deposition Value (mg/m²/day)	March- April 2023 Dust Deposition Value (mg/m²/day)	April -May 2023 Dust Deposition Value (mg/m²/day)	May – June 2023 Dust Deposition Value (mg/m²/day)
D1	88	119	82	72	303	303	166
D2	33	87	22	110	99	99	85
D3	155	308	86	158	120	120	27
D4	30	130	N/A	33	N/A	N/A	158
D5	32	100	58	NA	78	78	N/A
D6	38	85	N/A	NA	N/A	N/A	N/A

*N/A Discontinued monitoring location

Table 9-5: Historic Bergerhoff monitoring results

ID	June – July 2023 Dust Deposition Value (mg/m^2/day)	July – August 2023 Dust Deposition Value (mg/m^2/day	August- September 2023 Dust Deposition Value (mg/m^2/day)	September- October2023 Dust Deposition Value (mg/m^2/day)	October– November 2023 Dust Deposition Value(mg/m^2/day)
D1	325	244	160	198	201
D2	122	144	45	150	81
D3	78	68	43	65	48
D4	254	215	212	161	109
D5	N/A	N/A	N/A	N/A	N/A
D6	N/A	N/A	N/A	N/A	N/A

*N/A Discontinued monitoring location

Across the monitoring period, all dust deposition values recorded were below the TA Luft limit value of 350mg/m^2/day.

Figure 9-2 below presents the dust monitoring locations from where the results outlined above correspond to.

Figure 9-2: Dust Monitoring Locations

9.3.6 Dust Sensitive Receptors

The Proposed Development will involve activities associated with mineral extraction, such as:

- Site preparation/restoration (working soil and over burden);
- Materials Handling;
- Crushing of rock material;
- Onsite transportation; and,
- Offsite truck movements (potential track out)

A risk assessment of receptors and the impacts from potential dust was completed in accordance with the IAQM's Guidance on 'The Assessment of Mineral Dust Impacts for Planning' [86].

According to the IAQM Guidelines, adverse impacts from rock quarries "*are uncommon beyond"* 400m measured from the nearest dust generating activities [86]. As such, receptors which occur 400m or less from the Site boundary have been considered in this dust risk assessment.

Dust generating activities will occur over a ca. 35-year period (inclusive of Construction and Restoration Phase), covering the majority of land within the redline boundary. As a conservative estimation of dust generating activities, a 400m buffer will be used from the redline boundary of the Proposed Development, rather than the quarry void.

A total of ten (10No.) receptors were identified in this buffer (SR01 – SR10).

The Proposed Development will utilise existing infrastructure (such as a wheel wash), which will negate the requirement for unnecessary construction. Requirement for HGVs to leave paved surfaces will be minimal. As such, dust generated on the haul routes will be minimal.

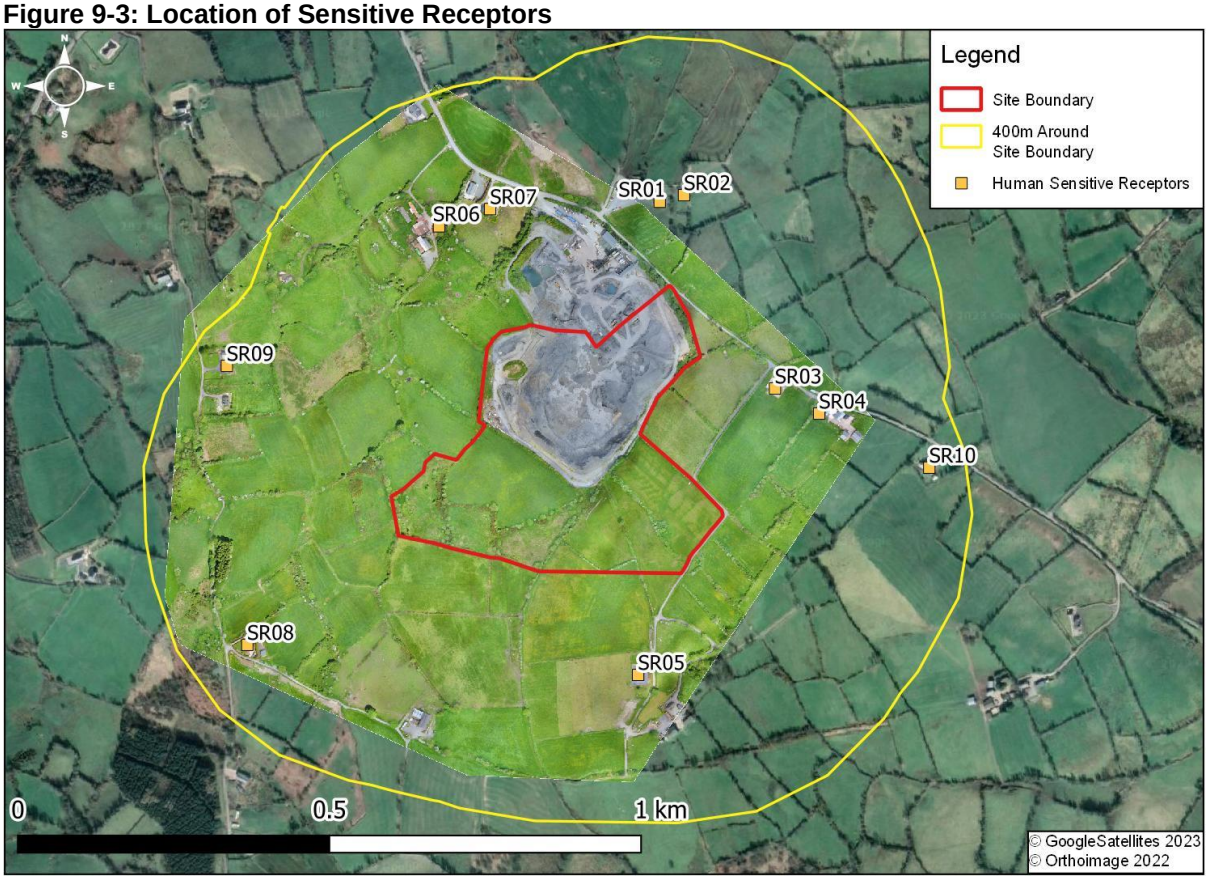
Table 9-6 below describes the sensitive receptors and potential landscape features that will potentially screen dust deposition.

Table 9-6: Identification of Sensitive Receptors (SRs)

ID	ITM (Easting, Northing)		Description of Sensitive Receptor	Distance/ Ordination from Emission Source (m)	Terrain between Site and Receptor
	E	N			
SR01	649667	818318	Residential Dwelling	ca.135m (northeast)	Tree cover to the south of the receptor will provide some degree of shielding from fugitive dust emitted from the quarry. The dominant landscape feature are the agricultural fields that surround the Proposed Development.
SR02	649706	818329	Residential Dwelling	ca.147m (northeast)	Tree cover to the south of the receptor will provide some degree of shielding from fugitive dust emitted from the quarry. The dominant landscape feature are the agricultural fields that surround the Proposed Development.
SR03	649852	818019	Residential Dwelling	ca.130m (east)	Tree cover to the west and southwest of the receptor will provide some degree of shielding from fugitive dust emitted from the quarry. The dominant landscape feature are the agricultural fields that surround the Proposed Development.
SR04	649923	817979	Residential Dwelling	ca.211m (east)	Tree cover to the west and southwest of the receptor will provide some degree of shielding from fugitive dust emitted from the quarry. The dominant landscape feature are the agricultural fields that surround the Proposed Development. .
SR05	649633	817560	Residential Dwelling	ca.177m (south)	The dominant terrain is the agricultural fields that surround the quarry.
SR06	649313	818279	Dwelling/ Farmyard	ca.197m (northwest)	Tree cover surrounds the receptor which will provide some degree of shielding from quarry activities. The dominant terrain is the agricultural fields that surround the Proposed Development.
SR07	649395	818307	Proxy for Residential Dwelling to the northeast of the Site	ca.196m (northwest)	Tree/shrub cover surrounds the receptor which will provide some degree of shielding from quarry activities. The dominant landscape feature are the agricultural fields that surround the Proposed Development.

ID	ITM (Easting, Northing)		Description of Sensitive Receptor	Distance/ Ordination from Emission Source (m)	Terrain between Site and Receptor
	E	N			
SR08	649006	817608	Residential Dwelling	ca.299m (southwest)	Tree/shrub cover surrounds the receptor which will provide some degree of shielding from quarry activities. The dominant landscape feature are the agricultural fields that surround the Proposed Development.
SR09	648973	818055	Residential Dwelling	ca.337m (west)	Tree cover is located to the east of the receptor which will provide some degree of screening from quarry activities. The dominant terrain is the agricultural fields that surround the Proposed Development.
SR10	650100	817892	Residential Dwelling	ca.340m (east)	Tree cover is located to the east of the receptor which will provide some degree of shielding from quarry activities. The dominant landscape feature are the agricultural fields that surround the Proposed Development.

Figure 9-3: Location of Sensitive Receptors



9.3.6.1 Designated Ecological Receptors

The closest European Protected Designated Sites (Natura 2000) is Lough Oughter and Associated Loughs SAC, located ca. 5.6km to the west of the Site. The Drumcon Lough (pNHA) is located ca.1.4km to the west of the Site.

Following the IAQM Guidance on assessing the effects of mineral dust on ecological receptors, any potential sensitive area will be included if it is located within a 400m radius of the Proposed Development. As none of the ecological sites identified are within 400m of the Proposed Development, the potential of fugitive dust effects on these receptors are determined as not likely and not significant and will not be assessed any further.

9.3.7 The Impact of Weather on Dust Emissions

Weather conditions can have a significant effect on the dispersion of ambient dust, thus influencing the effects on nearby sensitive receptors. Higher levels of dust deposition typically occur during dry spells associated with medium to strong breezes (>5.0m/s).

The nearest synoptic meteorological station, that provides hourly data, is Ballyhaise Co. Cavan. The Ballyhaise station is located ca. 8.5km to the southwest of the Proposed Development.

A windrose diagram was constructed to determine the potential influence of wind direction and speed on airborne dust particles, shown in Figure 9-4 below. The meteorological data consisted of five years of data (2018-2022 inclusive). Due to its relative proximity to the Proposed Development, the windrose taken from Ballyhaise station is determined to be represented of conditions at the Site.

Figure 9-4: Windrose for Ballyhaise, Co. Cavan (2018-2022)

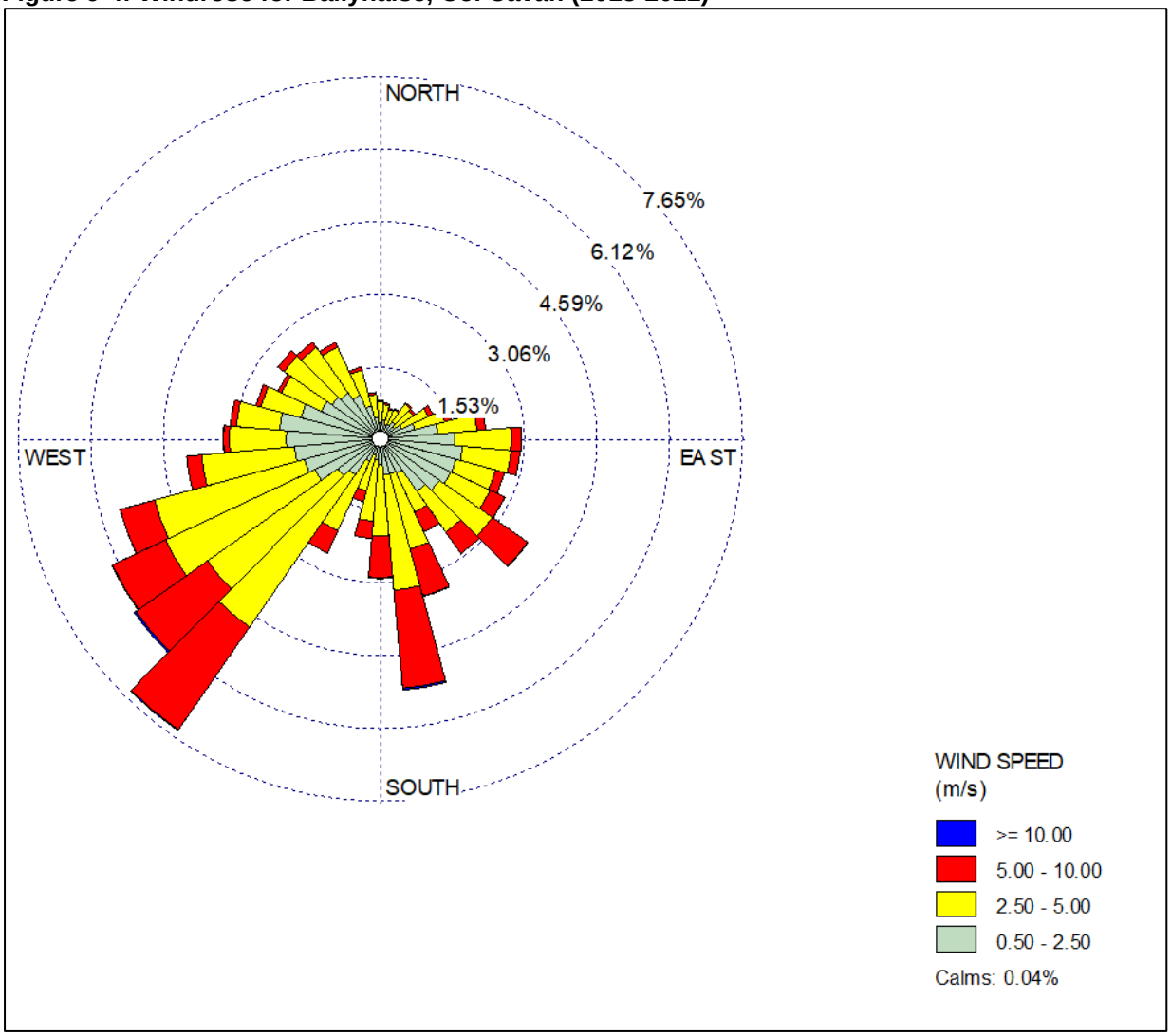


Table 9-7 below summarises the important meteorological variables recorded at the Ballyhaise station between 2018-2022.

Table 9-7: Meteorological Data at Johns

Year	Total Precipitation (mm)	Average Windspeed (m/s)
2018	937.7	3.3
2019	1114.7	3.2
2020	1161.8	3.4
2021	932.6	2.9
2022	1048.9	2.3

9.4 Characteristics and Potential Impacts of the Proposed Development

9.4.1 Characteristics of the Proposed Development

The main potential effects on air quality from rock quarries are dust emissions, which can have the following effects:

- Disamenity arising from dust deposition on surfaces – e.g., window ledges, cars, plants, laundry drying outside etc; and,
- Human health: arising from increased concentrations of dust particles (PM_{10}) suspended in the air.

Assessment of disamenity dust and suspended PM_{10} particles is detailed below:

- The Construction Phase (Site Preparation Phase);
- The Operational Phase; and,
- The Restoration Phase.

It is estimated that 20% of the HGV vehicles associated with the Scotshouse Quarry will transport aggregates directly from the Site to market and the effects of which was considered directly in this assessment. The other 80% which would be transporting aggregates from the existing quarry have been considered in the cumulative and in-combination effects (refer to section 9.7.1 below). Processing of material is limited to the equipment discussed in section 9.4.2 below.

The operations of onsite plant, which are powered by diesel engines, will omit nitrogen oxides, particulate matter and carbon monoxide, all which can have the potential to impact air quality.

9.4.1.1 Construction Phase

The Construction Phase associated with the Proposed Development is anticipated to ca.6 months (2 x 3 months). Activities associated with the Construction Phase, which has the potential to generate dust, includes:

- Stripping of overburden;
- Creation and seeding of soil embankments and berms;
- Creation of haul routes to connect the existing development to the Proposed Development; and,
- Removal of derelict stone agricultural structure from Zone B2.

These activities are fully considered in the mineral dust risk assessment below (refer to Section 9.5).

9.4.1.2 Operational Phase/Restoration Phase

The Operational Phase of the Proposed Development is expected to last ca. 33 years (with 1.5 additional years for restoration) and will present the greatest potential for dust generation from the Proposed Development. The Operational Phase will comprise a continuation of extraction in the existing quarry area (Zone A) and an extension into the southern agricultural area (Zone B). For further details refer to Chapter 3.

Whilst the extraction of the Proposed Development is anticipated to occur over a number of phases, as detailed in Chapter 3, the assessment of dust will consider a conservative estimation of activities and assess the impacts of the cumulative activities associated with all the phases. The main activities associated with the Operational Phase are:

- Extraction of material at ca. 350,000 tonnes per annum; and,
- 20% of the total HGV (56No.) were considered for onsite and offsite transportation.

The following equipment will be used during the Operational Phase of the Proposed Development:

- One (1) x Volvo 300 excavator;
- One (1) x Sandvik QJ341 Jaw Primary Crusher;
- One (1) x Roco 1600 Scalping Screen;
- One (1) to Two (2) x Roco tracked conveyer/stacker; and,
- One (1) x Volvo L180 Wheel Loader.

The movement of HGVs and the operation of onsite plant have the potential to cause impacts on local air quality, through the release of NO_2 to the atmosphere. Potential traffic emissions were screened in accordance with the thresholds set out by the Transport Infrastructure of Ireland, Technical Guidance on Air Quality Assessments [93]. According to the guidance, a detailed assessment is required when:

- Heavy good vehicles (HGV) (vehicles greater than 3.5 tonnes, including buses and coaches) flows will change by 200 AADT[7] or more.

Even when considering the total number of HGVs associated with the Scotshouse Quarry (56No.), where only 20% is attributed to the Proposed Development, these HGVs fall well below the threshold outlined by the TII guidance [93].

According to the IAQM Guidance on Demolition and Construction [99], exhaust emissions from onsite plant and onsite traffic are unlikely to make a significant impact on local air quality.

Therefore, assessing the potential impacts on air quality as a result of plant and traffic both onsite and offsite has been screened out.

As the restoration phase will include minor works such as removal of plant and equipment from the Site, no additional sources of dust are considered.

9.4.2 Potential Effects of the Proposed Development

9.4.2.1 Dust Risk Assessment

Suspended Dust

The IAQM Guidance on Mineral Dust [86] states:

> *"If the long-term background PM_{10} concentration is less than 17µg/m^3 there is little risk that the Process Contribution (PC) would lead to an exceedance of the annual-mean objective…..17µg/m^3 is considered to be a suitable screening value for an assessment of annual mean PM_{10} concentrations"*

This figure is based on the estimated maximum annual process contribution of 15µg/m^3 for mineral extraction activities.

The greatest potential for high rates of dust deposition and elevated PM_{10} concentrations occurs within 100m of dust generating activities.

According to the EPAs AG4 Guidelines on determining background concentrations, up to 2-3 years of data should be used [98]. The most recent five-year average of background PM_{10} concentration for Zone D is 12.4µg/m^3 (see section 9.3.3 above).

Table 9-8 below details the Predicted Environmental Concentrations (PEC) of ambient PM_{10}, which sums the expected process contribution to the background concentrations.

[7] Annual Average Daily Traffic (AADT) is defined as the total two-way traffic volume passing a point or segment of a road for one full calendar year, divided by the number of days in a year (365)

Table 9-8: Predicted Environmental Concentrations of PM_{10} ($\mu g/m^3$)

Parameters	PM_{10} Concentrations ($\mu g/m^3$)
Maximum Process Contribution*	15µg/m^3
Background Concentrations**	12.4µg/m^3
Predicted Environmental Concentration (PEC)	27.4µg/m^3
Annual Mean Objective*	32µg/m^3
Annual AQS Limit for	40µg/m^3

determined from the IAQM Guidance** [86] * determined from the 5-year average of Zone D**

The predicted environmental concentration is 27.4µg/m^3, which is below the annual mean objective of 32µg/m^3. According to the IAQM Guidance [86], if the predicted environmental concentration of PM_{10} is less than 32µg/m^3, there is little risk of the annual AQS limit being exceeded and no further consideration of the risk posed by ambient PM_{10} concentrations is warranted.

Disamenity Dust Risk Assessment

As per the IAQM Guidelines [86], the assessment of disamenity dust follows the Source-Pathway-Receptor Concept, whereby a combination of the Residual Source Emission (Source), frequency of wind speeds (Pathway) and the distance of the receptors to the source (Receptor) determines the likely effects of disamenity dust. Residual Source Emissions were determined for all activities associated with the Proposed Development and will be discussed as cumulative sources of dust emissions.

Table 9-9 below shows the estimation of the magnitude of Residual Source Emissions.

The magnitude of the Residual Source emissions was determined based on the scale of the anticipated operations at any one time and was classified between small and large, taking into account the designed in mitigation, see section 9.6. The assessment in Table 9-9 was completed in accordance with the IAQM Mineral Dust Guidance [86], see Appendix 9-1.

Table 9-9: Classification of Residual Source of Emissions

Activity	Activity Details (all values are approximate)	Magnitude of Residual Source Emission
Site Preparation	• Total area associated with the Proposed Development is 14.6ha. • Total of 2-3No. of plant equipment in operation at any one time. • An estimated 36,103 m^3 of overburden will likely be stripped as part of the Proposed Development. • Creation of soil embankments and berms will be completed with a maximum height of 2m and; • Stockpiling will occur when required. • Removal of derelict stone building.	**Medium**
Mineral Extraction	• Total working area ca. 17.9ha. • Drilling and blasting will occur as part of the Proposed Development. • Primary crushing of blast rock at the Quarry face; and,	**Medium**

Activity	Activity Details (all values are approximate)	Magnitude of Residual Source Emission
	• Maximum extraction rate estimated at 350,000 tonnes per annum.	
Material Handling	• 2No loading plant used at any one time. • 2No. Mobile plant equipment onsite (crusher, screening equipment). • Part consolidated surface for access routes unconsolidated ground around Site; and, • Activities will occur within a 10m buffer of adjacent lands.	**Medium**
Mineral Processing	• Primary crushing of blast rock at the quarry face will occur. • Aggregate materials extracted and; • A maximum of 350,000 tonnes of material would be extracted per annum.	**Medium**
Onsite transportation	• Wheel loaders will be used to transport materials. • As ground level is reduced, new haul routes will be created to maintain efficient movement of vehicles. • Maximum transport speed is ca.15km/hr; and, • <100 vehicle movements will occur per day.	**Small**
Offsite Transportation	• 20% of the total HGVs for the Quarry Site are attributed to offsite movement associated with the Proposed Development.	**Small**
Stockpiling/Exposed Surfaces	• Aggregates are stockpiled on-site or used in hot-mix manufacturing • No hot-mix macadam stockpiling • Daily transport of low dust potential material; • Stockpile located ca.70m of site boundary; • Quarry production estimated at 350,0000 tonnes per annum; • Large area of exposed surfaces • Stockpiles frequently created as part of operations; • Some stockpiles may be located within 50m of the Site boundary; and • Exposed rockface will occur within 50m of the site boundary.	**Medium**

The residual source of emission quantifies how much dust is expected to be generated by activities, without mitigation measures applied. To determine the impact on sensitive receptors, it is important to consider how the dust will be transported, the Pathway Effectiveness [86]. The site-specific factors considered to determine the Pathway Effectiveness of the dust emissions are the distance and direction of the receptors, relative to the prevailing wind directions.

For each receptor, wind frequency with speeds >5.0m/s from the direction of the dust source emissions was calculated for the five years of Met Eireann data for the Ballyhaise meteorological station. This 5.0m/s wind speed is characterised as a moderate breeze and is used as a general threshold for determining when wind dispersion is most likely to occur [86]. According to the IAQM [86], high risk meteorological conditions are when the wind is coming from the direction of the dust source at a sufficient strength, during periods of little or no rainfall (<0.2mm) or 'dry days'. As such, the meteorological information used for the risk assessment was filtered to only represent dry days. The direction and frequency of these wind speeds are shown in Figure 9-5 below,

Criteria for wind speed ranging from infrequent to very frequent are detailed in Appendix 9-1. Table 9-10 below details the categorisation of wind related to each sensitive receptor along with the pathway effectiveness, as per the IAQM Guidelines [86].

When determining the rating of the receptor distance from the dust source, close represents a receptor less than 100m from the source, an intermediate distance represents a receptor between 100-200m from the dust source and a distant distance represents a receptor located >200m from the dust source. As mentioned above, the dust source for the Proposed Development is determined as the site boundary. The sensitivity classification of receptors in Table 9-10 was taken from the IAQM Guidance [86]. Residential dwellings are considered 'High' sensitive receptors and farm/storage facilities considered as 'Low'. In brief, this is based on the level of amenity expected to be enjoyed by the receptors.

Figure 9-5: Windrose for Ballyhaise synoptic station 2018-2022 corrected to remove wet days

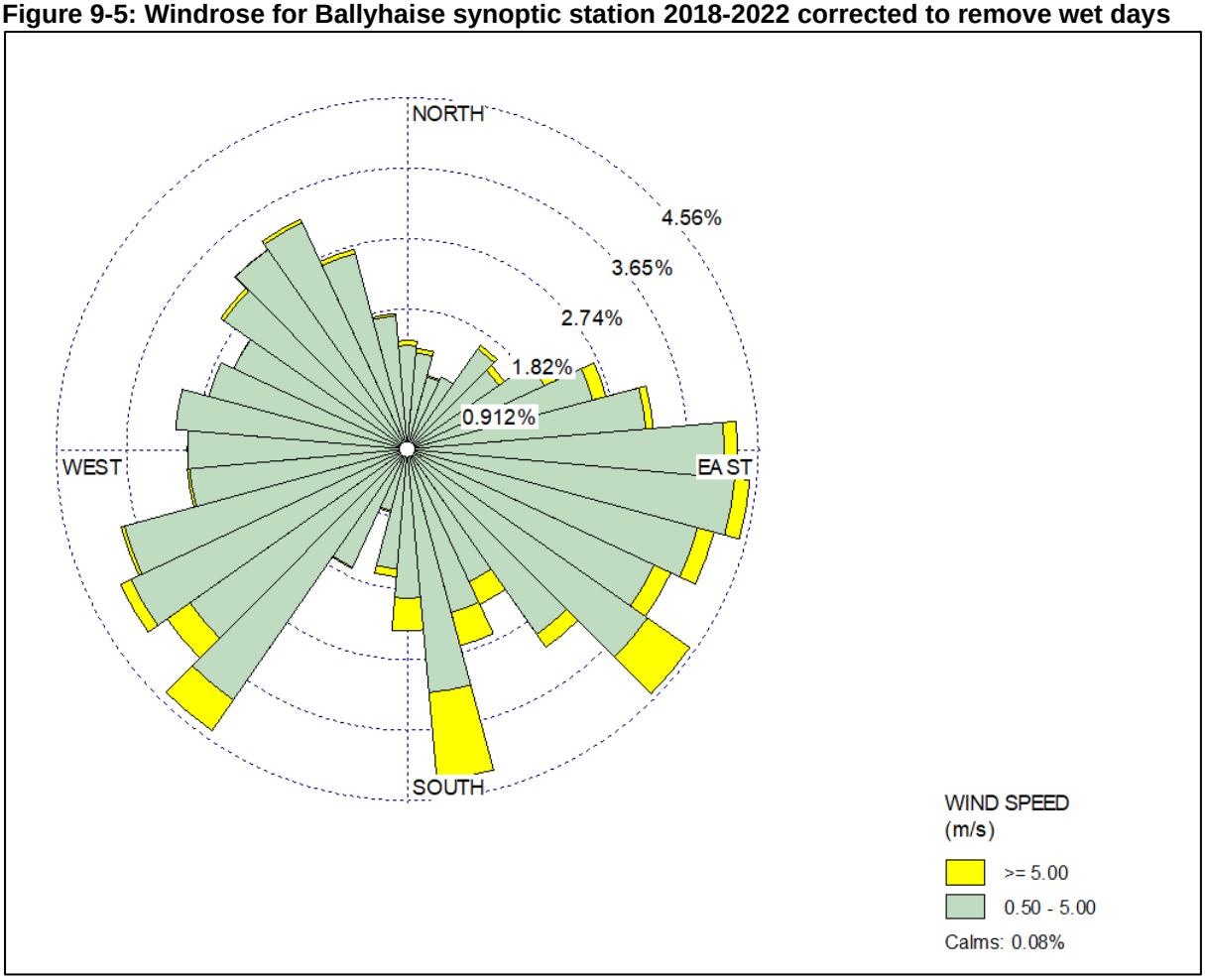


Table 9-10: Classification of the Pathway Effectiveness

ID (Receptor Sensitivity)	Distance from the Emission Source (Orientation to emission source)	Frequency of wind from the direction of dust source (dry weather) (>5.0m/s)	Pathway Effectiveness
SR01 **(High)**	ca.135m (northeast) **(Intermediate)**	0.6% (103 hours) coming from the southwest (175-215 degrees) **Infrequent**	**Ineffective**
SR02 **(High)**	ca.146m (northeast) **(Intermediate)**	0.6% (115 hours) coming from the southwest (185-225 degrees) **Infrequent**	**Ineffective**
SR03 **(High)**	ca.130m (east) **(Intermediate)**	<0.1% (2hours) coming from the southwest (265-305 degrees) **Infrequent**	**Ineffective**
SR04 **(High)**	ca.211m (east) **(Distant)**	0.1% (20 hours) coming from the southwest (305-335 degrees) **Infrequent**	**Ineffective**
SR05 **(High)**	ca.164m (south) **(Intermediate)**	0.1% (14 hours) coming from the northwest (5-35 degrees) **Infrequent**	**Ineffective**
SR06 **(Low)**	ca.196m (northwest) **(Intermediate)**	1.3% (244 hours) coming from the southeast (95-135 degrees) **Infrequent**	**Ineffective**
SR07 **(High)**	ca.196m (northwest) **(Intermediate)**	1.7% (310 hours) coming from the southeast (165-205 degrees) **Infrequent**	**Ineffective**
SR08 **(High)**	ca.299m (southwest) **(Distant)**	0.1% (14 hours) coming from the northeast (15-45degrees) **Infrequent**	**Ineffective**
SR09 **(High)**	ca.337m (west) **(Distant)**	0.7% (121 hours) coming from the east (95-125 degrees) **Infrequent**	**Ineffective**
SR10 **(High)**	ca.340m (east) **(Distant)**	0.1% (11 hours) coming from the west (285-315 degrees) **Infrequent**	**Ineffective**

Note: Close receptors include 5 increments of degrees. Intermediate receptors include 4 increments of degrees. Distant receptors include 3 increments of degrees.

Nine (9No.) receptors were identified as having a high sensitivity to dust deposition. One (1No) receptor was identified as having a low sensitivity to dust deposition (SR06). As storage/farm

buildings, the amenities of these facilities are not expected to be diminished as a result of dust deposition.

Having considered the distance of the receptors from the emission source and the frequency of winds (>5.0m/s) on dry days, the pathway effectiveness was derived for each sensitive receptor.

From Table 9-10 above, the pathway effectiveness was “Ineffective” for ten (10No.) human receptors (SR01-SR10).

To identify the potential risk of dust impact on the receptors, the pathway effectiveness and Residual Source Emission were considered together. As the Residual Source Emissions ranged from small to medium (Table 9-9 above), medium was applied to them all, as recommended in the IAQM guidelines [86].

The estimation of dust impact risk from this process is outlined in Table 9-11 below.

Table 9-11: Dust impact risk for Sensitive Receptors

ID	Residual Source Emission	Pathway Effectiveness	Dust Impact Risk
SR01	Medium	**Ineffective**	Negligible Risk
SR02	Medium	**Ineffective**	Negligible Risk
SR03	Medium	**Ineffective**	Negligible Risk
SR04	Medium	**Ineffective**	Negligible Risk
SR05	Medium	**Ineffective**	Negligible Risk
SR06	Medium	**Ineffective**	Negligible Risk
SR07	Medium	**Ineffective**	Negligible Risk
SR08	Medium	**Ineffective**	Negligible Risk
SR09	Medium	**Ineffective**	Negligible Risk
SR10	Medium	**Ineffective**	Negligible Risk

The Risk of Dust Impact has been classified as having a 'Negligible Risk' at sensitive receptors, based on a conservative estimation of the Residual Source Emission and the Pathway Effectiveness.

To identify the magnitude of dust impact on the receptors, the Risk of Dust Impact and Receptor Sensitivity were considered together.

The descriptor is outlined in Table 9-12 below.

Table 9-12: Magnitude of Dust Impact on Sensitive Receptors

ID	Receptor Sensitivity	Dust Impact Risk	The Magnitude of Dust Effect
SR01	**High**	**Negligible Risk**	**Negligible Effect**
SR02	**High**	**Negligible Risk**	**Negligible Effect**
SR03	**High**	**Negligible Risk**	**Negligible Effect**
SR04	**High**	**Negligible Risk**	**Negligible Effect**
SR05	**High**	**Negligible Risk**	**Negligible Effect**
SR06	**Low**	**Negligible Risk**	**Negligible Effect**
SR07	**High**	**Negligible Risk**	**Negligible Effect**
SR08	**High**	**Negligible Risk**	**Negligible Effect**
SR09	**High**	**Negligible Risk**	**Negligible Effect**
SR10	**High**	**Negligible Risk**	**Negligible Effect**

It is estimated that the magnitude of dust effect may have a "Negligible Effect" on sensitive receptors, without the appropriate mitigation measures.

9.5 Proposed Mitigation Measures and/or Factors

9.5.1 Dust Mitigation Measures

Although there is a negligible risk of effect from disamenity dust on identified receptors, it is recommended that the Applicant implement basic good practice mitigation measures.

Mitigation measures for the Proposed Development are divided into general measures (e.g. site management and maintenance) and those more specific to the Construction/Operational/ Restoration Phase of the Site (e.g. HGV movements).

Table 9-13 below details the mitigation measures associated with the Development.

Table 9-13: Proposed Mitigation Measures

General Mitigation Measures for the Entire Site
Design Measures • The majority of works will be completed in the quarry void, below all sensitive receptors. This will provide an enclosed environment of the majority of the works associated with the Proposed Development; • During initial extraction of Zone B, dust generating activities should be completed where possible to ensure maximum protection from nearby vegetation, sheltering features or topography; • HGVs exiting the Site will be via the existing wheel wash; and, • The peripheries of the quarry void are covered with well-established scrub/treeline, which will provide further screening to sensitive receptors from activities associated with the Proposed Development.

- Existing hedgerows will be kept as far as practicable to continue the current screening provided to sensitive receptors from dust.

Construction/Operational/Restoration Measures

The following mitigation measures will be implemented to minimise dust generation during all phases of the Proposed Development.

- All dust and air quality complaints will be recorded, their potential causes identified, and appropriate measures taken to reduce emissions in a timely manner;
- Electronic complaints will be maintained onsite available for review at any reasonable time;
- Speed restrictions within and around the Site will be limited to 15km/hr;
- Regular inspections of the Site will be completed to ensure basic good practice mitigation measures are implemented;
- Site stripping and reinstatement operation handling activities should be avoided during dry and windy conditions;
- Plant and equipment will be maintained to a high standard;
- Clearance of any spillages will be completed to avoid the accumulation of dry loose materials around the Site;
- Landscape berms on the periphery of the Site;
- Dampen the material extracted when possible;
- Use the mobile crushing plant and scalping screen within its design capacity;
- During initial extraction at Zone B, shelter material when possible to avoid dust dispersion if the materials are stored at ground level;
- Provide training to the site personnel on dust mitigation to be implemented on Site;
- Paving road surfaces within the Site where a negative impact on a sensitive receptor is likely;
- Water spraying of conveyors/conveyor transfer points, stockpiles and roads;
- Use of wheel wash for vehicles leaving the Site, covering of fine dry loads; and,
- Regular inspections of public roads in the vicinity of the entrance and cleaning where required.

9.6 Cumulative and In-combination Effects

The surrounding landscape from the Scotshouse Quarry is primarily used for grazing, rather than tillage. Due to the nature of surrounding activities, minimal dust is expected to be generated directly from grazing activities. There is potential that land in the vicinity of the Site is used to cut hay and silage. However, these activities will typically occur during the summer months. As such, given the short-term nature of the activities, the cumulative and in combination effects of agriculture on air quality are determined as negligible.

9.6.1 Potential Cumulative Ambient Dust Impacts

The background concentrations of PM_{10} Has been identified and justified in Section 9.3.3. it is considered that the background concentration of PM_{10} selected from Zone D constitutes the cumulative concentration of PM_{10} from the receiving environment. The potential concentrations of PM_{10} associated with the Proposed Development were outlined in Section 9.5.1, which identified there was little risk of the annual AQS being exceeded given the existing background concentrations and likely process contribution. As such, the potential for cumulative and in-combination effects to arise from ambient dust is neither likely nor significant.

9.6.2 Potential Cumulative for Disamenity Dust Impacts

There is potential for a cumulative and in combination effect from disamenity dust from the Proposed Development and the activities within the existing Scotshouse Quarry. As presented in Chapter 3, the Scotshouse Quarry will complete the majority of processing and off-site transportation of minerals that will be extracted from the Proposed Development.

When considered in tandem with the other processes occurring onsite, the residual source emission for offsite transportation increased from small to medium, given the number of HGVs leaving the Site from the Scotshouse Quarry. There was no change in the residual source emission for material processing, given the scale and nature of activities associated with the Proposed Development. The change in the residual source emission for offsite transportation

is immaterial to the assessment, as a medium classification for site preparation was used for each sensitive receptor.

Sensitive receptors to the northwest and northeast had their distances modified, as they are located closer to the existing quarry than the Proposed Development. Three (3No.) sensitive receptors had their distance classification upgraded from those used in the mineral dust risk assessment (SR01, SR07 and SR08). These changes are as follows:

- SR01 was reclassified as a 'Close' receptor (previously 'Intermediate');
- SR07 was reclassified as a 'Close' receptor (previously 'Intermediate'); and,
- SR08 was reclassified as a 'Intermediate' receptor (previously 'Distant').

Based on this reclassification of distances, the pathway effectiveness for these sensitive receptors was re-calculated (Table 9-14).

Table 9-14: Reclassified Residual Source Emissions for appropriate sensitive receptors

ID (Receptor Sensitivity)	Distance from the Emission Source (Orientation to emission source)	Frequency of wind from the direction of dust source (dry weather) (>5.0m/s)	Pathway Effectiveness
SR01 **(High)**	ca.99.2m (northeast) **(Close)**	1.0% (192 hours) coming from the southwest (175-225 degrees) **Infrequent**	**Ineffective**
SR07 **(High)**	ca.72.3m (northwest) **(Close)**	2.2% (399 hours) coming from the southeast (165-205 degrees) **Infrequent**	**Ineffective**
SR08 **(High)**	ca.111.6m (southwest) **(intermediate)**	0.3% (46 hours) coming from the northeast (15-45degrees) **Infrequent**	**Ineffective**

Despite the reclassification of the receptors based on distance, the pathway effectiveness remained ineffective. As with the mineral dust risk assessment completed for the Proposed Development, the magnitude of dust effects can be considered as "negligible" with the mitigation measures outlined in section 9.6 sufficient to manage dust emissions.

9.7 Interactions with other Environmental Attributes

- Chapter 5: Population and Human Health: Air Quality is an important consideration for human health, as potential PM_{10} concentrations can effect human health. However, the assessment on air quality showed there was little risk that the Proposed Development would have exceeded the AQS-standards, indicating negligible effect on human health;
- Chapter 6: Biodiversity: Air quality can potentially effect ecosystems, however, this assessment demonstrated that emissions from air associated with the Proposed Development will have no negative effect on protected ecosystems;
- Chapter 7: Land, Soils and Geology: Air-borne dust arising from the Proposed Development are sourced directly from the geology at the Site. This is a key component of air quality at the Site and has been comprehensively considered in this chapter (chapter 9); and,
- Chapter 14: Material Assets Traffic & Transport: Air quality can be impacted by increased traffic volumes. However, the traffic volumes associated with the Site were low and therefore would not have an effect on local air quality.

9.8 Indirect Effects

All significant and likely effects have been considered in this chapter. No additional indirect impacts were identified during the assessment.

9.9 Residual Effects

Based on the receiving environment, type and intensity of activities (associated with the Proposed Development), the residual effects on human health will be negligible.

Based on the historic bergerhoff monitoring results, receiving environment, type and intensity of activities (associated with the Proposed Development), the residual effects on receptors from disamenity dust will be negligible.

9.10 Monitoring

Section 9.3.5 above details the locations of existing Bergerhoff monitoring locations associated with the Scotshouse Quarry. It is proposed that four (4No.) locations (D1-D4) will be monitored around the Proposed Development and existing Scotshouse Quarry.

9.11 Reinstatement

The restoration phase of the Proposed Development outlines how the site will be restored to an inert state. This phase and potential associated effects have been considered throughout this Chapter.

9.12 Difficulties Encountered

No difficulties were encountered.

10 CLIMATE CHANGE

10.1 Introduction

This chapter of the EIAR provides a description and assessment of the likely effects of the Proposed Development on climate change in the context of national greenhouse gas (GHG) emissions. This chapter will also assess the potential effects to the Proposed Development from identified climate hazards.

10.2 Methodology

- International Panel on Climate Change: Guidelines for National Greenhouse Gas Inventories, 2019 [100];
- IEMA – Environmental Impact Assessment Guide to: Assessing Greenhouse Gases and Evaluating their Significance, 2017 [101];
- Monaghan County Council Climate Adaption Strategy, 2019 - 2024 [102];
- Monaghan County Council Development Plan 2019-2025 [27];
- Department of Communication, Climate Action and Environment – National Adaption Framework, Planning for a Climate Resilient Ireland [103];
- ISO 14064: Part 1 Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals [104];
- Global Facility for Disaster Reduction and Recovery – ThinkHazard tool [105];
- Department of Communications, Climate Action and Environment – Climate Action Plan 2023 [106];
- European Commission – Technical Guidance on the climate proofing of infrastructure in the period 2021-2027 [107]; and,
- Transport Infrastructure of Ireland – Carbon Tool [108].

The potential effects of the Proposed Development on climate were determined through an assessment of the sources of GHG emissions from the Proposed Development. The assessment of GHG emissions follows IEMAs *Guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance* [101]*.* These guidelines specify the use of emission factors, which were sourced from the recently published (December 2022), Transport Infrastructure of Ireland (TII) Carbon Tool [108]. The TII Carbon Tool is primarily used for lifecycle assessments of national road and rail projects but provides a comprehensive list of emission factors and methods to calculate GHGs that are relative to the Proposed Development.

The potential risks of climate change to the Proposed Development have also been assessed. Using the European Commission's *Technical Guidance on the climate proofing of infrastructure* [107], the vulnerability of assets associated with the Proposed Development to potential climate hazards was determined.

Due to the size and nature of the Proposed Development, there is no potential effects on microclimate in terms of wind tunnelling and shading. As such, potential effects on microclimate will not be assessed.

10.2.1 Policy Context

10.2.1.1 Paris Climate Agreement

The Paris Agreement is a legally binding international treaty on climate change that was adapted by 196 parties at the COP 21 in Paris 2016 [109]. The goal of the agreement is to limit global warming to below 2°C, preferably 1.5°C, compared to pre-industrial levels. The agreement aims to reach a global peaking of GHG emissions as soon as possible to achieve climate neutrality by 2050. The agreement includes commitments from all countries to reduce their emissions and work together to adapt to the impacts of climate change and calls on countries to strengthen their commitments over time [109]. The agreement provides a pathway

for developed nations to assist developing nations in their climate mitigation and adaption efforts, while creating a framework for the transparent monitoring and reporting of countries' climate goals.

10.2.1.2 National Adaption Climate Framework

The National Climate Adaption Framework was developed in 2018 [103], under the Climate Action Law and Low Carbon Development Act of 2015. The aim of the statutory framework was to set out a national strategy to reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts. The strategy also aims at improving the enabling adaption through online engagement and civil society, the private sector and the research community [103].

The key objective of the National Adaption Framework is to support climate action by setting out policy with a view to becoming more resource-efficient and contributing to the low carbon economy.

As the extractive industry is not currently identified under the National Adaption Climate Framework [103], this assessment has utilised the plan to provide context only. For the purpose of the GHG assessment, national projections for the Transport and Electricity sector will be considered. For sources of emissions not associated with Transport or Electricity, the GHG emissions will be compared to the First and Second Irish Carbon Budget (2021-2025, 2026 to 2030).

10.2.1.3 Monaghan County Council Development Plan 2019-2025

The Monaghan County Development Plan 2019-2025 [102] details various aims and objectives relating to climate, relevant to the Proposed Development.

CCP4: *To ensure new development is appropriately located, so as not to be exposed to the risk of flooding.*

CCP8: *To support diversification and innovation in the local economy by endorsing investment in emerging products, services and technologies that assist in the delivery of a low carbon future for County Monaghan.*

10.2.1.4 Climate Action Plan 2023

The Climate Action Plan 2023 is the second annual update to Irelands Climate action plan. The plan is the first to be prepared in accordance with the Climate Action and Low Carbon Development (Amendment) Act 2021 [106].

The climate Action plan sets out the roadmap to deliver on Ireland's climate ambitions and aligns with the legally binding economy-wide carbon budgets and sectoral emission ceilings that were agreed by the Government in July 2022 [106]. Whilst the extractive industry is not considered in any of the sectors outlined in the Climate Action Plan, specific industries were used for contextual purposes and are discussed in section 10.3.4 below.

10.2.1.5 Monaghan Climate Action Plan 2024-2029

The Climate Action and Low Carbon Development (Amendment) A2021, requires a Local Authority to prepare a 5-year Local Authority Climate Action Plan (LACAP). The Plan must align with the National GHG emission reduction targets - 51% reduction in greenhouse gas emissions by 2030. The Council is currently building evidence base for a County Climate Change Risk Assessment, a baseline GHG emission inventory for County Monaghan and a specific GHG baseline for Monaghan town which is a dedicated Decarbonisation Zone.

10.2.1.6 Monaghan County Council Climate Adaption Strategy 2019-2024

The Monaghan County Council Climate Change Adaptation Strategy 2019-2024 [102] was adapted by the elected members at the Council in 2019 [102].

The local authority adaption strategy takes on the role as the primary instrument at local level to:

- Ensure a proper comprehension of the key risks and vulnerabilities of climate change;
- Bring forward the implementation of climate resilient actions in a planned and proactive manner; and,
- Ensure the climate adaption considerations are mainstreamed into all plans and polices are integrated into all operations and functions of Monaghan County Council.

10.2.2 Assessing Greenhouse Gas Emissions

Anthropogenic GHG emissions have a global effect when they are released into the atmosphere over time. Therefore, assessing the effects of the GHG emissions of the development at a local level is inconsequential to these global emissions.

Currently, there is no set methodology to evaluate significance criteria or a defined threshold for GHG emissions for the extractive industry. The quantity of emissions from a quarry is dependent on the size and type of activities that are occurring within a site. The main sources of GHG emissions associated with the Proposed Development are from the use of vehicles onsite as well as the operation of plant and equipment.

According to the IPCC 2019 refinement of the 2006 publication of Guidelines for National Greenhouse Gas Inventories [100], GHG emissions can be split into three categories (or 'scopes'[8]):

- Scope 1: Direct emissions from sources owned or controlled by the reporting entity, such as emissions from combustion of fossil fuels in boilers and vehicles;
- Scope 2: Indirect emissions associated with the generation of purchase heat and stream; and,
- Scope 3: Other indirect emissions that occur in the value chain.

For the purpose of this stage of the assessment, potential GHG emissions have been divided into Scope 1, Scope 2 and Scope 3 emissions, as recognised by the ISO 14064 Part 1 standard [104]. Table 10-1 below details the scopes that were considered for this assessment.

The assessment boundary for assessing GHG emissions will only be associated with activities within the Site boundary, with those associated with the existing Scotshouse Quarry considered as cumulative emissions (section 10.8). Emissions included in the cumulative assessment includes Scope 2 related emissions, as information in electricity consumption was provided for the entirety of the Scotshouse Quarry. A proportion of GHG emissions from HGV movements and plant operations will be considered within the assessment boundary, while additional HGVs, plant operation and all employee vehicle movements associated with the existing Scotshouse Quarry will be considered under cumulative and in-combination effects.

For the purpose of this assessment, water usage will only be considered for that imported off the site via a private well and the main water line (potable water and toilets etc.). Water usage for processes is collected from surface water, which is diverted into a tank for use and recycled.

Table 10-1: Scoped Emissions used in GHG Assessment

Scope	Source
Scope 1 – Direct Emission	Operation of the onsite plant and generators
Scope 2 – Indirect Emissions Associated with the Proposed Development	Water usage from main lines and offsite well.

[8] Direct and indirect emissions do not relate to the EIA Directive definitions of "Direct" and "Indirect" effects and are assessed separately

Scope	Source
Scope 3 – Indirect Emissions	Truck movements assumed to be owned by third parties.

Potential Scope 1 emissions associated with the Proposed Development will be examined for a typical operating year (294 days). The data presented is based on the information provided in this EIAR (plant numbers).

Scope 1 emissions associated with the Proposed Development will arise from the operation of plant/equipment, operated and owned by the Scotshouse Quarry complex. The equipment included in the assessment includes:

- 1No. Excavator;
- 1No. Jaw Crusher;
- 2No. Scalping Screen;
- 1No. Conveyor; and,
- 1No. Wheel loader

Typical operational hours of the plant and machinery has been incorporated into the calculations of GHG emissions (Table 10-2 below). The calculation of carbon dioxide equivalent (CO_{2e}) was based on a manufacturer's specification of equipment, which provided information on fuel capacity for the plant used onsite (presented in L/hr). All plant were assumed to be operating on mineral diesel.

Table 10-2: Details of Scope 1 Emissions

Plant Type	Operating Hours (per day)	Fuel Consumption (L/hr)	Fuel Type
Excavator	7	14	Mineral Diesel
Jaw Crusher	6	14	Mineral Diesel
Scalping Screen*	7.5	20	Mineral Diesel
Conveyor	6	5	Mineral Diesel
Wheel Loader	7	34	Mineral Diesel
Generator	6.5	6.8	Mineral Diesel

***values for the operation of 2No. scalping screens**

For Scope 2 emissions, the total usage of water is estimated at 980m^3 per annum or 980,000 litres from the mains supply and private well. According to the TII Carbon Tool, emission factors for water usage is based off of UK Average taken from the 2021 BEIS emission factors [110] (Table 10-3).

Table 10-3: Details of Scope 2 Emissions

Source Type	Annual Consumption
Water Usage (litres)	980,000

Scope 3 emissions, those indirectly influenced by the operations of the Proposed Development, include vehicle movements not owned by the company that are used for activities on the site (contract HGV movements, employee vehicles). The movement of contract HGVs associated with the Proposed Development is estimated to 20% of the total contract HGVs used per day at both the existing and proposed quarry development (total =

56No.). This 20% constitutes HGVs, transporting aggregates from the Site which have only underwent primary crushing prior to be transported straight to market. The other 80% of HGV movements would be associated with the transport of aggregates to market from Scotshouse Quarry having underwent additional processing (secondary or tertiary screening etc.). This portion of the HGV movements and associated GHG emissions is considered under cumulative and in-combination effects.

An assessment on potential GHG emissions from the operations of 11No. HGVs was completed for the Proposed Development. The remainder of the HGV movements (45No. HGV and 2No. lorry deliveries) were assessed cumulatively in section 10.8 below. The HGV movement were conservatively estimated to travel 23.7km per day (47.4km roundtrip), based on a review of the Monaghan County Development Plan [27] which shows potential locations for the aggregate material to be used. Table 10-4 summarises the information used to calculate Scope 3 emissions.

To ensure consistency in the approach for using the TII Carbon Tool emission factors as part of this assessment, an average laden condition was assumed for HGVs both entering and leaving the Site. According to the emission factors provided by the TII Carbon Tool, an average laden HGV is estimated to emit 1.1kgCO_{2e} per km. In comparison, the conversion factors provided by the UK Government [111], suggests that a 0% laden HGV will emit 0.83kgCO_{2e} per km, while a 100% laden HGV will emit 1.2kgCO_{2e} per km. As a result, the use of an average laden emission factor for the entire round-trip travelled by the HGVs represents a conservative estimation of emissions.

Table 10-4: Details of Scope 3 Emissions

Transport Type	Distance Travelled (round trip km/day)	Fuel Type
11No. HGVs	47.4	Mineral Diesel

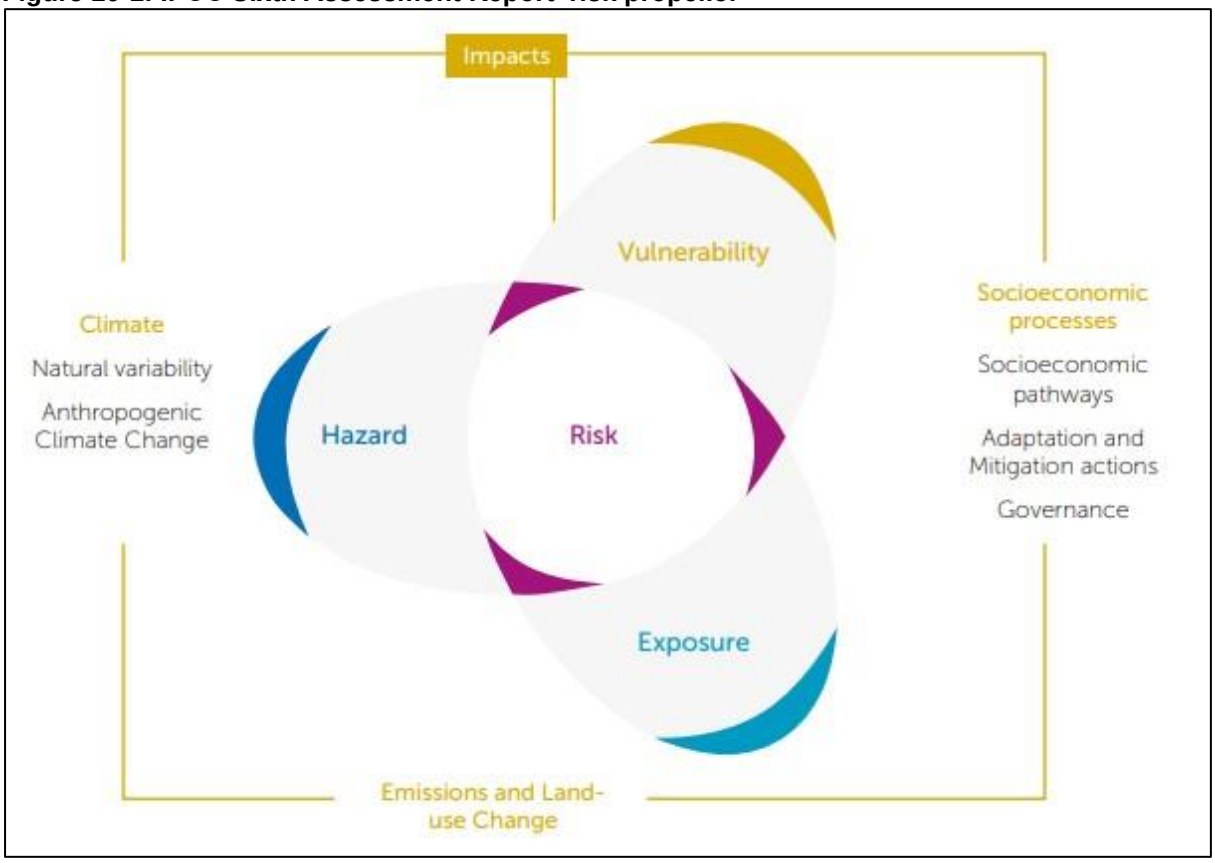
10.2.3 Climate Change Risk Assessment

The IPCC define three key components of a climate risk that interact and combine to generate the risks of climate impact [112]. These include:

- Hazard: The potential occurrence of a natural or a human induced physical event or trend (such as a heatwave, heavy rainfall event, or sea level rise) that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources;
- Exposure: The presence of people, livelihoods, species or ecosystems, environmental functions, services and resources, infrastructure, or economic, social or cultural assets in places and settings that could be adversely affected (e.g. homes in a flood plain); and,
- Vulnerability: The propensity or predisposition to be adversely affected (e.g. peoples underlying health conditions can be worsened by high temperatures or heatwaves).

Figure 10-1 below displays the framework for identifying potential climate risk associated with a development.

Figure 10-1: IPCC Sixth Assessment Report 'risk propellor'



In accordance with the EU technical guidance on climate proofing infrastructure, a climate change risk assessment aims to ensure that infrastructure projects are resilient to the potential impacts of climate change, reducing the risk of damage and disruption and promoting a sustainable future [107].

10.2.3.1 Identification of Climate Hazards

As part of the climate change risk assessment, a desk-based review of numerous sources was used to identify the climate hazards that have the potential to impact the Proposed Development. The following resources were used to estimate the potential risk to the Proposed Development from climate hazards:

- The Monaghan County Council Climate Adaption Strategy [102];
- OPW Flood Maps [79];
- Global Facility for Disaster Reduction and Recovery (GFDRR) - ThinkHazard [105]

A desk-based review of the Monaghan County Council Climate Adaption Strategy was completed to identify climate hazards that have been identified by the local authority as potential risks to the county, and in turn, the Proposed Development. The Climate Adaption Strategy provided an overview of historical climate events that resulted in direct consequences to services and infrastructure in Monaghan.

To determine the potential risk of floods to the Proposed Development, in collaboration with the Hydrology Chapter presented in Chapter 8, the OPW flood maps were reviewed [79].

Finally, the GFDRR provides a free tool for identifying potential climate hazards for an area [105]. ThinkHazard provides a general view of hazards, for a given location, that should be considered in a project design. The tool highlights the likelihood of different natural hazards affecting a project area (rated between very low and high) and provides guidance on how to reduce the impact of these hazards.

Further information on the hazards that will potentially impact the Proposed Development is discussed in section 10.3.3 below.

10.3 Receiving Environment

10.3.1 Baseline Climate

The climate of Ireland is primarily driven by ocean influences, mainly the Atlantic, resulting in maritime climate conditions. This results in relative warm summers and mild winters. The wettest months of the year typically occur between November to January. The prevailing wind direction is from the southwest, contributing heavily to the wet weather experienced in the winter/spring, with the less influential Easterly winds contributing to cooler temperatures in the spring and warmer temperatures in the summer.

Typically, climate is averaged weather data over 30-year periods to determine long-term trends in important variables such as temperature, precipitation and windspeed. The period of 30-years is considered long enough to smooth out year to year variations. Met Eireann currently references the 1981-2010 period as the baseline period for day-to-day weather and climate conditions.

The closest station that has a 30-year average of variables produced is the Clones station, located ca.7km north of the Site. The station was closed in 2007//2008 and therefore doesn't contain the final 3-years of analysis from the reference period (1981-2010). The average period therefore consists of 29 years' worth of averaged data (1978-2007)

Table 10-5 below summarises the climate data for the Clones station.

Table 10-5: Climate Averaged Data from the Clones Station (1978-2007)

Variable	1978-2007 Average
Mean Temperature (°C)	9.4
Precipitation (sum of monthly means in mm)	960.4
Mean of wind speed (kn)	7.8
Mean number of days with gale force winds	2.2

According to the EPAs Status of Ireland's Climate Report [113], published in 2021, the following is noted regarding Ireland's observational climate:

- The annual average surface air temperature in Ireland has increased by approximately 0.9°C, with the number of warm spell days across Ireland increasing over the last 60 years;
- The decade between 2006 and 2015 has been the wettest in the period between 1711 and 2016; and
- Long-term data shows increases in river flows across most of the country, with data also indicating a potential increase in drought conditions.

10.3.2 Projected Future Climate Change

Observed changes in Ireland's climate over the last century are in line with global and regional trends associated with human induced climate change. Climate projections in Ireland are based on global GHG emission scenarios, predicting the future usage of fossil fuels globally and the corresponding release of GHG gases. The Representative Concentration Pathway (RCP) is a trajectory adopted by the IPCC [112]. RCP scenario 4.5 (RCP4.5) represents an intermediate scenario with emissions expected to peak in 2040 and then decline [112]. RPC scenario 8.5 (RCP8.5) is the worst-case scenario approach based on an overestimation of projected coal outputs [112] The range of these scenarios provide an intermediate and worst-

case estimation of potential changes in the environment in response to climate change. Based on this range, the following projections were made regarding Ireland's climate [113]:

- Projected seasonal changes in temperature range from 0.9°C (RCP4.5) to 1.9°C (RCP 8.5), with an increase in the duration and intensity of heatwaves expected; and,
- Projected changes in the frequency of very wet days (>30mm of precipitation) range between a 21% increase (RCP4.5) and a 31% increase (RCP8.5).

Projections regarding regional scale sea-level risk and changes in wind speed require more comprehensive research to determine the long-term trends.

10.3.3 Climate Hazards

According to the IPCC's Sixth Assessment Report, climate impacts are becoming more severe and manifesting at an accelerated pace [112]. These impacts can have cascading effects on both natural and human systems, often interacting with other human activities. The IPCC defines climate risk as the potential for adverse consequences to human and ecological systems, recognising the diverse values and objective associated with these systems [112].

According to the Climate Adaption Plan from Monaghan [102], the main climate hazards that are likely to impact County Monaghan are:

- Increased summer heatwaves and extreme temperatures and drought conditions;
- Increase in extreme wind events particularly during winter months;
- Increase in precipitation during the winter months; and,
- Sporadic cold events and snow events.

Following a desk-based review of the GFDRR Think Hazard Tool, 5No. hazards were identified as at least a medium risk to Monaghan County:

- River Flood (High risk);
- Coastal Flood (High risk);
- Landslide (Medium risk); and
- Wildfire (Medium risk).

As the Proposed Development is located ca. 61.1km from the coast, there is limited risk to the coastal flooding identified by the GFDRR and has therefore been screened out as a potential hazard. There is also limited topographic variation of the surround landscape and therefore the risks to the Proposed Development to landslides have been screened out as a potential hazard. Finally, a desk-based review of satellite imagery of the Site on Google Earth (2009 until 2023) shows no evidence for burning. The existing vegetation (light shrubbery and grasses) also provides limited risk to potential wildfires. Therefore, the potential risks of wildfires to the Proposed Development have been screened out as a potential risk.

Based on the above desk-based reviews, the following hazards will be incorporated into the climate vulnerability assessment:

- River Floods;
- Extreme Temperatures (heat and cold);
- Extreme Precipitation; and,
- Extreme Wind.

10.3.4 National Sectoral Emission Ceiling

The National Sectoral Emission Ceilings refer to the total amount of permitted greenhouse gas emissions that each sector of the economy can produce during a specific period of time [114].

Under Section 6C of the Climate Action and Low Carbon Development Act 2015 (as amended) sectoral emission ceilings are set out to outline the maximum amount of greenhouse gas emissions that are permitted in different sectors of the Irish economy [114].

The Act commits Ireland to achieve climate neutrality by no later than 2050. The carbon budget programme was established, which comprises of three successive 5-year periods of national emission ceilings for tonnes of CO_{2e} [114] (Table 10-6).

Table 10-6: Ireland's Carbon Budgets

National Climate Budget	Emission Ceiling for assessment period (tonnes of CO_{2e})
First Carbon Budget (2021 to 2025)	295,000,000
Second Carbon Budget (2026 to 2030)	200,000,000
Third Carbon Budget (2031 to 2035)	151,000,000

It is outlined that considerations need to be made with regards to how emissions may develop post 2030, to establish a basis for proposals for the provisional third carbon budget (2031 to 2035).

Within the national carbon budgets, sectoral emission ceilings have been created to reflect the EPAs Emission Inventory [114]. Currently, the sectoral emission ceilings are only presented for the first two carbon budget periods (2021 to 2025 and 2026 to 2030). For GHG emissions within the site boundary, sectoral emissions for the Transport sector will be used to account for emissions associated with HGV movements. Emissions associated with electricity generation associated with Scotshouse Quarry complex, which will be calculated cumulatively in section 10.8 below, will be compared against the Electricity sectoral emission ceilings for the respective periods (Table 10-7).

Table 10-7: Sectoral Emission Ceilings Relative to the Proposed Development

Sector	First Sectoral Emission Ceiling (2021 to 2025) (tonnes of CO_{2e})	Second Sectoral Emission Ceiling (2026 to 2030) (Tonnes of CO_{2e})
Transport	54,000,000	37,000,000
Electricity	40,000,000	20,000,000

Other sources of emissions associated with the Proposed Development, such as the operation of plant and water usage, are not currently accounted for in any of the sectoral emissions under the current Climate Action Plan 2023 [106]. As such, these emissions were compared to the first and second national climate budgets (Table 10-6 above).

10.4 Characteristics and Potential Impacts of the Proposed Development

10.4.1 Characteristic of the Proposed Development

GHG emissions will mainly arise from the following activities that will take place at the Proposed Development:

- Movement of HGVs associated with transport of aggregates to market;
- Use of machinery onsite; and,
- Electricity and water usage.

As part of the assessment, the GHG emissions generated from the Proposed Development will be compared to the relevant sectoral emissions ceilings when possible. For those not considered under any of the sectoral emission ceilings, emissions will be compared to the National Carbon Budgets.

10.4.1.1 Construction Phase

As per the description of the Proposed Development presented in Chapter 3, the Construction Phase will be completed over a period of 6 months. Activities associated with this phase, such as the stripping of overburden, will likely result in loss of vegetation for sequestration and cause increases in potential CO_{2e}. The effects of plant and equipment during the Construction Phase on GHG emissions will be temporary and an adverse effect. Due to the temporary nature of activities, the addition of GHG emissions from a 6-month construction period would be inconsequential to national/sectoral carbon budgets measured over a short-term periods (-year carbon budgets). As such, Construction Phase emissions are determined as insignificant in the context of national and sectoral carbon budgets.

10.4.1.2 Operational Phase

The Operational Phase of the Proposed Development is expected to span over 30 years, including the Restoration Phase. For the purpose of this assessment, the calculation of GHG emissions will be based on the first two sectoral emission ceilings: 2021 to 2025 and 2026 to 2030. It is anticipated that emissions beyond 2030 will be influenced by improvements in plant performance, advancements in energy sources, and increased utilisation of renewable energy.

To calculate the GHG emissions, a typical year will be used as the basis and then extrapolated over the entire carbon monitoring period. Since the Proposed Development is scheduled to commence operation in 2024, only two years of CO_{2e} emissions will be incorporated into the assessment. For the second carbon budget, a total of 5-years' worth of GHG emissions will be assessed.

The GHG emissions associated with the Proposed Development will be sourced from Scope 1, Scope 2 and Scope 3 emissions, which have been identified and discussed in section 10.2.2 of the assessment. These emissions encompass direct emissions from onsite activities, indirect emissions from purchased electricity, and other emissions associated with the project's supply chain respectively.

10.4.1.3 Restoration Phase

The Restoration Phase of the Proposed Development will follow the plan that accompanies this EIAR and will be carried out in accordance with the best practice guidelines available during the time of restoration (ca. 35 years in the future). It is envisaged that it will take 2No. years for the restoration of the quarry to be completed. There is potential for the plant operations to be used for the restoration phase. However, as it cannot be foreseen the technology used for these activities in ca. 2050, the potential emissions associated with the Proposed Development at this period has been screened out. Moreover, the potential for use of plant and machinery is minimal given the design of the restoration plan.

10.4.2 Potential Impacts of/to the Proposed Development

10.4.2.1 Climate Change Vulnerability Assessment

The Climate Change Vulnerability Assessment determines the sensitivity of the Proposed Development to climate hazards combined with the correspondent exposure of the Proposed Development to these hazards. To determine the potential vulnerability, the receptors associated with the Proposed Development have been divided into the following:

- Plant and Machinery – equipment used as part of the typical quarry operations;
- Infrastructure – onsite roads, wheel washes; and,
- Inputs – Electricity and Water.

Determining the sensitivity of the assets to potential climate hazards takes into account different components such as design, age, dependencies and built in mitigation measures.

Sensitivity of the Proposed Development

The aim of the sensitivity analysis is to identify which climate hazards are relevant to the specific type of project, irrespective of its location [107].

The EC Technical Guidance provides a scoring system for classifying the sensitivity of assets to potential climate hazards, rated between High and Low sensitivities (Table 10-8 below).

Table 10-8: Scoring of sensitivity analysis

Sensitivity Level	Definition	Scoring
High Sensitivity	The climate hazard will have a major impact on the asset category	**3**
Medium Sensitivity	It is possible or likely that the climate hazard will have a moderate impact on the asset category.	**2**
Low Sensitivity	It is possible that the hazard will have a low impact or negligible impact on the asset category	**1**

Table 10-9 below displays the sensitivity of the assets identified for the Proposed Development to effects from the climate hazards identified.

As part of the Proposed Development climate resilience has been incorporated into the planned approach for extraction at the Site. The quarry floor has a shallow gradient which slopes towards the quarry access gate. Run off from the quarry floor from the north of the Proposed Development and currently drains overland via informal channels and large puddles.

The following approaches will reduce the sensitivity of the assets to potential flooding:

- Summer (low elevation quarry floor) and winter (higher elevation quarry floor) benches are designed into the phasing plan to offset risk when water levels increase in the quarry;
- Water pumping be completed into the existing lagoon and will be completed at a rate which will ensure a discharge limit of 360m^3/day will not be exceeded at any time.

The quarry floor has a shallow gradient which slopes towards the quarry access gate, with runoff from the quarry located to the north of the Proposed Development and currently drains overland, with the development of the lower bench floor, natural gradient within the Site will be towards the lower bench floor.

Table 10-9: Sensitivity of assets associated with the Proposed Development

Climate Variables	Extreme Rainfall	Extreme Temperature (Hot)	Extreme Temperature (Cold)	River Floods	Extreme Wind
Assets:					
Infrastructure	2	1	1	1	1
Plant and Machinery	2	1	1	2	1
Inputs (electricity and water)	2	2	1	1	2

Regarding the sensitivity of the assets the following can be determined:

- **Infrastructure**: Extreme rainfall will have a potentially moderate impact with regards to infrastructure on the site. The implementation of design measures, including the use of winter and summer benches and water pumps reduces the sensitivity. Infrastructure will be upgraded as works are completed to reflect changes in ground level following different phases of extraction. The quarry void will also provide levels of protection from extreme winds and limit exposure to extreme temperatures;
- **Plant and Machinery**: The plant and machinery onsite will have a robust design and are structurally capable of withstanding extreme weather conditions (extreme winds and extreme rainfall). As a conservative estimation of the potential impacts of floods, the sensitivity to plant and machinery to these hazards are considered as medium given the potential for activities to cease in the event of a flood event; and
- **Inputs (electricity and water)**: The highest rating climate hazard with regards to inputs is from extreme temperature, particularly drought events. The site is supplied with three different water sources, including recycled water for the use of the wheel wash. A private well supplies the canteen area and other onsite facilities. The site is also supplied by a mains water supply. Given the variability of water sources to the site, the sensitivity of these assets to extreme temperatures has been determined as medium.

Exposure of the Proposed Development

The exposure analysis takes into account the geographical location of the Proposed Development and the potential exposure of it to the climate hazards identified. Due to the scale of the Proposed Development, the determination of exposure will be based on current climate conditions. As with the sensitivity analysis, the exposure analysis will be determined based on a scoring system, in accordance with the EC Guidance [107], summarised in Table 10-10 below.

Table 10-10: Exposure definition and scoring

Sensitivity Level	Definition	Scoring
High Exposure	Climate hazard may arise once to several times per year	**3**
Medium Exposure	Climate hazard may arise numerous times in a decade	**2**
Low Exposure	Climate hazard may arise a number of times in a generation or lifetime	**1**

Table 10-11 below presents the findings of the exposure assessment of the Proposed Development. The assessment includes a review of the available information and data sources. Based on the review, the following conclusions can be drawn:

- **River Flooding**: A flood risk assessment was carried out in Chapter 8, following a desk-based review of the OPW websites. No flood events or recurring flood incidents were identified at the Site or in its vicinity. Moreover the closest river is down gradient from the Site. As such, the exposure of the Proposed Development to river flooding is determined as Low;
- **Extreme Wind**: Thresholds identified by Met Éireann are provided for mean winds speeds exceeding 50km/hr, 65km/hr and 80km/hr. Gust charts are shown at 90km/hr, 110km/hr and 130km/hr. An analysis of the hourly data from the Ballyhaise station shows that only 0.01% of data (2004 to present) recorded windspeeds between 45-50km/hr. No records of wind speed > 50km/hr were recorded in the entire available hourly dataset for Ballyhaise. As such, the exposure of the Proposed Development to extreme wind was classified as Low;
- **Extreme Rainfall**: According to Met Éireann, an orange weather warning is issued if daily rainfall falls between 50-80mm. Over the entire monitoring period, only one day

exceed these levels, recorded in 2010. As a result, the exposure of the Proposed Development to rainfall has been determined as Low;

- **Extreme Temperatures (Hot)**: According to Met Éireann extreme hot temperatures are recorded when maximum daytime temperatures exceed 30°C and night-time temperatures exceed 20°C. An examination from the Ballyhaise station does not show any records of daily and night-time temperatures exceeding this threshold; and
- **Extreme Temperatures (Cold)**: Regarding extreme low temperatures, an orange weather warning is issued when air temperature falls below -5 degrees Celsius. According to the daily data from the Ballyhaise station, 84No. days had minimum temperatures of at least -5°C. Based on the frequency of days were cold temperatures reach a minimum of -5°C, exposure can be considered as Medium for cold temperatures.

Table 10-11: Exposure Ratings for the Proposed Development

Extreme Temperatures (Hot)	Extreme Temperature (Cold)	Extreme Wind	River Flooding	Extreme Rainfall
1	2	1	1	1

Vulnerability Assessment

The vulnerability assessment combines the outcomes of the sensitivity and exposure analysis with the aim to identify key vulnerabilities and the potential significant climate hazards associated with the Proposed Development. Based on the scoring of the sensitivity analysis (Table 10-9) and the exposure analysis (Table 10-11), a vulnerability rating is achieved. As per the EC Technical Guidance, the vulnerability of the assets to potential climate hazards are ranked between 'Low and "High" based on the product of the scores recorded for the sensitivity and exposure analysis.

Table 10-12 below details the results of the vulnerability assessment for the Proposed Development. As per the EC Guidance, the highest vulnerability rating for assets were used to determine the vulnerability of the Proposed Development to specific climate hazards [107].

Table 10-12: Vulnerability of Proposed Development assets to climate hazards

Climate Hazards	Extreme Temperature (Hot)		Extreme Temperature (Cold)		Extreme Wind		River Flooding		Extreme Rainfall	
Sensitivity/Exposure	S	E	S	E	S	E	S	E	S	E
Assets										
Infrastructure	1	1	1	2	1	1	1	1	2	1
Plant And Machinery	1	1	1	2	1	1	1	2	2	1
Inputs (Water and Electricity)	2	1	1	2	2	1	1	1	2	1
Vulnerability Rating (highest of assets)	**2**		**2**		**2**		**2**		**2**	

1- Low Vulnerability
2- Low Vulnerability

Based on the combination of the sensitivity of the assets and their exposure, the vulnerability of the Proposed Development to climate hazards is determined as 'Low'. As per the EC Guidance [107], when the vulnerability of a development is low, a detailed climate assessment is not required.

Therefore, the effects of climate change on the Proposed Development are considered as not likely and not significant.

10.4.2.2 Greenhouse Gas Assessment

Operational Phase

The calculation of GHG emissions follows the methodology employed by the IEMA Guidance [101] and the use of the emission factors provided by Carbon Tool created and managed by the Transport Infrastructure of Ireland [108]. The contribution of the Proposed Development to GHG emissions were determined based on the relative sectors (section 10.3.4). Emissions were calculated for a typical year and extrapolated based on its contribution to the first or second carbon budget. As the Proposed Development is expected to be in Operation from 2024, two years of emissions were estimated. The Proposed Development will continue to be in operation during the second carbon budget and therefore 5No. years of emissions were also calculated. The Proposed Development is expected to be in operation for ca. 33 years, however, further extrapolations were not completed as the sectoral emission ceilings outline the difficulties in quantifying potential emissions from sectors after 2030 [114]. The extrapolations of emissions associated with the Proposed Development represents a conservative estimation, as changes in technology (such as the availability of renewable energy) will likely reduce emissions in the future.

As discussed in section 10.2.2 above, the HGVs associated with the Proposed Development are estimated to travel 47.4km per day, with the plant equipment estimated to operate on mineral diesel.

Table 10-13 below presents the estimations of released CO_{2e} associated with the Proposed Development with regards to Transport.

Table 10-13: Calculation of tonnes of CO_{2e} from HGV movements associated with the Proposed Development during Operational Phase

GHG Emission Source	**Tonnes of CO_{2e} (per year)**
11No. HGVs (47.4km round trip per day)	164.5
GHG Emission Source	**Tonnes of CO_{2e} (2024 to 2025)**
Extrapolations of HGV emissions for Period 2024 to 2025	328.9
First Carbon Budget 2021 to 2025	54,000,000
Contribution to remaining first sectoral carbon budget (%)	0.001%
GHG Emission Source	**Tonnes of CO_{2e} (2026 to 2030)**
Extrapolations of HGVs emissions for Period 2026 to 2030	822.5
Carbon Budget for Transport (2026 to 2030)	37,000,000
Contribution to second sectoral carbon budget (%)	0.002%

It is calculated that the Proposed Development will emit 164.45 tonnes of CO_{2e} per annum, based on current technologies. Compared to the sectoral emissions ceilings for the first carbon budget, based on two years of operations, the Proposed Development would contribute

0.001% of the overall budget. When these emissions are further extrapolated over a 5-year period, to reflect the 2026-2030 carbon budget, the Proposed Development would contribute to 0.002% of emissions across this period.

The remaining GHG emissions associated with the Proposed Development (plant operations and water usage) are compared to the National Carbon Budgets, as these emissions are currently not accounted for under the sectoral emission ceilings (Table 10-14 below).

Table 10-14: Calculation of tonnes of CO_{2e} from plant and water usage from Proposed Development during Operational Phase

GHG Emission Source	**Tonnes of CO_{2e} (per year)**
Operation of Plant onsite (6No. plant, 1No. generator)	505.2
98,000L of Water	0.01
Total Emissions	505.2
GHG Emission Source	**Tonnes of CO_{2e} (2024 to 2025)**
Extrapolation of plant and water usage emissions for Period 2024 to 2025	1,010.4
Irelands First Carbon Budget (2021 to 2025)	295,000,000
Contribution to remaining first national carbon budget (%)	0.0003%
GHG Emission Source	**Tonnes of CO_{2e} (2026 to 2030)**
Extrapolation of plant and water usage emissions for Period 2026 to 2030	2,526
Second National Climate Budget (2026 to 2030)	200,000,000
Contribution to second national carbon budget (%)	0.0013%

Based on the estimations of plant operations and water usage, the Proposed Development would contribute 0.0003% of the First National Climate Budget and 0.0013% of the Second National Carbon Budget.

Due to the low contributions of GHG emissions to the relative sectoral emission ceilings and national carbon budgets, the effects of the Proposed Development on climate are determined as not significant.

10.4.2.3 Unplanned Events

No unplanned events that would have a major impact on GHG emissions associated with the Proposed Development could occur.

10.5 Proposed Mitigation Measures and/ or other factors

Mitigation measures can be introduced to avoid, reduce, replace and offset carbon emissions associated with the Proposed Development. These measures will follow the mitigation hierarchy, which includes the following approaches:

Avoid: The avoidance of GHG emissions involves strategies to minimise emissions by avoiding or reducing activities that contribute to them, including:

- Extraction Efficiency: The Proposed Development will optimise extraction techniques to minimise the production of waste and maximise the extraction of quarry material; and

- Minimise Clearing: The Proposed Development will avoid any unnecessary vegetation clearance by planning extraction activities in a way that minimise the removal of trees and other carbon sequestering plants.

Reduce: The reduction of GHG emissions focuses on implementing measures that minimise emissions, including:

- Energy Efficiency: The Proposed Development will implement energy-efficient practices, and when available, equipment in the quarry operations. This includes optimising the lighting and reduce energy consumption during non-operational periods; and
- Fleet Management: The Proposed Development will employ fuel efficient vehicles when possible and regularly ensure the vehicles are properly maintained to ensure fuel efficiency.

Replace: The replacement approach involves substituting high-emission activities or materials with lower-emission activities, including:

- Renewable Energy: The client is currently investigating the potential for installing sources of renewable energy onsite (solar panels). This could provide a source of renewable energy for processes onsite;
- Alternate Fuels: Vehicles and plant onsite will transition to low-carbon or carbon neutral fuels, where feasible; and
- Electric Equipment: Diesel equipment can be upgraded to electrical equipment, where suitable alternatives are available.

Offset: Offset measures involve compensating for the unavoidable GHG emissions by investing in activities that reduce emission elsewhere, including:

- Facilitate a landscape design that promotes tree and shrub growth as far as practicable.

10.6 Cumulative and In Combination Effects

As discussed above, potential Scope 1 and 3 emissions associated with the existing Scotshouse Quarry (employee vehicles and HGVs) are potential sources of cumulative GHG emissions. As discussed in section 10.6.1, electricity consumption (Scope 2 emissions) were provided for the entire Scotshouse Quarry complex and will therefore be calculated as a cumulative emission to the Proposed Development.

Based on the information provided, potential sources of cumulative emissions associated with the entire Scotshouse Quarry include:

- The operation of plant equipment associated with the existing Scotshouse Quarry;
- Electricity purchased for the entire Scotshouse Quarry;
- The movement of HGV vehicles; and,
- The movement of employee vehicles.

Activities associated with the existing Scotshouse Quarry that potentially emit GHG emissions include:

- 2No. Crushers;
- Hot Mix Macadam Plant;
- Screening Plant; and,
- Conveyor.

Under the assumption of a maximum extraction rate associated with the Proposed Development of 350,000tpa, this assumes that the screening plant would process approximately 119 tonnes of material per hour. This would be typical of a small screening plant, which according to available information online, would have a fuel capacity between 5-

20 litres per hour. As a conservative estimation, it is assumed that the screening plant would operate at 20L/hr. The assumptions made with regards the crushers and conveyors were discussed in section 10.2.2 above.

With regards to the hot-mix macadam plant, the planning application submitted under 15/113 states that the processing capacity of the macadam plant was to between 60 – 80 tonnes per hour. It is estimated that the macadam plant consumes 250,000 litres of kerosene per annum, or 113 litres per hour based on an operating time of 7.5 hours per day. Electricity usage for the macadam plant is incorporated into the total electricity consumption for the site.

Table 10-15 below summarises the parameters used for the assessment of cumulative GHG emissions.

Table 10-15: Parameters for plant use in the existing Scotshouse Quarry

Plant Description	Fuel Consumption (L/hr)	Operating Hours
Crusher (x2No.)	28	6 hours
Screening Plant	20	7.5 hours
Conveyors (2No.)	10	6 hours
Macadam Plant	113	7.5 hours

The estimated CO_{2e} emissions associated with the existing Scotshouse Quarry and its combined contribution with emissions from the Proposed Development (only plant) are shown and extrapolated relative to the national carbon budgets in Table 10-16 below.

Table 10-16:Cumulative plant emissions in context of national carbon budgets

GHG Emission Source	Tonnes of CO_{2e} (per year)
Operation of Plant for Proposed Development (6No. plant, 1No. generator)	505.2
Operation of Plant for Existing Scotshouse Quarry (7No. Plant)	883.9
Cumulative Plant Emissions	1,389.1
GHG Emission Source	**Tonnes of CO_{2e} (2024 to 2025)**
Extrapolation of cumulative plant emissions (2024-2025)	2,778.2
Irelands First Carbon Budget (2021 to 2025)	295,000,000
Contribution to remaining first national carbon budget (%)	0.001%
GHG Emission Source	**Tonnes of CO_{2e} (2026 to 2030)**
Extrapolation of plant and water usage emissions for Period 2026 to 2030	6,945.5
Second National Climate Budget (2026 to 2030)	200,000,000
Contribution to second national carbon budget (%)	0.003%

Based on the cumulative emissions, the entire Scotshouse Quarry will produce1,3891 tonnes of CO_{2e} per annum. Compared to the First Carbon Budget, the cumulative emissions contribute to 0.001% of the total national emissions and 0.003% of emissions under the second National Carbon Budget.

The entire Scotshouse Quarry is anticipated to use 16,500kwH per annum, including the macadam plant, onsite pump and onsite facilities. Table 10-17 below shows the contribution of the Scotshouse Quarry to the sectoral emissions ceiling for the electricity sector.

Table 10-17: Cumulative emissions from electricity purchased in context of sectoral carbon budgets

GHG Emission Source	**Tonnes of CO_{2e} (per year)**
Emissions from 16,500kwH of electricity purchased per annum	5.0
GHG Emission Source	**Tonnes of CO_{2e} (2024 to 2025)**
Extrapolation of cumulative electricity emissions (2024-2025)	9.9
First Carbon Budget for Electricity (2021 to 2025)	40,000,000
Contribution to remaining first sectoral carbon budget (%)	0.00002%
GHG Emission Source	**Tonnes of CO_{2e} (2026 to 2030)**
Extrapolation of electricity emissions for Period 2026 to 2030	24.9
Carbon Budget for Electricity (2026 to 2030)	20,000,000
Contribution to second sectoral carbon budget	0.0001%

Based on the cumulative emissions, the entire Scotshouse Quarry will produce 4.97 tonnes of CO_{2e} per annum. Compared to the First sectoral carbon budget for the electricity sector, the cumulative emissions contribute to 0.00002% of the first carbon budget and 0.0001% of emissions under the second National Carbon Budget.

An estimation of the number of HGV vehicles associated with the existing Scotshouse Quarry accounts for the 80% of vehicles not used in the main part of the assessment (45No.) in addition to 2No. additional HGVs for deliveries per day. Therefore, a total of additional 47No. HGVs will be incorporated into the cumulative assessments based on the assumptions presented in 10.2.2 above. For employee vehicles, a maximum of 20No. employees for onsite staff and 6No. assigned for offsite staff. Based on statistics from the Central Statistics Office, the average employee in Ireland travels 15km to work, or a 30km round trip. Therefore, the total distance travelled by the 26No. Scotshouse employees is estimated at 870km per day, or 255,780km per year (294 operational days). Table 10-18 below displays the cumulative transport related emissions from HGV movements and employee vehicles in the context of the sectoral emission ceilings.

Table 10-18: Cumulative Transport Emissions in the context of Transport sectoral emission ceilings

GHG Emission Source	**Tonnes of CO_{2e} (per year)**
47No. HGVs (47.4km round trip per day)	702.8
26No. employee vehicles	56.7
Transport Emissions associated with Proposed Development	164.5
Cumulative Transport Emissions for Scotshouse Quarry and the Proposed Development	923.9
GHG Emission Source	**Tonnes of CO_{2e} (2024 to 2025)**

Extrapolations of HGV emissions for Period 2024 to 2025	1,847.8
First Carbon Budget 2021 to 2025	54,000,000
Contribution to remaining first sectoral carbon budget (%)	0.003%
GHG Emission Source	**Tonnes of CO_{2e} (2026 to 2030)**
Extrapolations of HGVs emissions for Period 2026 to 2030	4,619.5
Carbon Budget for Transport (2026 to 2030)	37,000,000
Contribution to second sectoral carbon budget (%)	0.01%

Based on the cumulative estimation of transport emissions, over a two-year period, the Scotshouse Quarry and the Proposed Development would contribute to 0.003% of the first sectoral carbon ceiling (2021 to 2025) and 0.01% to the second sectoral carbon budget (2026-2030).

As a result of these emissions, the potential cumulative effects of the Proposed Development on climate change from GHG emissions are determined as not significant in the context of national and sectoral emission ceilings.

10.7 Interactions with other Environmental Attributes

- Chapter 5: Population and Human Health: Increases in extreme weather events (such as heat) has the potential to influence population and human health. Due to the scale of contributions of the Proposed Development on national greenhouse gas emissions, the interactions between Population and Human Health and Climate Change are determined will be “not significant”;
- Chapter 6: Biodiversity: Climate Change has the potential to effect ecosystems. However, the effects of GHG emissions associated with the Proposed Development was determined as not significant;
- Chapter 8: Water: Climate Change can have a direct effect on the water shown to be influencing the Proposed Development. The frequency of extreme rainfall events are expected to increase under changing climate conditions. Based on current climate information, the vulnerability of the Proposed Development to flooding is considered to be Low; and,
- Chapter 14: Material Assets Traffic and Transport: Climate Change is directly linked to GHG emissions, with road traffic considered one of the highest contributors to national emissions. The assessment on GHG emissions from HGV movements has shown the effects to be “not significant”.

10.8 Indirect Effects

All significant and likely impacts have been considered in this chapter. No additional indirect impacts were identified during the assessment.

10.9 Residual Effects

The effects of GHG emissions as a result of the Proposed Development will be ‘not significant’ based on the size and type of the Proposed Development. The effects of climate change on the Proposed Development will be ‘not significant’ based on the results of the climate vulnerability assessment. This has taken into account the design measures to effectively reduce the sensitivity of the site to potential flood events.

10.10 Monitoring

No monitoring of GHG emissions is required as part of the Proposed Development.

10.11 Reinstatement

The restoration phase of the Proposed Development outlines how the site will be restored to an inert state. This phase and potential associated effects have been considered throughout this Chapter.

10.12 Difficulties Encountered in Compiling this Information

There were no difficulties encountered when completing the assessments as part of this chapter. Assumptions made regarding the vulnerability of the Proposed Development to climate hazards and regarding greenhouse gas emission estimates are detailed above.

11 NOISE AND VIBRATION

11.1 Introduction

This Chapter of the EIAR provides a description and assessment of the likely effects of the Proposed Development on noise and vibration.

In this Chapter the following is presented:

- Quantifying the existing ambient and background acoustic/sound environment;
- Quantifying the likely construction and operational noise and vibration associated with the Proposed Development;
- Assess the likely significant effects which may have arisen from the Proposed Development; and,
- Relevant and proportional mitigation measures implemented and prescribed.

11.2 Methodology

In preparing this assessment, the following methodologies have been reviewed, and where relevant applied.

- Department of Environment Heritage and Local Government (DoEHLG) - Quarries and Ancillary Activities: Guidelines for Planning Authorities, 2004 [12];
- EPA 2006, Environmental Management Guidelines, Environmental Management in the Extractive Industry (Non-Scheduled Minerals), 2006; [14];
- BS5228-1:2009, Code of practice for noise and vibration control on construction and open sites, Noise [115];
- SI No 140/2006 Environmental Noise Regulations 2006 [116];
- ANC Guidelines (Greenbook) Environmental noise measurement guide 2013 [117];
- BS4142:2014 Methods for rating and assessing industrial and commercial sound, 2014 [118];
- IEMA Guidelines for environmental noise impact assessment, 2014 [119];
- ISO 1996-1:2016 Acoustics - Description, measurements and assessment of environmental noise - Part 1: Basic quantities and assessment procedures 2003 [120];
- ISO 1996-2:2017 Acoustics - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels [121];
- NRA Guidelines for the treatment of noise and vibration in National Road Schemes, 2004 [122];
- NRA Good practice guidance for the treatment of noise during the planning of National Road schemes, March 2014 [123];
- Smith, Peterson and Owens Acoustics and Noise Control, 1996 [124];
- World Health Organization’s (WHO) Night noise guidelines for Europe [125];
- World Health Organization’s (WHO) Guidelines for Community Noise [126];
- Monaghan County Development Plan 2019-2025 [27];

- Aggregate Levy Sustainability Fund (ALSF): Sustainable Aggregates Theme 1 - Reducing the environmental effect of aggregate quarrying: Dust, noise and vibration, year unknown [127]; and,
- Irish Concrete Federation (ICF) 2005, Environmental Code, Second Edition, October 2005 [97].

This chapter assesses noise and vibration impacts that have arisen from the Proposed Development through two distinct means.

- An assessment on the likely changes in the acoustic environment, as audible noise at sensitive receptors or vibration. This methodology is based on the IOA/IEMA guidelines above; and,
- An assessment on the likely site-specific noise and vibration emissions that will be audible at sensitive receptors rated against industry standard limits for noise nuisance.

A full glossary of terms is given in Appendix 11-1.

11.2.1 Legislative and Policy Context

The following sections will review and highlight relevant policies and legislation relating to the Development in the context of national, regional and local objectives on noise.

11.2.1.1 Monaghan County Council Development Plan 2019-2025

The Monaghan County Development Plan 2019-2025 [27] details the following policy relating to noise, relevant to the Development:

'NP1 *To promote the implementation of the Noise Directive 2002/49/EC and Environmental Noise Regulations 2006.'*

11.2.1.2 Monaghan County Council Noise Action Plan (2018-2023)

Regarding quarrying and ancillary activities, the Monaghan County Council Noise Action Plan [128] states:

> *"Suggested noise limit values are 55dB L_{Aeq},1hr and 45dB L_{Aeq},15min for daytime and night-time respectively, although more onerous values may be appropriate in areas with low levels of pre-existing background noise."*

11.2.1.3 Planning

The Permitted Area (original consent 89/09) set out conditions which included requirements for limits on noise levels.

The conditions regarding noise were reiterated when the quarry was registered under S261:

> *"2c) Blasting, mechanical or electrical work operations shall be confined to the day hours of 8am to 6pm and the noise emission (other than from blasting) during these hours should not exceed 45 dB(A) rated sound level at any point along the boundaries of the development."*

11.2.1.4 EPA & ICF Guidance

Best guidance for quarry noise control issued by the EPA [14] and by the Irish Concrete Federation [97] detail recommended noise limits of:

- Daytime (i.e. 8:00am to 8:00pm) $L_{Aeq,1hr}$ 55dB; and,
- Night-time (i.e. 8:00pm to 08:00am) $L_{Aeq,1hr}$ 45dB.

These values are deemed the industry standard for the proper operation of a quarry to control noise while ensuring necessary aggregates can be removed and processed, while protecting local amenity and sensitivity.

11.2.1.5 Quarries and Ancillary Activities:

The Department of Environment Heritage and Local Government issued a guidance document to Local Authorities to assist them in the assessment and regulation of quarries, dated 2004 [12]. This guidance specifically outlined information relating to noise to be considered and limits to be applied, which are shown below.

> *'Noise emissions from the facility shall not exceed 55dB(A) $L_{Aeq,30min}$ during the daytime and 45dB(A) $L_{Aeq,15min}$ during the night-time at the façade of the nearest noise sensitive locations, subject to adjustment in the event of a change in the accepted limits for industrial noise…Vibration levels from blasting shall not exceed a peak particle velocity of 12mm/second, measured in any three mutually orthogonal directions at any sensitive location. Blasting shall not give rise to air overpressure values at sensitive locations which are in excess of 125dB ($L_{in,max}$) peak with a 95% confidence limit. No individual air overpressure value should exceed the limit value by more than 5dB (L_{in})'*

11.2.2 Criteria Noise Impact

The noise limits outlined here are derived utilising best practice, standards for the industry, planning conditions and industrial standards.

The noise limits are similar to international criteria for the protection of human health from noise nuisance and protection of human health. These noise limits were therefore applied as the criteria within this Chapter for noise impact from the Proposed Development.

11.2.2.1 Construction Phase

The construction phase (or site preparation phase) noise was assessed utilising the British Standard BS5228-1 [115], which is designed for the assessment of noise arising from construction and open sites.

This standard identified a methodology (the ABC method, section E.3.2 of standard) for assigning construction noise limits at Noise Sensitive Receptors (NSRs) based upon the existing ambient noise levels. An excerpt detailing the ABC method is shown in Table 11-1.

Table 11-1: BS5228 ABC Method for assessing Construction Noise Impact

Assessment category and threshold value period (L_{Aeq})	**Threshold value, in decibels (dB) ($L_{Aeq,T}$)**		
	Category A[A)]	**Category B[B)]**	**Category C[C)]**
Night-time (23:00-07:00)	45	50	55
Evening and weekends [D)]	55	60	65
Daytime (07:00-19:00) and Saturday (07:00-13:00)	65	70	75

Note 1	A potentially significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.
Note 2	If the ambient noise level exceeds the Category C threshold values given in the table (i.e., the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3dB due to site noise.
Note 3	Applied to all residential receptors only.
A)	Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

Assessment category and threshold value period (L_{Aeq})		Threshold value, in decibels (dB) ($L_{Aeq,T}$)		
		Category A[A)]	Category B[B)]	Category C[C)]
B)	Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.			
C)	Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.			
	19:00-23:00 weekdays, 13:00-23:00 Saturday and 07:00-23:00 Sunday.			

The noise limits for construction noise can be exceeded for a short period of time as per DoEHLG guidance [12]:

> *"It may be necessary to raise the noise limits to allow temporary but exceptionally noisy phases in the extraction process, or for short-term construction activity which cannot meet the limits set for routine operations, e.g. the construction of baffle mounds, which bring long-term environmental benefits."*

This is in-line with the higher sound limits generally applied under BS5228 in Table 11-1 above.

11.2.2.2 Operational Site-Specific Noise

Historical activities at the Site, ambient monitoring and best guidance for quarry noise control issued by the DoEHLG [12], EPA [14] and Irish Concrete Federation [97] which detail recommended noise limits are presented in Section 11.2.1 above. Based on the above, the following standard noise limits are recommended and are presented below:

- Daytime (i.e. 8:00am to 8:00pm) $L_{Aeq,1hr}$ 55dB; and
- Night-time (i.e. 8:00pm to 08:00am) $L_{Aeq,1hr}$ 45dB.

11.2.2.3 Site Blasting

During the blasting events within the Site, air over pressure (referring to the sound wave generated by the blast) and vibration limits are common monitoring criteria to ensure the safety of residents and their buildings. These two distinct aspects are described below:

> **Air overpressure** - the sound pressure wave, transmitted through the air from the blast. Although much of this sound pressure wave is generated under 20Hz (low frequency) it is accompanied by higher, audible frequencies, ensuring that the sound pressure wave is audible. This is typically, due to the inaudible less than 20Hz component, monitored under a dB linear weighting (also known as un-weighted).
>
> **Vibration** - the acoustic pressure wave, transmitted through the ground from the blast. Although the pressure is transmitted through the ground, reverberation within surface structures, including building components (glass) can result in an audible emission.

Both air overpressure and vibration are emitted from the source blast in predominately low frequencies, therefore both are predominately sensory rather than audible.

National guidance from the DoEHLG [12], EPA [14] and ICF [97] relating to blast limits at sensitive receptors are outlined in Table 11-2:

Table 11-2: Blasting Limits

Parameter	DoEHLG	EPA	ICF
Ground borne Vibration Limit	Ground borne vibration levels measured at the nearest occupied dwelling should not exceed the specified limit values. The EPA recommends that to avoid any risk of damage to properties in the vicinity of a quarry, the vibration levels from blasting should not exceed a **peak particle velocity of 12 millimetres per second** as measured at a receiving location when blasting occurs at a frequency of once per week or less. In the rare event of more frequent blasting, **the peak particle velocity should not exceed 8 millimetres per second.**	**Peak particle velocity = 12mm/s**, measured in any of the three mutually orthogonal directions at the receiving location (for vibration with a frequency of less than 40Hz).	The vibration levels from blasting should not exceed a **peak particle velocity of 12mm/s**, measured in any three mutually orthogonal directions at a receiver location. These levels are well below the levels at which structural damage occurs.
Air Overpressure Limit	Blast noise is characterised by containing a large proportion of its energy within a frequency that is below the normal hearing range and is therefore termed " air overpressure." The EPA recommends that blasting should not give rise to air overpressure values at the nearest occupied dwelling in excess of **125 dB(Lin)max. peak with a 95% confidence limit.** 95% of all air overpressure levels measured at the nearest occupied dwelling shall conform to the specified limit value. No individual air overpressure value should exceed the limit value by more than 5 dB(Lin).	**125dB (linear maximum peak value) with a 95% confidence limit.**	Blasting should not give rise to air overpressure values **at sensitive locations which are in excess of 125dB (Lin) max pea**k. To allow for wind fluctuations and weather conditions**, 95%** of all air over-pressure levels measured at the nearest noise sensitive locations **should conform to the specified limit value**. No individual air over-pressure value should exceed the limit value by more than 5dB (Lin).

Parameter	DoEHLG	EPA	ICF
Other Notes	Nearby residents (e.g. within 500 metres) need to be given advance notice when blasting operations are due to take place, which should only be carried out between 09.00 and 18.00 hours, Monday to Friday (except in emergencies or for health and safety reasons beyond the control of the developer). Similarly, such residents should be given the "all clear" signal by means of sirens or other agreed measures when blasting has been completed.	Normal hours of blasting should be defined (e.g. 09:00 - 18:00 Monday to Friday), and provision should be included to permit blasting outside these hours for emergency or safety reasons beyond the control of the quarry operator. It is recommended that quarry operators provide advance notification of blasting to nearby residents through use of written notes, signage at site entrance, telephone, or warning sirens (or a combination of these methods).	Planning permissions will normally specify hours of blasting and the local community should be advised in advance. Blast information including vibration, air over pressure, explosive charge and distance of the blast from blast sensitive installation, should be monitored and recorded.

Utilising best practice, the following criteria for compliance have been used within this assessment:

- Vibration - PPV 12mm/s measured in any of the three mutually orthogonal directions at the receiving location; and,
- AOP - 125dB (Lin) max peak measured at the receiving location.

Limits are respective to the closest receiving properties.

11.2.2.4 Site Associated Road Traffic

The L6280 local road adjoins the R212 regional to the west of the Site, which is the primary transport route for HGVs accessing and egressing Scotshouse Quarry. The surrounding roads are not major roads as per the Environmental Noise Regulations 2006 and therefore no strategic noise maps have been developed locally.

This Chapter based on the following has not identified significant and likely effects arising from the Proposed Development for road traffic noise and it has therefore been screened out of further assessment:

- Existing road traffic movements are established from the existing Quarry;
- No significant change in traffic is proposed, refer to Chapter 14 (Material Assets); and,
- No traffic associated with the Site during the night-time period.

11.2.3 Noise Modelling

Noise modelling was carried out using Soft Noise Predictor version 2023.01 software. The noise model has been developed for the Site to incorporate the noise emission sources during the operation of the Proposed Development, and the layout of the local environment. The model predicted site specific emissions only – i.e., it does not incorporate existing ambient sources such as road traffic.

The noise model was run utilising ISO 9613 1 & 2 for the basis of sound transmission from source to receiver.

11.2.3.1 Model Calculations

The Noise Model calculation formula is based on ISO 9613 – 1 & 2. Utilising this standard Predictor calculates the noise level as follows:

$$L|t.per = L_{dW} - C_{m,per} - C_{t,per}$$

Where

$$L_{dw} = L_W + D_c - A$$

$L_{lt,per}$ Long-term average octave (or 1/3-octave) SPL during the evaluation period in dB

L_{dw} Equivalent continuous downwind octave (or 1/3-octave) SPL in dB

$C_{m,per}$ Meteorological correction during the evaluation period in dB

$C_{t,per}$ Correction for the active time of the source during the evaluation period in dB

L_W Sound power level in dB(A) per octave (or 1/3-octave), re 1 pW

D_c Directivity correction in dB

A Attenuation (octave-band) in dB per octave (or 1/3-octave)

The attenuation A is calculated as follows:

$$A = A_{div} + A_{atm} + A_{gr} + A_{bar} + A_{fol} + A_{site} + A_{hous}$$

A_{div} Geometrical divergence in dB

A_{atm} Atmospheric absorption in dB/octave (or 1/3-octave)

A_{gr} Ground effect in dB/octave (or 1/3-octave)

A_{bar} Screening in dB/octave (or 1/3-octave)

A_{fol} Attenuation due to foliage in dB/octave (or 1/3-octave)

A_{site} Attenuation due to installations on an industrial site in dB/octave (or 1/3-octave)

A_{hous} Attenuation due to housing in dB

The noise modelling inputs and outputs are presented in Appendix 11-2. In developing the model all operational sources were deemed fully operational during the daytime period, i.e., on for the full 12-hour period and operating at full duty capacity. In reality, many emissions will operate for a lesser duration and below duty capacity at times. As such this noise model presents a worst-case scenario for most hours.

11.3 Receiving Environment

A review of the locality was conducted utilising OSI online mapping, Google and Bing Aerial Photography.

Based on this research, Noise Sensitive Receptors (NSRs) were identified in the locality and are shown in Figure 11-1 and described in Table 11-3. MOR have not been informed of any noise or vibration complaints or exceedances during the operation of the Proposed Development.

Figure 11-1: Location of Noise Sensitive Receptors

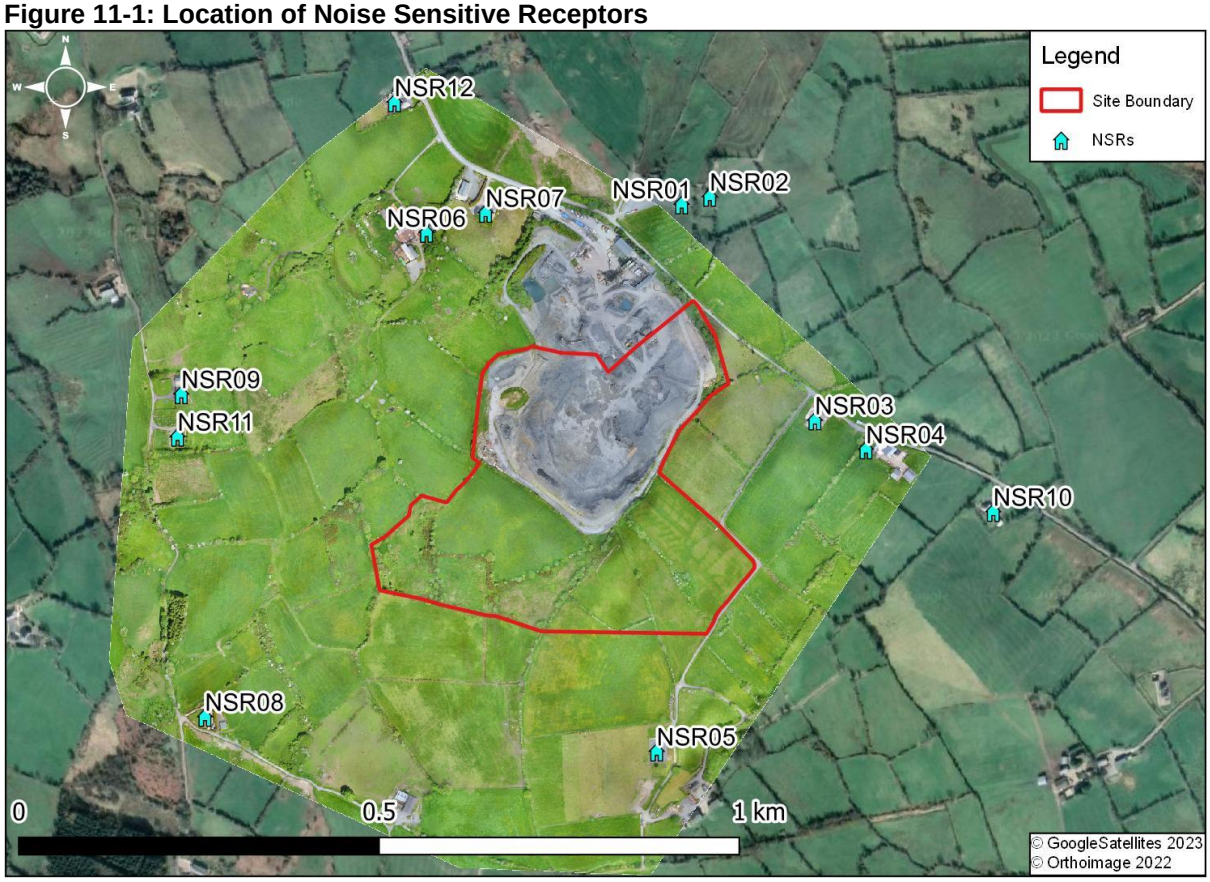


Table 11-3: Identification of Noise Sensitive Receptors (NSRs)

ID	ITM (Easting, Northing)		Location Relevant to Site	Approx. Distance from Site Boundary (m)
	E	N		
NSR01	649667	818318	North of the Site.	ca.135m
NSR02	649706	818329	North of the Site.	ca.146m
NSR03	649852	818019	East of the Site.	ca.130m
NSR04	649923	817979	East of the Site.	ca.211m
NSR05	649633	817560	South of the Site.	ca.177m
NSR06	649313	818279	Northwest of the Site.	ca.196m
NSR07	649395	818307	Northwest of the Site.	ca.196m
NSR08	649006	817608	Southwest of the Site.	ca.299m
NSR09	648973	818055	West of the Site.	ca.337m

ID	ITM (Easting, Northing)		Location Relevant to Site	Approx. Distance from Site Boundary (m)
	E	N		
NSR10	650100	817892	East of the Site.	ca.340m
NSR11	648968	817996	West of the Site.	ca.308m
NSR12	649269	818460	Northwest of the Site.	ca.379m

Where feasible, the numbering IDs of the NSR's match the sensitive receptors (SR's) presented in Chapter 9 Air Quality, for consistency.

The Site is in an agricultural area, with several agricultural activities in the immediate locality. There are several residential properties within the vicinity of the Site, with the closest, NSR03, being located ca.130m from the Site (see Figure 11-1).

11.3.1 Baseline Ambient Acoustic Assessment

11.3.1.1 Characterisation of the Ambient Acoustic Environment

The Applicant commissioned acoustic surveys in 2022 and 2023, which were completed by BHP Laboratories Limited. BHP technicians are certified to carry out the measurements by the Institute of Acoustics and have extensive experience across a range of sectors. The full report can be found at Appendix 11-3. The results are presented in Table 11-4 and Table 11-5 for the years 2022 and 2023 respectively and shows in Figure 11-2.

In addition, a site visit was completed by Kenneth Goodwin, the MOR acoustician on 17th November 2022.

Figure 11-2: Ambient Monitoring Locations – BHP

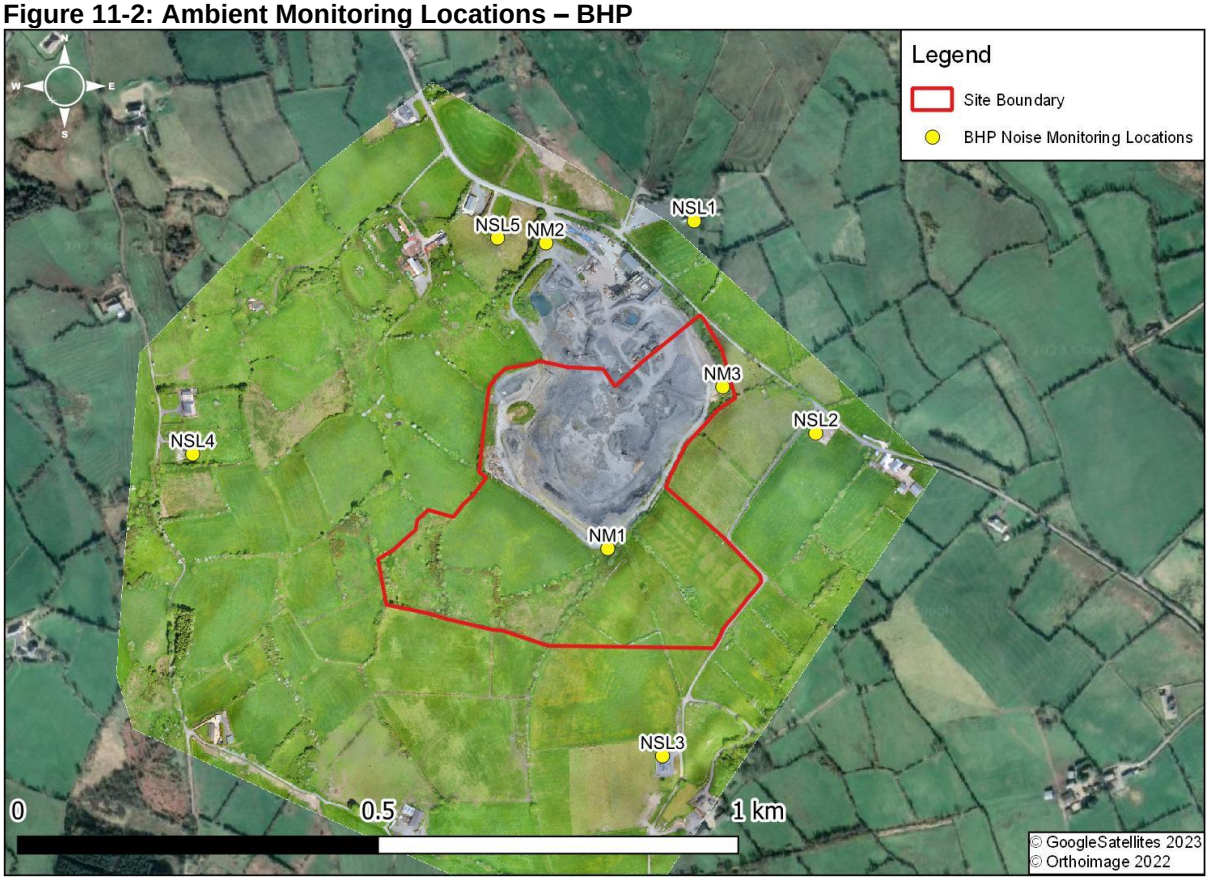


Table 11-4: Ambient Daytime Sound Levels 2022

Location	Start Time	$L_{Aeq,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)	L_{AFmax} (dB)	Description
NM1	09:32 - 10:32 20/12/2022	47	53	40	84	Quarry activity audible from this location. Macadam plant could be heard in the distance at 48-53dBA consistently through testing. Truck passed noise monitoring point during testing. This was the noise associated with the L_{Amax}.
NM2	13:57 - 14:57 27/10/2022	55	60	52	67	Macadam plant could be heard during the start of testing (20mins) operating at 58-63dBA. When not running, mobile plant was heard on site at 45-53dBA. Trucks entering and exiting the quarry was audible at 45-50dBA occasionally.
NM3	14:07 - 15:07 27/10/2022	54	57	37	72	Macadam plant was audible during the start of testing (10mins) at 50-55dBA. When not running, mobile plant and trucks moving on site was heard at 42-47dBA.
NSL1	15:50 - 16:50 19/12/2022	55	59	40	68	Macadam plant audible at 53-58dBA almost consistently through testing. Infrequent traffic passing on local road heard faintly in the background
NSL2	14:31 - 15:31 19/12/2022	51	51	43	81	Macadam plant audible 45 - 53dBA for second half of testing. Occasional passing traffic on local road was audible and associated with the L_{Amax} of 81dBA.
NSL3	09:22 - 10:22 20/12/2022	51	53	42	75	Quarry activity not audible from this location. Dog barking is associated with the LAmax of 75dBA regularly during testing. Cattle in nearly sheds could be heard at 65 -45dBA occasionally.
NSL4	16:08 - 17:08 19/12/2022	50	54	36	73	Quarry activity not audible from this location. Nearby tractor was audible intermittently during testing at 45 -53dBA. One bus passed audible at up to 73dBA. Occasional passing traffic on local road heard at 55 -65dBA.
NSL5	14:22 - 15: 22 19/12/2022	52	54	40	72	Macadam plant audible at 45 -52dBA for the second half of testing. Cars passing on local road were audible at 45 - 55dBA and an occasional truck passing at up to 72dBA

Table 11-5: Ambient Daytime Sound Level 2023

Location	Start Time	$L_{Aeq,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)	$L_{AF\ max}$ (dB)	Description
NM1	17:28-18:28 23/01/2023	47	52	27	60	No quarry activity audible from this location during testing. Tractor working in nearby off-site field. This is the noise associated with the maximum. Birdsong consistently during testing at 45-50dBA
NM2	15:07-16:07 23/01/2023	43	45	31	69	Mobile plant was heard on site at 40-50dBA. Trucks entering and exiting the quarry was audible at 45-50dBA occasionally.
NM3	15:03-16:03 23/01/2023	41	44	30	73	Mobile plant and trucks moving on site was heard at 42-47dBA regularly during testing.
NSL1	17:22-18:22 23/01/2023	36	38	25	57	Infrequent traffic passing on local road heard faintly in the background. Dog barking from nearby house and was associated with the maximum. No quarry noise audible.
NSL2	16:18-17:18 23/01/2023	38	43	28	69	Occasional passing traffic on local road was audible. Car entered the driveway of the house and was associated with the maximum levels heard. Mobile plant audible faintly in the distance. Distant tractor operating was heard at 35-40dBA occasionally.
NSL5	16:15-17:15 23/01/2023	46	52	28	67	Cars passing on local road were audible at 45-55dBA and an occasional truck passing at up to 67dBA. Mobile plant audible faintly in the distance. Farm related noise such as cattle and sheds banging audible from the site next door to this location.

Based on the information gathered, it was noted the local ambient acoustic environment was influenced by:

- Agriculture - domestic animals, farm machinery and birdsong;
- Industry - Quarry plant and other site-based manufacturing;
- Transport - traffic noise from local road movements.

Generally higher levels of ambient acoustic sound were found at NM2 and NM3, during 2022, with noise due to the macadam plant and the movement of vehicles near the SLM. The macadam plant forms part of the existing permitted Scotshouse Quarry operations. Mitigation was applied at the end of 2022, the levels at those locations in 2023 were quieter.

All monitoring locations recorded $L_{Aeq,1hr}$ values of 47dB to 55dB during 2022 and 36dB to 47dB during 2023 survey.

The background ambient acoustic environment for all monitoring locations as $L_{A90,1hr}$ ranged from 36dB to 52dB in 2022 and 25dB to 31dB in 2023.

Ambient noise levels from 2023 will be used for this assessment with the exception of location NSL03 and NSL04 which will use values from 2022 as there were no measurements from 2023.

11.3.2 Conclusion of Existing Ambient Acoustic Environment

Based on the desk-based review of the area and the baseline noise survey carried out it is reasonable to conclude that the ambient existing sound levels surrounding the Site are low to moderate.

11.4 Characteristics and Potential Impacts of the Proposed Development

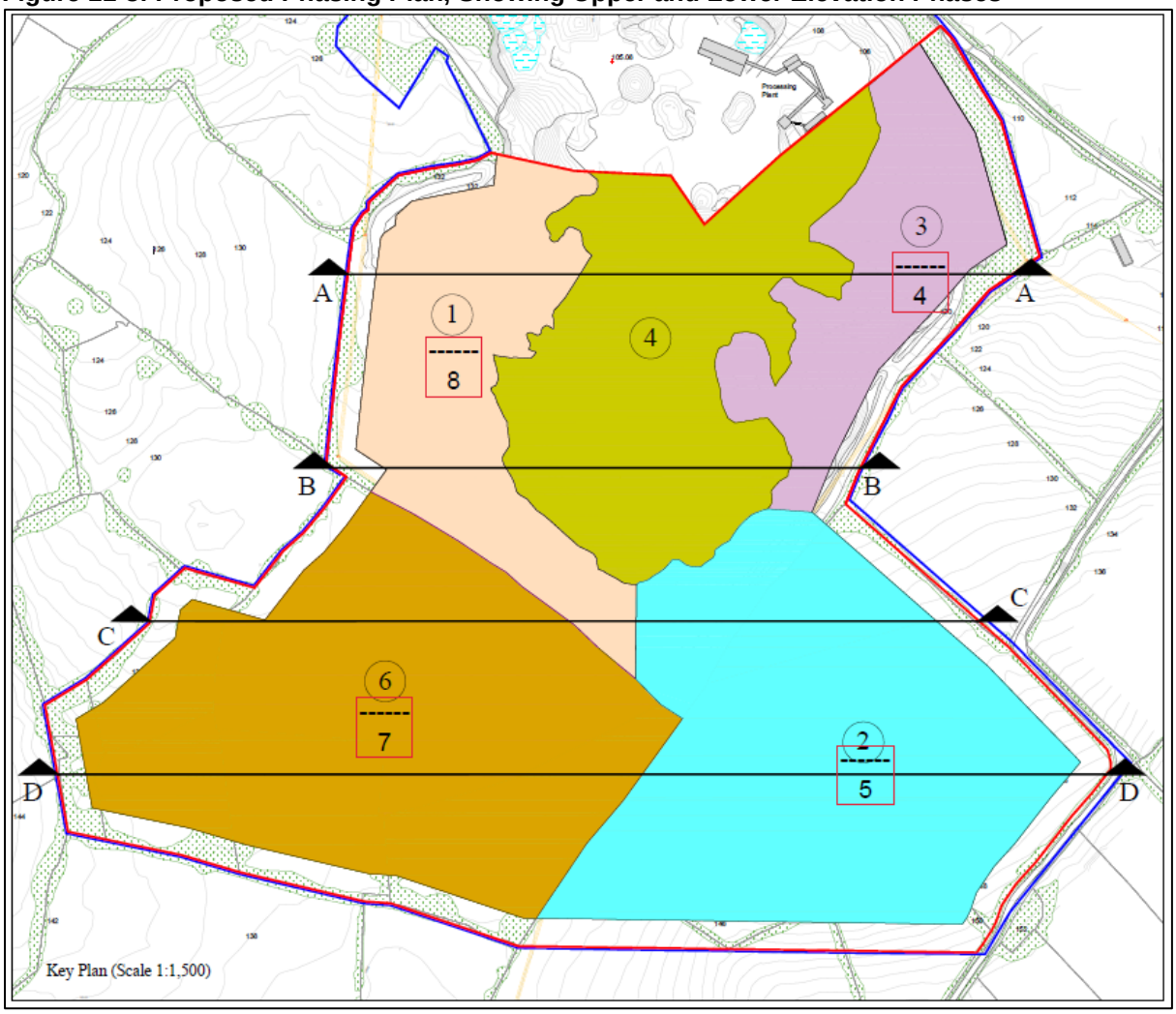
The potential noise and vibration arising from the Proposed Development has three distinct phases:

- Construction Phase;
- Operational Phase; and,
- Restoration Phase

The sources of noise and potential impacts arising from the phases are distinctly different and therefore have been discuses separately.

To assess the worst-case scenario for operational noise, the upper benches will be modelled for the acoustic assessment for both zones, A and B. Phases 1 and 3 from Zone A and Phases 2 and 6 from Zone B will be assessed regarding noise and vibration. The phases are shown in Figure 11-3.

Figure 11-3: Proposed Phasing Plan, Showing Upper and Lower Elevation Phases



11.4.1 Construction Phase Noise

Noise during the construction phase (or site preparation) of the Proposed Development will consist mainly of topsoil and overburden removal and construction of soil embankments. This phase of work will require the use of a bulldozer or similar unit along with an excavator unit for creation of the embankment.

Table 11-6 below gives typical sound pressure levels ($L_{Aeq,T}$) for typical equipment employed for such works.

Table 11-6: Typical equipment employed for Site Preparation

Plant	Description	Reference (BS5228-1)	Sound Pressure L_{Aeq} at 10m
Bulldozer	Clearing of soils	C.2.01	75
Excavator	Creation of embankments	C.2.02	77
Combined Sound Pressure Level (at 10m)			**79dBA**

Activities that will have a negligible sound such as surveying, planting of embankments etc. have been omitted. Similarly, activities that are characteristic of the agricultural area including fencing and hedgerow maintenance have not been assessed.

Table 11-7 below details the potential construction noise impact at NSRs, which utilised the BS5228 ABC Method for peak noise, associated with the construction phase (or site preparation) of the Proposed Development (utilising combined sound power of 79dB at 10m)

The predicted levels at the NSRs facades have been compared directly to noise construction limits. Utilising the measured 2022/2023 sound levels as typical of historic ambient, the lowest construction limit has been selected within the ABC method.

Table 11-7: Construction Phase Noise Assessment (BS5228 ABC Method)

NSR	Distance Site Boundary (m)	Predicted Site Specific Sound Pressure Level at NSR Facade $L_{Aeq,T}$ dB	ABC Threshold Compliant for main Site	Compliant with BS5228-1
NSR01	135	57	65	Yes
NSR02	146	56		Yes
NSR03	130	57		Yes
NSR04	211	53		Yes
NSR05	177	54		Yes
NSR06	196	53		Yes
NSR07	196	53		Yes
NSR08	299	50		Yes
NSR09	337	49		Yes
NSR10	340	49		Yes
NSR11	308	49		Yes
NSR12	379	48		Yes

All NSRs identified will experience less than a $L_{Aeq,1hr}$ of 65dB, due to the distances between NSRs and the Site preparation works. These values represent the worst case where plant will be operational on the closest boundary to each of the properties. This assessment assumes all on-site plant is operating at the closest point of the boundary to these receptors for a constant duration of 1 hour. These values are below the typical construction noise nuisance limit of $L_{Aeq,1h}$r 65dB. The Construction Phase works will be completed over 6 months period, 2 slots of 3months each.

11.4.2 Construction Phase Vibration

Vibration from the Site Preparation Phase of works are negligible based on the plant and machinery to be used, the works involved, the distances between the site works and the closest sensitive receptors, and the intervening agricultural ground. Historical impacts from the Development on vibration from the Construction Phase of works were imperceptible.

11.4.3 Operational Phase Noise

Noise during the Site's Operational Phase will largely be associated with blast preparation, blasting, rock breaking (2-3 days post blast), crushing, screening and aggregate transport.

The future acoustic emissions will be similar to ongoing activities within the rock quarry. These can be broadly divided into two distinct steps:

- Blasting preparation; and,
- Aggregate processing.

Blasting preparation involves the use of a drilling rig on the top of the bench to be removed. Upon completion of the initial work, the blast event will occur. During the blast event, the Applicant will shut down and remove all personnel from the quarry as explosives are used to break/shatter a portion of the rock face to the ground. No further activities are conducted until the Site is declared safe by the blast specialist.

Table 11-8 presents typical sound pressure ($L_{Aeq,T}$) values for plant utilised within the Site as part of the operational phase of the Proposed Development, processing included primary crushing and primary screening, along with stockpiling, utilising mobile plant.

A pump will be run intermittently in the Proposed Development when water levels are high following a rainfall event or similar event. A pump is normally considered a noise source but as it's submersible and it will be connected to mains power noise associated with this equipment will be negligible at the closest NSR location.

Table 11-8: Operational Sound Pressure Levels

Plant	Description – typical plant values derived from	Sound Pressure L_{Aeq} at 10m
Excavator	Volvo EC300E excavator	73
Jaw crusher	Sandvik QJ341 jaw crusher	74
Scalping screen	Roco 1600 scalping screen	70
Tracked conveyers	Roco tracked conveyer / stackers	82
Wheel Loader	Volvo 180 Wheel loader	97

As part of this assessment, a noise model using specialist acoustic software Predictor V.2023.01, has been prepared to assess predicted noise emissions at the Site during the Proposed Development works. The site-specific emissions from the Proposed Development, outlined in Table 11-8 above, are supplied in Table 11-9 below and displayed in Figure 11-3 below.

The results are predicted at 1.5m height, as the Proposed Development will only operate during daytime periods. To establish the worst-case scenario, for each NSR the highest noise level from all the phases has been selected, the results are detailed in Table 11-9.

Table 11-9: Operational Noise Assessment

NSR	Predictor Output ($L_{Aeq,1hr}$) (dB)	EPA & ICF L_{Aeq} Limit (dB)	Compliant?
NSR01	43	55	Yes
NSR02	43		Yes
NSR03	41		Yes
NSR04	43		Yes
NSR05	43		Yes
NSR06	41		Yes
NSR07	53		Yes

NSR	Predictor Output ($L_{Aeq,1hr}$) (dB)	EPA & ICF L_{Aeq} Limit (dB)	Compliant?
NSR08	28		Yes
NSR09	29		Yes
NSR10	27		Yes
NSR11	28		Yes
NSR12	39		Yes

Predicted cumulative sound levels at all NSRs was predicted to be below noise nuisance criteria, as stated in Section 11.11.4, best guidance for quarry noise control issued by the EPA and ICF for daytime L_{Aeq} 55dBA.

Activities likely to result in audible noise at NSRs will normally occur during daytime hours so predicted results have been calculated at 1.5m.

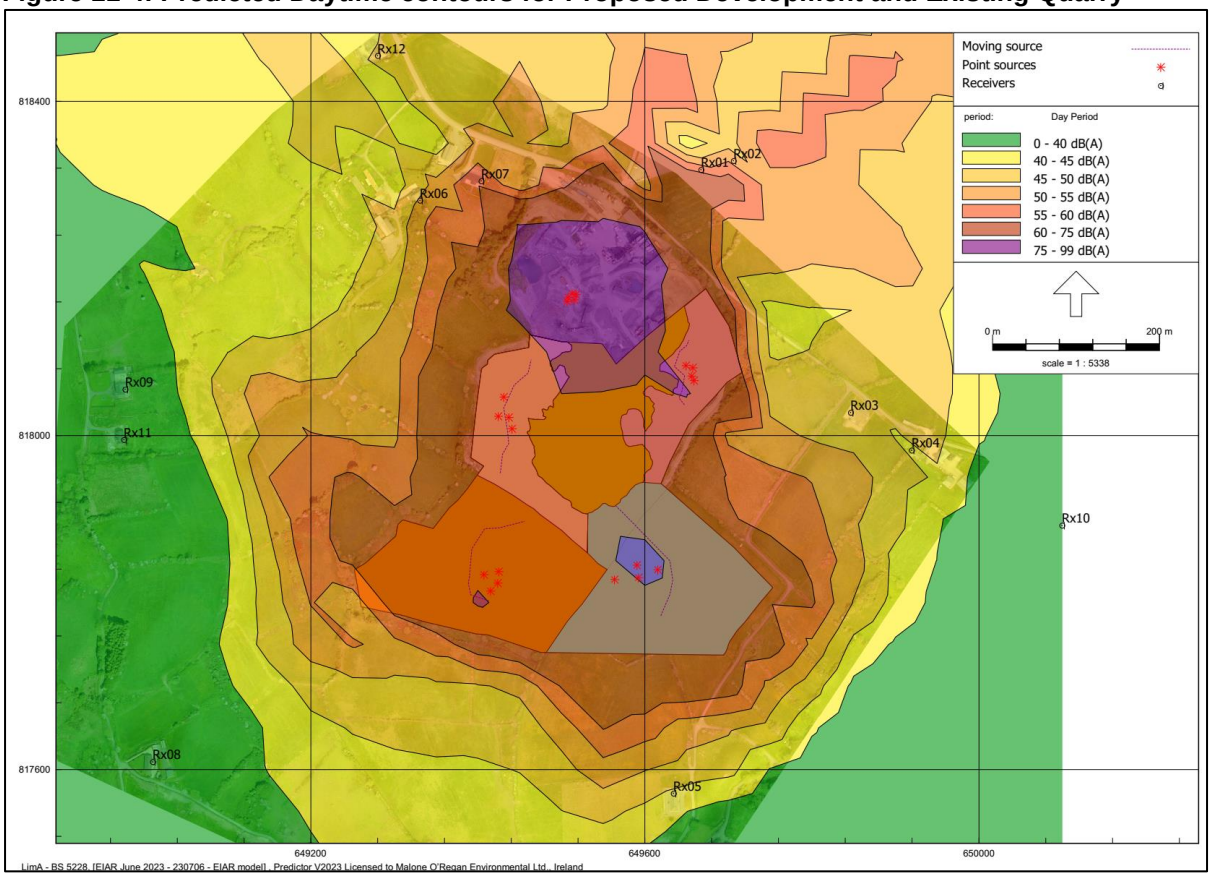
Predicted Site-specific values were also compared against ambient $L_{Aeq,T}$ values from the baseline noise survey. Four (4No.) NSRs (NSR01, NSR02, NSR04 and NSR07) were deemed to have an effect as per the IOA/IEMA guidelines, with a predicted change of 5-7dBA at these NSRs. The Proposed Development works will potentially be audible at these NSRs, the future noise will be the same as the actual noise present within the current Development, as the same machinery and plant used for the Proposed Development will be the same. Given that there are no known noise complaints from existing receptors, there is no reason to expect this to change in the future.

Additionally, the predicted change is the worst-case scenario as only the initial berm for each phase has been modelled. As the works progress for each phase, the noise will be reduced at NSRs due to the increasing relative height of the berms and cliff face.

One (1No.) NSR (NSR03) was deemed moderate as per the IOA/IEMA guidelines, with a predicted change of +4dBA. This predicted change will potentially be audible on the background, however due to the lower levels, it is unlikely to be intrusive. As such, as per the IOA/IEMA guidelines, the impact was deemed locally slight with predicted noise been non-intrusive, where no mitigation was presented.

The remaining NSRs were deemed to experience negligible effects, with no predicted changed occurring. The daytime noise contours for the operational Phase with all phases and the existing working simultaneously are shown in Figure 11-4.

Figure 11-4: Predicted Daytime contours for Proposed Development and Existing Quarry



The blast event itself is a short duration, high intensity, predominately low frequency event. An integral part of the operation of the rock quarry the emission during the blast into the air is known as air overpressure. As stated, the predominant sound pressure within this air overpressure is low frequency and inaudible.

As a standard procedure all blast events on the Site will be monitored by the blast specialist for both air-over pressure and vibrations. Receptors within 500m will be informed prior to any blast activity, with monitoring occurring at the closest receptor to the blast.

The blast event is a short duration, locally significant effect. The blast specialist will ensure all blasts will be conducted in line with relevant health and safety requirements, and ensure, through design of the proposed blast, that air over pressure levels will be below the limits established in Section 11.2.2.3.

Prior to any blast a blast specification will be developed by the explosives supervisor, be specific to each individual blast to occur on the site and take full cognisance of the site conditions on the day of the blast event. This specification will ensure:

- Minimisation of fly rock being projected outside of the declared danger zone;
- Minimise the risk of misfires;
- Enable location of misfires to be identified;
- Ensure faces are left in a safe condition following the blast event.

11.4.4 Operational Phase Vibration

Operational Phase vibration will occur during quarry face blasting. Efficient blasting ensues that as much of the explosive energy as possible is utilised for rock fragmentation, and ground vibration and air overpressure is an inefficient use of this energy [14].

A 150m buffer will be used to offset effects from blasting vibration, the buffer has been calculated and is shown in Figure 11-5. NSR01, 02 and 03 are just inside the buffer, however the distance to the blasting locations (Zone B) is greater or equal of 200m.

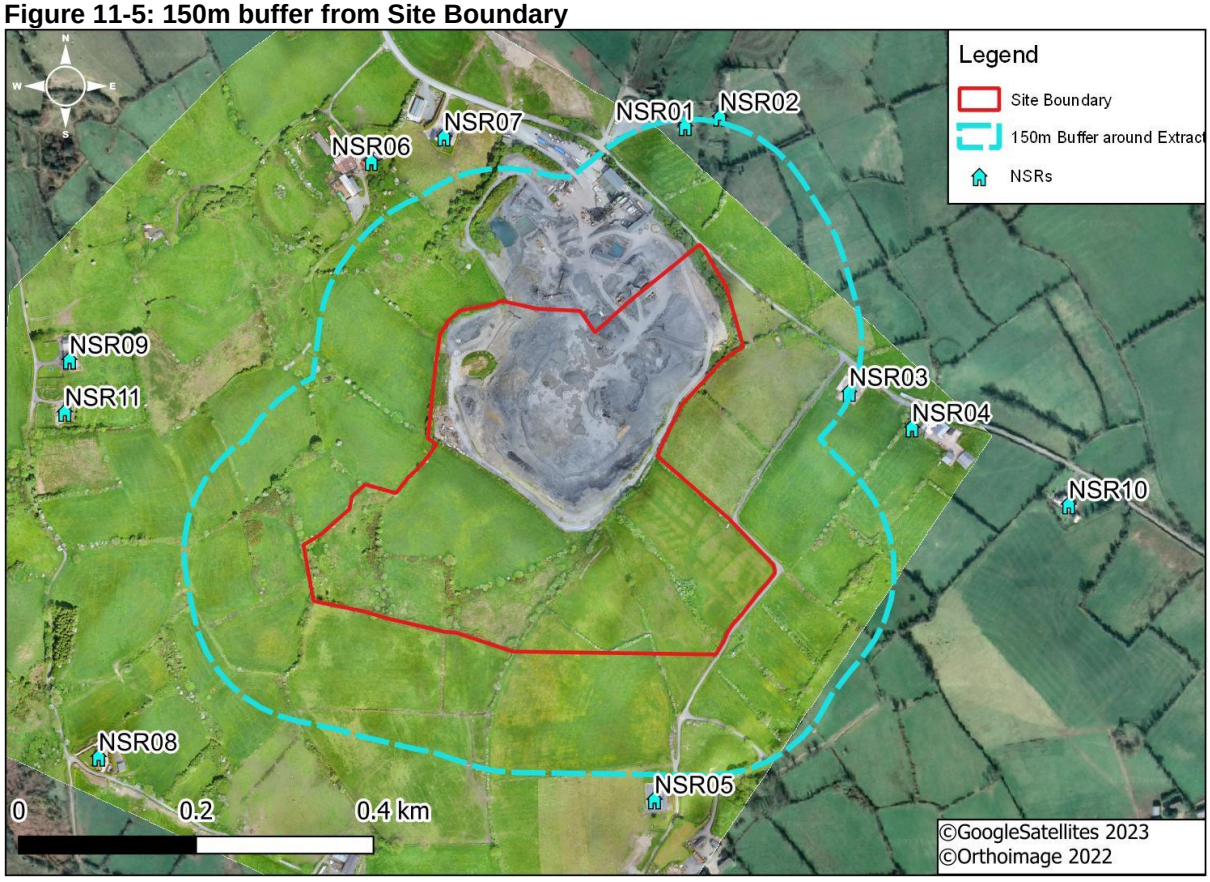
Blasting during previous operations at the existing quarry is considered as a good representation of future predicted blast events at the Proposed Development as the site setting remains the same and blasts will be designed in line with historical blasts.

Ground vibration and air blast monitoring for blasting events was carried out between 2017 and 2022. There have been no exceedances in PPV recorded at location NSR06. The monitoring results for the period were within the recommended threshold values for vibration.

During the operation of the Proposed Development, rock will continue to be extracted by blasting and in compliance with current vibration limits for the existing quarry, refer to section 11.2.2.3 above.

The blast event is therefore a short duration, locally significant effect, which will be controlled through compliance with blast limits and notification to local residents.

Figure 11-5: 150m buffer from Site Boundary



11.4.5 Past Blast Events

The blast event itself is a short duration, high intensity, predominately low acoustic frequency event. An integral part of the rock blast is the emission during the event into the air, known as air overpressure. As stated, the predominant sound pressure within this air overpressure is low frequency and inaudible.

As a standard procedure, all blast events on the Site were monitored by the blast specialist for both air-over pressure and vibration. The results from the blast records from 2017 to 2022 for air overpressure and vibration are presented in Table 11-10 and Table 11-11 respectively. The blasting records were measured at NSR06, refer to Figure 11-5 above.

Table 11-10: Air overpressure records for historic blasting

Date	PPSL (dB)	ZC Freq (Hz)	Compliant? <125dB
18/04/2017 12:49	118	6.3	Compliant
02/06/2017 12:38	115.6	8.3	Compliant
09/08/2017 13:20	115.9	4.6	Compliant
06/06/2018 13:30	117.4	2	Compliant
27/07/2018 12:39	111.2	1.9	Compliant
06/03/2019 12:40	117	6.7	Compliant
12/04/2019 11:02	118	7.6	Compliant
01/07/2019 11:00	110	3	Compliant
23/07/2019 12:12	112	6.4	Compliant
13/09/2019 11:59	116	5.4	Compliant
29/10/2019 12:12	116	2.8	Compliant
12/02/2020 15:47	120	2.3	Compliant
20/05/2020 13:30	122	3.7	Compliant
09/06/2020 13:36	122	2.8	Compliant
08/08/2020 13:00	112	6.6	Compliant
05/12/2020 12:00	118	8.3	Compliant
05/03/2021 12:43	125	5.3	Compliant
31/03/2021 12:37	122	3.8	Compliant
18/06/2021 11:30	119	9.1	Compliant
05/04/2022 12:13	125	3	Compliant
07/09/2022 12:26	113	11	Compliant

Table 11-11: Vibration records for historic blasting

Date	Transversal		Vertical		Longitudinal		Compliant? <12 mm/s
	PPV (mm/s)	ZC Freq (Hz)	PPV (mm/s)	ZC Freq (Hz)	PPV (mm/s)	ZC Freq (Hz)	
18/04/2017 12:49	2.16	2.16	2.03	23	64	17	Compliant
02/06/2017 12:38	3.56	3.81	4.32	30	24	20	Compliant
09/08/2017 13:20	3.65	4.7	3.17	51	21	23	Compliant

Date	Transversal		Vertical		Longitudinal		Compliant? <12 mm/s
	PPV (mm/s)	ZC Freq (Hz)	PPV (mm/s)	ZC Freq (Hz)	PPV (mm/s)	ZC Freq (Hz)	
06/06/2018 13:30	5.59	5.21	3.3	37	73	18	Compliant
27/07/2018 12:39	9.4	8.38	6.73	23	57	20	Compliant
06/03/2019 12:40	1.524	39	1.651	43	1.397	30	Compliant
12/04/2019 11:02	2.921	34	4.318	85	3.174	21	Compliant
01/07/2019 11:00	7.747	30	5.08	28	5.715	20	Compliant
23/07/2019 12:12	4.191	19	5.715	23	6.858	21	Compliant
13/09/2019 11:59	2.286	20	2.286	37	3.429	19	Compliant
29/10/2019 12:12	0.889	>100	5.334	57	3.048	16	Compliant
12/02/2020 15:47	3.302	22	3.429	64	3.048	20	Compliant
20/05/2020 13:30	2.54	14	2.032	47	2.413	32	Compliant
09/06/2020 13:36	7.239	19	7.747	64	7.747	20	Compliant
08/08/2020 13:00	6.731	20	4.445	43	4.826	17	Compliant
05/12/2020 12:00	1.397	43	1.397	47	1.524	37	Compliant
05/03/2021 12:43	2.794	47	2.413	17	2.413	15	Compliant
31/03/2021 12:37	2.413	22	2.159	57	2.794	18	Compliant
18/06/2021 11:30	1.651	21	1.143	73	1.016	51	Compliant
05/04/2022 12:13	8.001	19	10.67	28	8.89	30	Compliant
07/09/2022 12:26	1.651	19	1.397	28	1.143	20	Compliant

The previous tables show every blast record was below the industry standard compliance limits presented in section 11.2.2.3 by the DoEHLG, EPA and the ICF.

11.4.6 Restoration Phase Noise

Noise during the restoration of the Site will be associated with the creation of ramp for access to the waterbody.

This activity will require minimal plant, consisting of tractor and bulldozer. Table 11-12 below gives typical sound pressure ($L_{Aeq,T}$) values for plant utilised in quarry restoration sites for each of the steps.

Table 11-12: Typical equipment employed for Restoration.

Plant	Description	Reference (BS5228-1)	Sound Pressure L_{Aeq} at 10m
Bulldozer	Clearing of soils	C.2.01	75

Plant	Description	Reference (BS5228-1)	Sound Pressure L_{Aeq} at 10m
Excavator	Creation of embankments	C.2.02	77
Combined Sound Pressure Level (at 10m)			**79dBA**

During this stage of works, existing activities within the existing Quarry may continue to operate, the impact of emission are incorporated within the ambient measured value. It would not be uncommon on quarry projects that closure/restoration phases would be rated against the Construction limits instead of Operational limit, as they are short term, and the closure will see the end of the quarry operations. In this case, the peak site-specific emissions are predicted to be below the construction limit stated in Section 11.2.3.1. Plant and equipment will be operating at distinct tasks around the Site, where noise emission will be dispersed. Therefore, to enable a calculation of the likely worst-case for audible noise, the activity was assumed to occur at the boundary, while distances at NSRs was calculated from the closest boundary.

The peak site-specific emissions from the Proposed Development at the closest NSR, NSR01 (ca.143m from the Extraction area), is calculated to be 56dBA.

The Proposed Development will not introduce new sound characteristics, nor will the restoration stage present sound qualities typically deemed to be objectionable, such as tonal or clearly impulsive/impact sounds.

Based on the assessment the predicted impact is deemed so be not significant short-term impact on a local basis.

11.4.7 Restoration Phase Vibration

No Rehabilitation Phase vibration is likely.

11.5 Proposed Mitigation Measures and/or Factors

11.5.1 Construction Phase

11.5.1.1 Noise

The following mitigation measures will be in place during construction:

- Site Preparation works will be designed to avoid noisy work outside the hours of
    - Monday to Friday 07:00 to 19:00; and,
    - Saturday 08:00 to 14:00.
- Work occurring outside these hours will be subject to tighter construction stage noise limits, as per BS5228 (Section 11.2.2.3 of this EIAR);
- Nomination of a responsible person to accept and respond to complaints;
- Ensuring all plant and equipment is serviced and in good repair;
- Avoidance of plant or equipment left idling;
- Planning of works to ensure drop heights from equipment or during demolition are minimised to reduce noise generated; and,
- Noise monitoring programme during construction phase works.

11.5.1.2 Vibration

No mitigation required for the Construction Phase relating to vibration control.

11.5.2 Operational Noise

11.5.2.1 Noise

Plant operating hours will be from 07:00 to 19:00 (with processing works only occurring between 08:00 and 18:00), Monday to Friday and 08:00 to 14:00 on Saturdays. No quarrying activities will take place on Sundays or Public Holidays.

The associated equipment during the Operational Phase will be in proximity to the working face of the quarry at different intervals during the operational lifetime within the Site. This will aid in reducing noise emissions from the operations on-site. Berms created during the site preparation works will also aid in reducing noise emissions from the Site.

The following mitigation measures will be implemented:

- All plant (fixed and mobile) is maintained to a high standard to reduce any tonal or impulsive sounds;
- All plant is throttled down or switched off when not in use;
- Drop heights of material are minimised;
- Rubber linings are used on chutes and transfer points;
- Where possible, plant and machinery are enclosed or cladded; and,
- Internal routes are reduced in gradients and routed to minimise noise emissions from vehicles on-site.

Air overpressure from a blast is difficult to control because of its variability, however, much can be done to reduce the effect. In line with best practice mitigation measures from vibration sources, good communication and public relations are a key factor in reducing any startle effects to residents.

Part 44, from HSA [38], stated about blasting specification (Regulations 47):

> *"47. The operator shall ensure that –*
>
> *(a) an adequate written blast specification, including identification of the danger zone based on an assessment of the risks, is prepared by the explosives supervisor for each shotfiring operation at the quarry to ensure that, so far as is reasonably practicable, when such shotfiring occurs, it will not give rise to danger, and,*
>
> *(b) a copy of any relevant information contained in the blast specification referred to in paragraph (a) is given to any person upon whom it imposes duties".*

11.5.2.2 Vibration

Operational stage vibration will arise during quarry face blast events. The control of the ground borne vibration will be a key aspect of the blast engineer's approach. Design methods to reduce ground borne vibration will include the following items as identified in BS 5228-2 [115]:

- Ensuring appropriate burden to avoid over or under confinement of the charge;
- Accurate setting out and drilling;
- Appropriate charging;
- Appropriate stemming with appropriate material such as sized gravel or stone chippings;
- Using delay detonations to ensure smaller maximum instantons charges;
- Using decked charges and in-hole delays;

- Blast monitoring to enable adjustment of subsequent charges;
- Designing each blast to maximise its efficiency and reduce the transmission of vibration; and,
- Avoiding the use of exposed detonating cord on the surface in order to minimise air overpressure.

It will be the task of the competent blast engineer to take into consideration the current quarry face, the known geology and modern blasting best practices, to maximise the efficiency and thereby minimise energy loss through ground borne vibration to the surrounding environment.

11.5.3 Rehabilitation Phase

11.5.3.1 Noise

The Rehabilitation Phase will be temporary insofar as it will be at periodic intervals over the lifetime of the quarry.

The Rehabilitation Phase will be limited to the operational times of 07:00 to 20:00, Monday to Friday and 07:00 to 18:00 on Saturdays. No works will occur on Sundays or Public Holidays.

Mitigation measures as mentioned in Section 8.6.2 will be adhered to including:

- All mobile plant will be maintained to a high standard to reduce any tonal or impulsive sounds; and,
- All mobile plant throttled down or switched off when not in use.

11.5.3.2 Vibration

No likely significant vibration impacts to sensitive receptors during the Rehabilitation Phase.

11.6 Cumulative and In-Combination Effects

The Proposed Development has been assessed in relation to the potential variation in noise levels and found no significant effects.

The Site activities have been further assessed in line with existing ambient background levels, that included existing noise from Scotshouse Quarry, and other existing noise sources as detailed in Section 11.3.3.1 and found no significant effects.

As a worst-case scenario, a backup generator of 300kVA will be used to power the asphalt plant located in the existing Scotshouse Quarry.

The predicted cumulative, site-specific emissions from the Proposed Development and from the backup generator at the closest NSRs, NSR01 ca.206m and NSR02 ca.228m, are calculated at 46dBA and 44dBA respectively, which will result in an increase around 3-4dBA for the results presented in Table 11-9. These values are lower than the daytime noise limit of L_{Aeq} 55dBA.

11.7 Interactions with other Environmental Attributes

Noise is closely linked with human beings (Chapter 5), as residential receptors are the primary noise sensitive receptors, and have been discussed as the primary receptor in this chapter.

Noise can influence fauna, through disturbance of animals, impacts on specific species have been outlined in Chapter 6 (Biodiversity) where relevant.

Traffic associated with the Proposed Development is likely to be one of the primary sources of noise at the Site. This has been thoroughly examined in this chapter (Chapter 11). The potential effects of the Proposed Development on traffic are examined in Chapter 14 (Traffic and Transport).

11.8 Indirect Effects

There are no anticipated indirect effects – all effects have been identified and are considered within this chapter.

11.9 Residual Effects

The residual noise effect, based on the proposed emissions, phasing and intensity of the Site, the mitigation outlined and practices to be employed and within the context of the existing and long history of operations within the Scotshouse Quarry, is deemed to be neutral long term, and reversible effect.

11.10 Monitoring

The operator will conduct noise monitoring twice annually at the locations previously used as presented in Figure 11-2 for noise compliance.

All blast events should be monitored for vibration and air overpressure at the closest NSR from the blasting area.

A ground borne limit of 12mm/s for PPV at any direction, and air overpressure limit of 125dB linear with a 95% confidence limit should be used for compliance assessment against best practice.

11.11 Reinstatement

The restoration phase of the Proposed Development outlines how the site will be restored to an inert state. This phase and potential associated effects have been considered throughout this Chapter.

11.12 Difficulties Encountered in Compiling this Information.

No difficulties were encountered.

12 LANDSCAPE AND VISUAL IMPACT

12.1 Introduction

This Chapter of the EIAR describes the likely landscape and visual impacts arising from the Proposed Development in terms of context, landscape character and specific potential views. Although closely linked, landscape and visual impacts are assessed separately.

Landscape Impact Assessment (LIA) relates to assessing effects of a development on the landscape as a resource in its own right and is concerned with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character.

Visual Impact Assessment (VIA) relates to assessing effects of a development on specific views and on the general visual amenity experienced by people. This deals with how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the landscape and / or introduction of new elements. Visual impacts may occur from visual obstruction (blocking of a view, be it full, partial or intermittent) or visual intrusion (interruption of a view without blocking).

Cumulative Landscape and Visual Impact Assessment is concerned with additional changes to the landscape or visual amenity caused by the development in conjunction with other developments (associated or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future.

The Proposed Development is described in detail in Chapter 3 (Description of Development) of this EIAR.

12.2 Methodology

This landscape and visual impact assessment (LVIA) was completed with regard to the sensitivity of the landscape and its vulnerability to change. The assessment considers both the location of visual receptors relative to the Proposed Development and the type of visual receptor.

The following documents formed part of this assessment:

- Environmental Protection Agency (EPA) publication Guidelines on the Information to be contained in Environmental Impact Statements (2022) [8];
- Landscape Institute and the Institute of Environmental Management and Assessment (IEMA) publication entitled Guidelines for Landscape and Visual Impact Assessment (2013) [129];
- 'Photography and Photomontage in Landscape and Visual Impact Assessment', Landscape Institute Technical Guidance Note 06/2019 [130];
- Monaghan County Council Monaghan County Development Plan 2019-2025 [27]; and,
- Online tourism and recreational amenity resource information for the local area.

The following works were undertaken as part of this assessment:

- Desk based studies including a review of Ordnance survey maps at 1:50000, and 1:2500 maps and satellite imagery to define the scope of the fieldwork required;
- Fieldwork to assess potential impacts on the landscape and potential visual impacts, and to confirm and refine the set of viewpoints to be used for the visual assessment stage;
- Assessment of the significance of the landscape impact of the development as a function of landscape sensitivity weighed against the magnitude of the landscape impact; and,

- Assessment of the significance of the visual impact of the development as a function of visual receptor sensitivity weighed against the magnitude of the visual impact. This aspect of the assessment is supported by photomontages prepared in respect of the selected viewpoints.

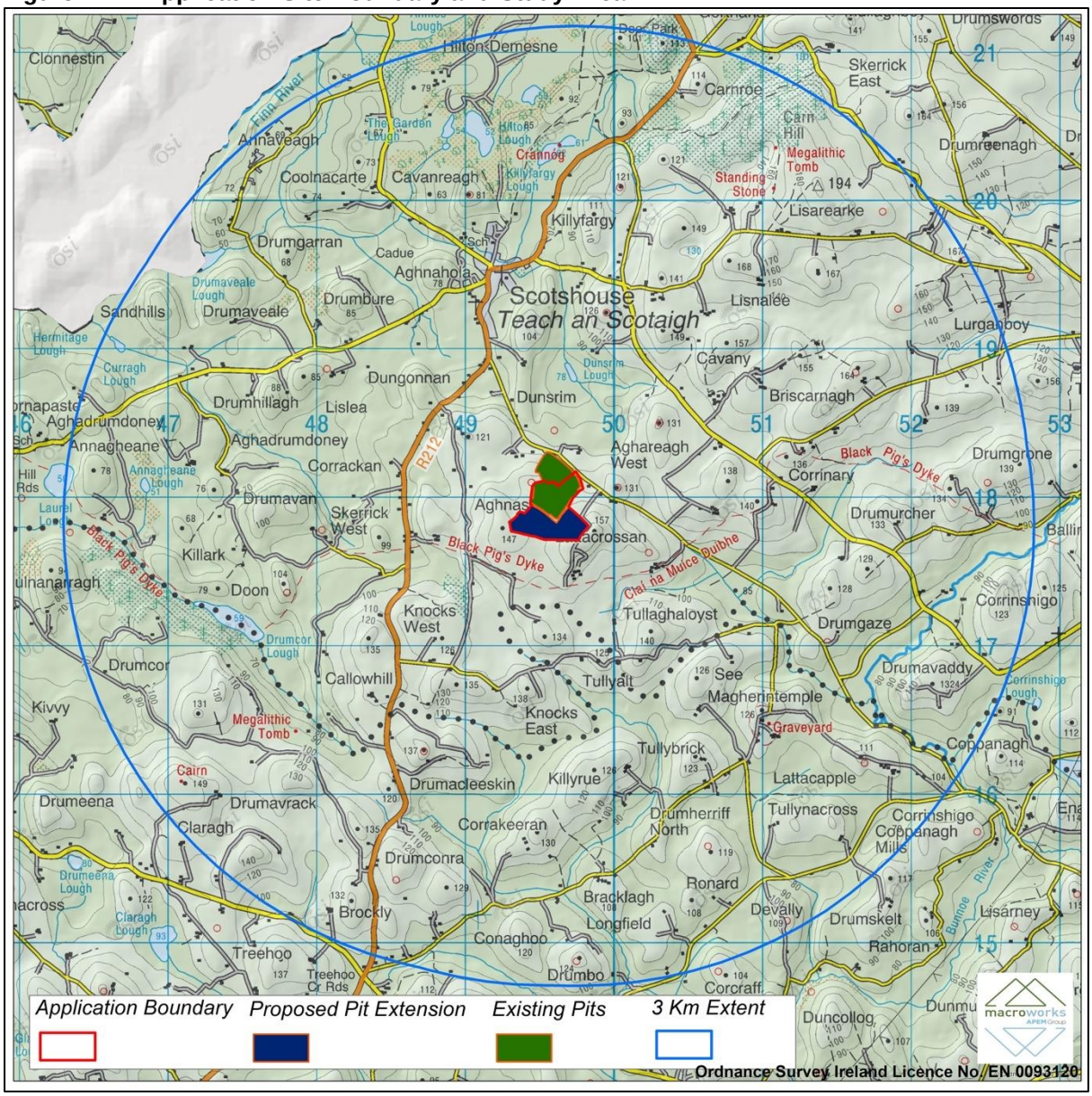
12.2.1 Assessment Criteria

Landscape Impact and Visual Impact of the Proposed Development will be assessed as per the guidance above.

12.2.2 Definition of Study Area

From similar studies it is anticipated that the Proposed Development is likely to be difficult to discern beyond approximately 3km and is not likely to give rise to significant landscape or visual impacts beyond approximately 1km. However, in the interests of a comprehensive appraisal, a 3km radius study area is used in this instance (Figure 12-1).

Figure 12-1: Application Site Boundary and Study Area



12.3 Receiving Environment

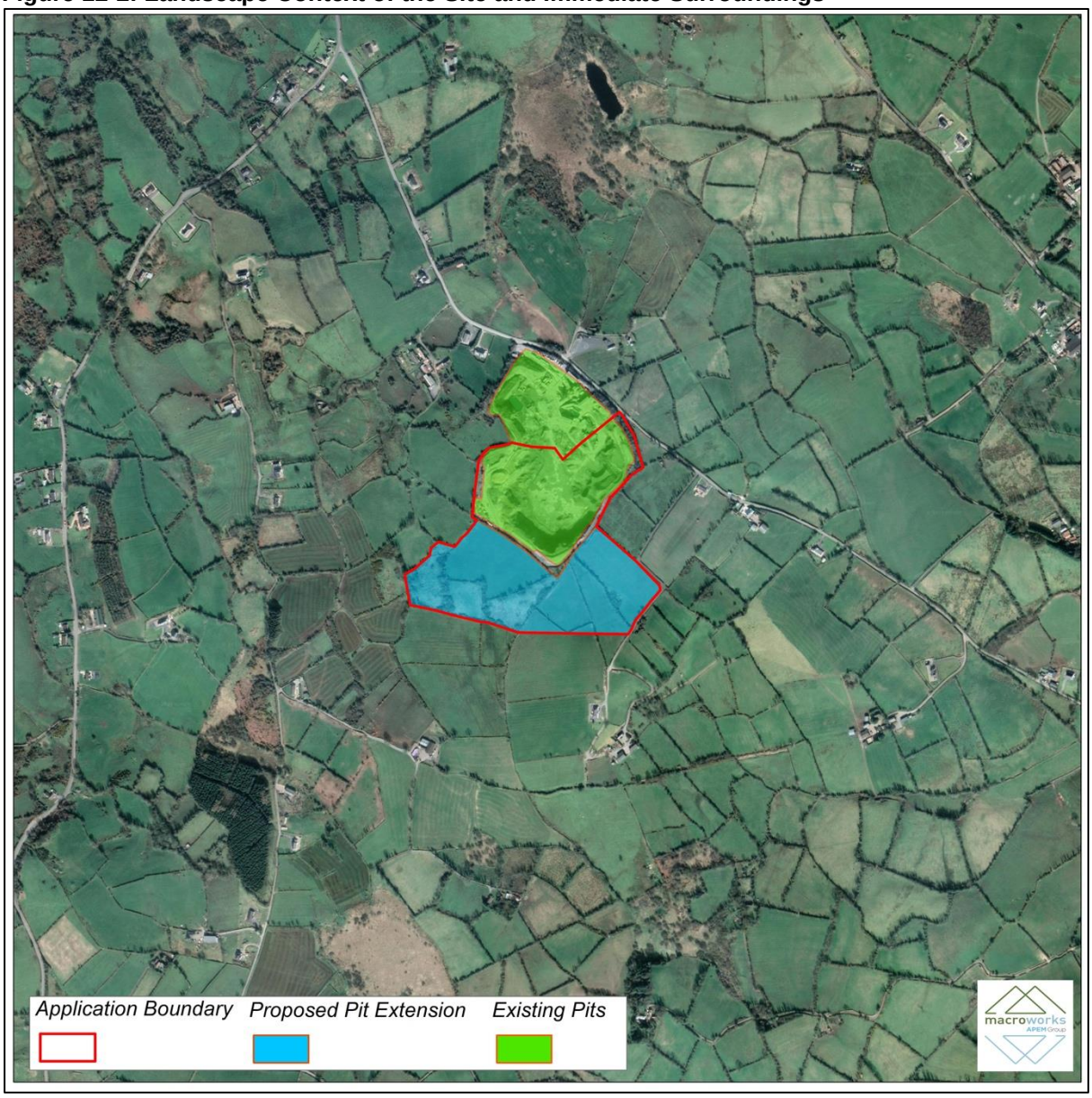
12.3.1 Landscape Baseline

The landscape baseline represents the existing landscape context and is the scenario against which any changes to the landscape brought about by the Proposed Development will be assessed. A description of the landscape context of the Site and the wider study area is provided below. Although this description forms part of the landscape baseline, many of the landscape elements identified also relate to visual receptors i.e.: places and transport routes from which viewers can potentially see the Proposed Development.

12.3.1.1 Landform and Drainage

At a macro level, the study area is very much representative of west Co. Monaghan/northeast Co. Cavan in that it is characterised by the area's trademark low rolling hills and/or drumlins, blanketed by small-sized pastoral fields delineated by native hedgerows, consisting predominantly of Hawthorn and Blackthorn (see Figure 12-2 below). Regarding landform, the most notable feature is the existing quarry void located at the centre of the study area in the lands adjacent to the Proposed Development. The Site is located on slightly elevated land which forms part of a northeast-southwest oriented row of drumlins. Thus, elevations are generally lower to the northwest and southeast of the Site. There are a number of streams within the study area, all of which flow away from the Site following the sloping pattern of the landscape and flowing via the low-lying hollows of this hilly drumlin landscape. Small waterbodies are dispersed throughout the study area, occurring more commonly in the southern half of the area. The Bunnoe River passes through the study area toward the east and the similarly-sized Finn River passes through the study area toward the north, both flowing in a general northeast-southwest direction.

Figure 12-2: Landscape Context of the Site and Immediate Surroundings



12.3.1.2 Vegetation and Land Use

Across the majority of the study area, the predominant land use is agricultural. Vegetation throughout the study area is relatively mixed, comprising rolling agricultural farmland mainly consisting of good quality pasture and arable crops. Medium sized tracts of commercial coniferous forestry lie in the west and north of the study area, with patches of marshland intermittently spaced throughout. Field patterns are clearly demarcated by mature hedgerows and are generally composed of small to medium-sized fields, with the fields toward the northern half of the study area tending to be larger. A notable land use within the study area is that of the existing operational Scotshouse Quarry, located in the centre of the study area.

12.3.1.3 Centres of Population and Houses

The only defined centre of population within the study area is Scotshouse Village, located toward the north. Otherwise, settlement within the study area generally comprises single dwellings dispersed in a linear fashion along the local roads, or dwellings associated with agricultural landholdings. In general, residences tend to be well located in secluded locations on the lower slopes of hills within the study area.

12.3.1.4 Transport Routes

The R212 regional road is the most significant transport route within the study area, passing approximately 700m to the west of the application site in a north–south orientation. An arterial network of local roads serves dwellings scattered across the study area, including the L6280 which lies to the immediate north-east of the existing Scotshouse Quarry.

12.3.1.5 Tourism, Heritage and Public Amenities

The only tourism, heritage or public amenity within the study area is the Scotshouse Community Centre. A section of Clones Golf Club is located within the northern portion of the study area. Otherwise, amenity within the study area typically pertains to local sports clubs and local parks within the wider study area. Overall, the study area is not considered to be highly synonymous with outdoor recreation.

12.3.2 Landscape Planning Context

12.3.2.1 Monaghan County Development Plan 2019-2025

Chapter 6 'Heritage, Conservation and Landscape' of the Monaghan CDP 2019-2025 (MCDP 2019-2025) [27] deals in part with landscape and includes some observations which are of direct and indirect relevance to the site and study area:

> Landscape Background
>
> *"Monaghan's unique drumlin landscape is encapsulated in its Irish name Mhuineachain which means "little hills or shrubbery". The landscape is varied to include the uplands of Sliabh Beagh and Mullyash to the north and east of the county respectively. In the central part of the County a series of low-lying lakes and wetlands extend from west to east. To the north and south of this belt of lakes the landscape character consists of high drumlin farmland.*
>
> *The landscape in Monaghan is different to the more open landscapes encountered elsewhere in the country due to the deposition of drumlins at the end of the last glaciations. The landscape vegetation has evolved over centuries due to changes in agricultural practices, settlement patterns and infrastructural development.*
>
> *The Monaghan County Development Plan has an essential role ensuring the protection and enhancement of the landscape whilst facilitating economic development."*

Within the CDP a number of Heritage, Conservation and Landscape Policies are included, of which the following are relevant to the Proposed Development:

- *"**HLP8** To ensure the preservation of the County's landscapes, by having regard to the character, value and sensitivity of the landscape as identified in the County Monaghan Landscape Character Assessment (2008) or any subsequent versions when considering planning applications.*
- ***HLP9** To protect the landscapes and natural environments of the County by ensuring that any new developments in designated sensitive rural landscapes do not detrimentally impact on the character, integrity, distinctiveness or scenic value of the area. Any development which could unduly impact upon such landscapes shall be resisted.*
- ***HLP10** To co-operate with adjoining local authorities north and south of the border, to ensure that the natural environment is maintained in a sustainable manner and to encourage a collaborative and consistent policy approach with adjoining areas on matters of environmental and landscape protection and to identify threats to the integrity of such sites through a transboundary approach.*
- ***HLP11** To contribute towards the protection of County and local level landscape designations from incompatible developments. Proposals for development that have*

the potential to significantly adversely impact upon these designations shall be accompanied by an assessment of the potential landscape and visual impacts of the proposed development. This shall demonstrate that landscape impacts have been anticipated and avoided to a level consistent with the sensitivity of the landscape and the nature of the designation.

- ***HLP12** Support, as appropriate, any relevant recommendations contained in the National Landscape Strategy for Ireland."*

12.3.2.2 Monaghan Landscape Character Assessment 2008

The Monaghan Landscape Character Assessment (2008) (LCA2008) is incorporated into the MCDP 2019-2025 [27] and identifies nine (9No.) Landscape Character Areas (LCAs) and fourteen (14No.) different Landscape Character Types (LCTs).

The LCA2008 defines LCAs and LCTs as:

> *"Landscape Character Areas are the unique individual geographical areas in which landscape types occur. They share generic characteristics with other areas of the same type but also have their own particular identity."*
>
> *"Landscape Character Types are distinct types of landscape that are relatively homogenous in character. They are generic in nature in that they may occur in different localities throughout any defined area. Nonetheless, where they do occur, they commonly share similar combinations of geology, topography, land cover and historical land use. For example, blanket bog uplands are distinct landscape character types and are recognisable as such whether they occur in Monaghan or other counties.*

Landscape Character Areas

Two LCAs fall within the study area – LCA 4 'Clones River Valley & Farmed Uplands', and LCA 5 'Monaghan Drumlin Uplands'. The Proposed Development is located entirely within LCA 5 'Monaghan Drumlin Uplands'. The key characteristics are described as:

- *"Elevated landscape featuring drumlin hills and small to medium sized loughs. These drumlins are not so steep sided and they do not follow a particular strong alignment and as such, the pattern of glaciation is not very pronounced*
- *Occasional rock outcrops on the eastern side near the townland of Annyalla.*
- *Occasional loughs and areas of marshland located between drumlin hills*
- *Land uses mostly given over to pastoral farming. Hedgerows featuring native species define the field boundaries, some of these are cut and some are not cut or managed. Hedge trees are fairly frequent.*
- *Long ranging views to the south and the north can be gained at particular points along the highest elevations of this ridgeline. The views extend for many kilometres."*

The landscape description is given as:

> *"This is a farmed upland landscape which is relatively remote, being distant and elevated topographically from major and minor towns or settlements. Nonetheless human activity in the form of farming and presence of farmsteads is quietly evident. The landscape pattern is relatively strong and takes the form of cut or managed hedgerows mostly with some hedge trees abounding pastoral fields. On the east side, many of these hedgerows feature gorse. Occasional clumps of deciduous woodland are located in this landscape. Small watercourses and streams are present albeit flow is very slow and sometimes stagnant. Occasional patches of marshland and areas of localised flooding are located in low lying areas. Dwellings are frequently well located in secluded locations on the lower slopes of the drumlin hills. Many of these are traditional or indeed of a modern simple design that sits well in this landscape setting. Occasional industrial heritage remnants observed include a disused waterwheel and associated millrace."*

Under 'Landscape Condition & Sensitivity', the report states:

- *"Most of this landscape is in good condition. The summit or highest point along the ridgeline is likely to be highly sensitive to development because it is visually exposed for many kilometres.*
- *In general, this landscape would not be regarded as highly scenic and hence, the capacity to accommodate development without undue compromise to the farmed landscape pattern is good."*

Within the section on 'Landcover and Ecology' the Report states:

> *"The area is dominated by improved grassland used as pasture, interrupted by hedgerows which are overall dominated by the use of native species such as Hawthorn (Crataegus monogyna) and Ash (Fraxinus excelsior). Pockets of broadleaved trees and coniferous plantations also occur in this area. Mature trees associated with the hedgerows are often overgrown with Ivy (Hedera helix)…"*

Landscape Character Types

Two LCTs fall within the study area – LCA8 'Undulating Farmland' and LCA4 'Farmed Foothills'. The proposed quarry extension is located entirely within the LCT 4 'Farmed Foothills' which is addressed below with a list of its key characteristics, according to the Monaghan Landscape Character Assessment (2008).

- *"Rising ground comprising rolling hills, and occasional drumlins.*
- *Localised valleys featuring streams.*
- *Mid to long ranging views and views towards higher upland pasture and/or moorland.*
- *A patchwork of predominantly small sized well drained fields defined typically by hedgerows containing native species and used for pasture and small-scale forestry.*
- *Patches of heath (Calluna spp.) and gorse (Ulex spp.).*
- *Tracts of peat and/or bog.*
- *Isolated farm and residential properties."*

The landscape is described as having:

> '*a rolling topography generally with occasional steep sided hills and scattered or isolated drumlins. Long ranging views are available as are views towards higher upland pasture and moorland. Where land uses are given over to pasture, the scale of the field sizes is small. Marshy areas are located in low lying ground and are often associated with the margins of peatbogs. Small to medium sized tracts of commercial coniferous forestry are also present particularly in the north of the County. Field boundaries are generally defined by uncut hedgerows, comprising Hawthorn (Crataegus monogyna) and Blackthorn (Prunus spinosa) and containing occasional mature trees. Some of these larger hedgerow trees are in poor condition and covered in Ivy (Hedera helix). Gorse (Ulex spp) is common in the hedgerows across this area…"*

In terms of the listed 'Forces for Change' for the LCT, none pertain to quarrying and/or extractive activities.

12.3.2.3 Cavan County Development Plan 2022-2028

Whilst the Proposed Development is located entirely within County Monaghan, a portion of the study area is within County Cavan. Cavan County Council has not prepared a Landscape Character Assessment, however Chapter 10 'Natural Heritage' and Appendix 14 'Landscape Characterisation' of the Cavan CDP 2022-2028 [131] deal with landscape.

Landscape Character Areas

There are five main Landscape Character Areas (LCAs) within County Cavan. The only one which falls within the 3km study area is LCA4 – Drumlin Belt and Uplands of East Cavan.

According to the CDP Appendix 14, LCA4 is described as stretching *"from Redhills to Cootehill in north-east Cavan through the county taking in east of Cavan Town, Stradone and Crosskeys to Killydoon and Kilcogy in south-west Cavan. This area is typical of the Drumlin landscape with many inter-drumlin lakes distributed throughout the region…"*

12.3.2.4 Views of Recognised Scenic Value

Views of recognised scenic value are primarily indicated within Development Plans in the context of scenic views/routes designations, but they might also be indicated on touring maps, guidebooks, websites, roadside rest stops or on post cards that represent the area.

Scenic Designations (Monaghan County Development Plan 2019-2025) [27]

There are no designated Co. Monaghan scenic routes, views from scenic routes or areas of primary amenity value within the study area.

Scenic Designations (Cavan County Development Plan 2022-2028) [131]

There are no designated Co. Cavan scenic viewpoints or scenic routes (or any other scenic designations) within the study area.

12.3.2.5 National Parks & Wildlife Service

According to the National Parks & Wildlife Service (NPWS), the only ecological designations within 3km the study area are two Proposed Natural Heritage Areas (pNHA). These are Drumcor Lough pNHA, located c. 1km southwest of the Site at its nearest point and Annagheane Lough pNHA, located c. 2km west of the Site at its nearest point.

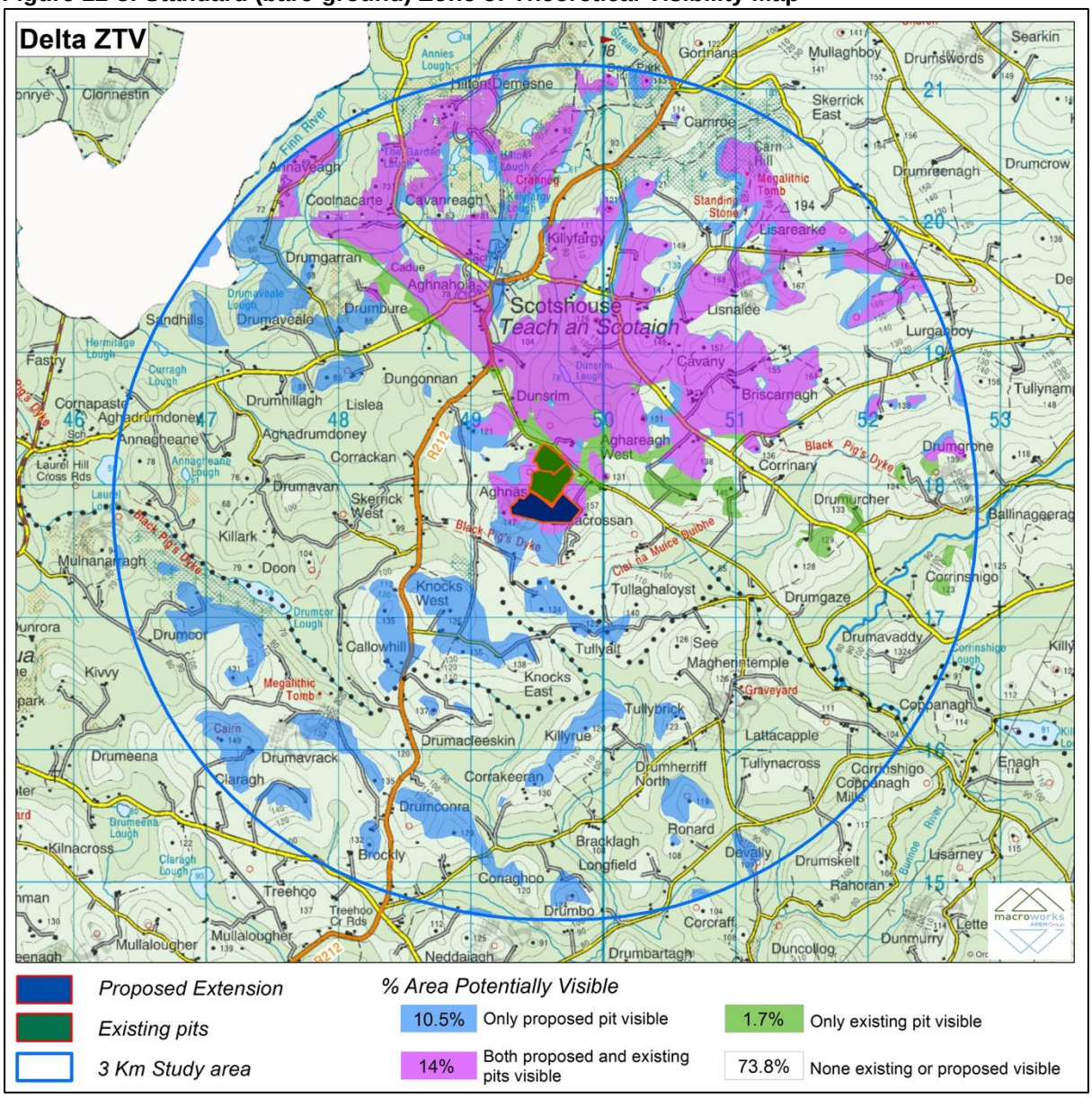
12.3.3 Visual Baseline

Only those parts of the Study Area that potentially afford views of the Proposed Development are of interest to this part of the assessment. Therefore, the first part of the visual baseline is establishing a 'Zone of Theoretical Visibility' and subsequently, identifying important visual receptors from which to base the visual impact assessment.

12.3.3.1 Zone of Theoretical Visibility

A computer-generated Zone of Theoretical Visibility (ZTV) map was created to determine where the Proposed Development would be potentially visible from (see Figure 12-3 below). Given that the Site will not be developed in isolation from the existing quarry, the ZTV map incorporates the theoretical visibility of both the existing quarry and the Proposed Development. The ZTV map is based solely on terrain data (bare ground visibility), and omits features such as trees, hedges or buildings, which may screen views. Given the complex vegetation patterns within this landscape, the main value of this form of ZTV mapping is to determine those parts of the landscape from which the Proposed Development will definitely not be visible, due to terrain screening within the 3km study area.

Figure 12-3: Standard (bare-ground) Zone of Theoretical Visibility Map



The following key points are illustrated by the 'bare-ground' Delta ZTV map:

- A total of 73.8% of the study area has no visibility of the Proposed Development (those areas in Figure 12-3 above without any coloured shading);
- There are areas in the southern half of the study area where only the extension lands are visible (blue shading). It should be noted however that these areas typically pertain to open agricultural fields; and,
- The lowlands situated to the north of the study area shows relatively comprehensive theoretical potential for visibility of both the existing quarry and the Proposed Development (pink shading).

The most important point to make in respect of this 'bare-ground' ZTV map is that it is theoretical. The Proposed Development is predominantly in-ground and will therefore be considerably screened by surrounding and intervening hedgerow vegetation, trees and numerous buildings, walls etc. throughout the study area, resulting in a much lesser degree of actual visibility.

12.3.3.2 Identification of Representative Viewpoints

Viewshed Reference Points (VRP's) are the locations used to study the visual impacts of a proposal in detail. It is not warranted to include each and every location that provides a view of a development, as this would make it extremely difficult to draw out the key impacts arising from a proposal. Instead, the selected viewpoints are intended to reflect a range of different receptor types, distances and angles. The visual impact of a proposal is assessed by Macro Works using up to six (6No.) categories of receptor type as listed below:

- Key Views (from features of national or international importance);
- Designated Scenic Routes and Views;
- Local Community views;
- Centres of Population;
- Major Routes; and,
- Amenity and heritage features.

VRP's might be relevant to more than one category, and this makes them even more valid for inclusion in the assessment. The receptors that are intended to be represented by a particular VRP are listed at the beginning of each viewpoint appraisal. The Viewshed Reference Points selected in this instance are set out in Table 12-1 and Figure 12-4 below.

Table 12-1: Representative Viewpoints

VP No.	Location	Direction of View
VP1	Residences to north of Scotshouse Quarry entrance	N
VP2	Scotshouse Village	SE
VP3	Local road northeast of Site	S/SW
VP4	Local road southwest of Site	N/NE
VP5	Local road southeast of Site	NW
VP6	R212 southwest of Site	NE

Figure 12-4: Viewpoint Location Map

12.4 Characteristics and Potential Impacts of the Proposed Development

12.4.1 Proposed Development Characteristics

The Proposed Development is an extension to the south of the existing Scotshouse Quarry, which immediately adjoins the northern perimeter of the Site. Extraction methods are intended to be similar to what currently occurs on-site. The first stage of the Proposed Development will be to strip topsoil and overburden from the Site lands as per the phasing plan (see section 3.3.3 above) and to use this material to create a landscaped embankment / berm ca. 4m wide and 2m high around the perimeter of the Site. This will provide visual screening. These berms will be planted with vegetation in accordance with the restoration plan (see Chapter 6: Biodiversity), and this vegetation will provide additional visual screening and assimilation with the surrounding vegetation. Approximately 190m of existing hedgerows along the Site boundaries will be retained.

12.4.2 Landscape Impact Assessment

First a judgement will be made on the sensitivity of the receiving landscape, followed by an assessment of the magnitude and significance of landscape effects.

12.4.2.1 Landscape Value and Sensitivity

The landscape value and sensitivity of the Proposed Development are considered in relation to a number of factors highlighted in the Guidelines for Landscape and Visual Impact Assessment 2013 [129], which are set out below and discussed relative to both the Site and the wider study area.

The study area is a typical rural Irish landscape, consisting of agricultural grassland along with a reasonable scattering of farmsteads and rural dwellings. Land use also includes the existing Scotshouse Quarry, plots of commercial conifer forestry and underutilised patches of marshland. There are few fallow or unused areas, while the land-use and vegetation patterns remain clear-cut and coherent. The physical landscape within the central portion of the study area has been notably altered as a result of the existing Scotshouse Quarry. A series of small streams flow down the slopes of the drumlins within the study area, all flowing away from the Site in various directions. The most notable watercourses within the study area are the Bunnoe River which passes through the study area toward the east and the similarly-sized Finn River, which passes through the study area toward the north. Both rivers flow in a general northeast-southwest direction.

Whilst the majority of the study area presents a notable pastoral aesthetic afforded by a patchwork of small to medium sized agricultural fields, there are small parcels of forestry dispersed throughout the northwest portion of the study area. To the north of the Site, there is a slight urban influence due to its near distance to the village settlement of Scotshouse, otherwise settlement is generally dispersed along the local road network within the study area. In terms of heritage and amenity, the study area comprises relatively typical features such as old churches, graveyards and local sports clubs. It is not considered that the study area is highly synonymous with outdoor recreation. This is further reflected by the lack of any waymarked walking or cycling trails within the study area.

The landscape character of the immediate surrounds of the Site is that of a typical productive rural landscape that is not particularly rare or distinctive at either a national or regional scale. This is reflected in the current Monaghan County Development Plan [27], where the Site is located within LCA 5 'Monaghan Drumlin Uplands' which *"would not be regarded as highly scenic and hence, the capacity to accommodate development without undue compromise to the farmed landscape pattern is good."* Furthermore, there are no designated scenic routes, views from scenic routes or areas of primary amenity value within the study area.

Overall, it is considered that the central study area and large parts of its wider surroundings represent a typical modified rural landscape, where agricultural and other working rural land uses are the most common practices. The character of the study area is one defined by a strong legacy of intensive agriculture, but more recently includes extractive industries.

Whilst these parts of the study area present with a strong pastoral aesthetic, the landscape here is not considered to be highly rare or distinctive. A key landscape sensitivity consideration is that the Proposed Development represents the extension of an already long-established adjacent quarry, which is one of the defining features of the landscape character in the immediate area. In line with the guidance (see section 12.2 above), the sensitivity of the receiving landscape to the Proposed Development is deemed to be **Medium-low**.

12.4.2.2 Magnitude and Significance of Landscape Effects

In terms of physical landscape effects, the Proposed Development involves constructing berms along the southern, southwestern and south-eastern portions of the Site. This will alter the existing landform within the Site, resulting in localised elevated topography. Conversely, the extraction area will create a void within the Site from approximately 145mOD at the highest point down to a final extraction level of 90mOD. This extraction area is essentially an extension of the existing quarry to the immediate north. As per the EPA guidelines (see chapter 1), the physical landscape impacts are classified as negative and permanent.

The planned screening berms may detract slightly from the sloping pastoral setting in the immediately vicinity of the existing quarry, but their presence is considered preferable to views of the excavated near-vertical faces of the quarrying activity. Furthermore, once the native planting on the berm becomes established, the berms will appear more naturalistic.

This is a productive rural landscape containing the adjoining Scotshouse Quarry, agricultural pastures, coniferous plantations, road infrastructure and typical rural hinterland industries. Therefore, it is not considered likely that the Proposed Development will noticeably detract from the integrity of landscape patterns or the productive landscape character that prevails in the study area.

Quarry related activities, such as the movement of heavy vehicles within, to and from Scotshouse Quarry are already commonplace in the immediate context of the Site. The Proposed Development immediately adjoins the south of Scotshouse Quarry and thus will involve an extension to existing Scotshouse Quarry. The Proposed Development does not seek to increase production output at the quarry and is not envisaged to create a notable change in nature or frequency of vehicle movements in the area.

On the basis of the factors discussed above, it is considered that the magnitude of landscape impact is in the order of **Medium** in the immediate vicinity of the application site (c. <500m from site boundaries). The magnitude of impact will soon reduce thereafter as the Proposed Development becomes a smaller component of the overall landscape fabric and is more likely to be read in conjunction with Scotshouse Quarry.

With reference to the significance matrix (see Figure 1-4, section 1.12.1 above), the Medium-low landscape sensitivity judgement attributed to the study area coupled with a Medium magnitude of landscape impact is considered to result in an overall significance of no greater than **Moderate** within the immediate vicinity of the Site and reducing to slight and imperceptible at greater distances.

12.4.3 Visual Impact Assessment

12.4.3.1 Sensitivity of Visual Receptors

The assessment of the sensitivity of visual receptors at each of the selected viewpoints is recorded in Table 12-2 below.

Table 12-2: Scale of Value for each criterion

Strong association	Moderate association	Mild association	Negligible association

Values associated with the view	VP1	VP2	VP3	VP4	VP5	VP6
Susceptibility of viewers to changes in views						
Recognised scenic value of the view						
Views from within highly sensitive landscape areas						
Primary views from residences						
Intensity of use, popularity (number of viewers)						
Viewer connection with the landscape						

Values associated with the view	**VP1**	**VP2**	**VP3**	**VP4**	**VP5**	**VP6**
Provision of vast, elevated panoramic views						
Sense of remoteness / tranquillity at the viewing location						
Degree of perceived naturalness						
Presence of striking or noteworthy features						
Sense of Historical, cultural and / or spiritual significance						
Rarity or uniqueness of the view						
Integrity of the landscape character within the view						
Sense of place at the viewing location						
Sense of awe						
Overall sensitivity assessment	**ML**	**ML**	**ML**	**ML**	**ML**	**ML**
N = Negligible; L = low sensitivity; ML = medium-low sensitivity M = medium sensitivity; HM = High-medium sensitivity; H = high sensitivity; VH = very high sensitivity						

12.4.3.2 Magnitude and Significance of Visual Effects

The assessment of visual impacts at each of the selected viewpoints is aided where appropriate by photomontages of the Proposed Development. Photomontages are a 'photo-real' depiction of the scheme within the view, utilising a rendered three-dimensional model of the Proposed Development, which has been geo-referenced to allow accurate placement and scale. For each viewpoint, the following images have been produced:

- Existing view (incl. extent bars indicating the full extents of the existing and proposed developments); and,
- Montage view (with mitigation established).

The six viewpoints selected and assessed for this project are represented by photomontages that are presented in Appendix 12-1. All viewpoints are assessed in Table 12-3 below, according to the methodology, baseline environment and technical criteria set out in the guidance documents listed in section 12.2 above.

Table 12-3: Assessment of Impact on Viewshed Reference Points

VP NO.	Existing View	VP Sensitivity	Visual Impact Magnitude (pre- and post-mitigation)	Significance/Quality/ Duration of Visual Impact
VP1	**Residences to north of quarry entrance** - This view is afforded from a point along a local road near where it crests the summit of the low hill that contains the existing Scotshouse Quarry. There is some linear residential development dispersed along this road in the form of one-off housing. Approximately 200m to the southeast along the road from this location is the existing operational quarry entrance. The industrial infrastructure associated with the Macadam Plant and multiple utility poles within the quarry can be discerned along the skyline, tucked behind deciduous trees. Notwithstanding this, there is a slight degree of visual amenity at this location facing toward the northeast where a broad lowland pastoral basin begins to open up.	**Medium-low**	No elements of the Proposed Development will be visible from this location due to existing foreground screening. Therefore, the magnitude of visual impact is **Negligible** by default.	**Imperceptible / Neutral / Long Term**
VP2	**Scotshouse Village** - This view is afforded from within the village of Scotshouse and aligns the small Scotshouse Close housing development, which experiences views similar to this towards the south/southeast. In this scene, there is a patchwork of agricultural pasture blanketing the rolling terrain in the backdrop. Mature hedgerows delineate the fields, whilst numerous linear residential developments can be identified along the local roads ascending into the distance. A range of low vegetated hills occupy the skyline in the distance.	**Medium-low**	The existing Scotshouse Quarry is not visible from this location. However, a small portion of the Proposed Development is visible in a distant agricultural field on the slope of a low hill toward the background of the view. Whilst a small portion of the Proposed Development is visible from this location, it is not prominent in this textured view where intervening hedgerow vegetation and residences serve to block or obstruct direct views of the Site. Furthermore, the Proposed Development will not alter the profile of the ridgeline above it. The visual change is limited and therefore the Proposed Development is deemed to be minimal in terms of visual presence. On balance, the magnitude of visual impact will be **Low-negligible**.	**Slight-imperceptible / Negative / Long Term**

VP NO.	Existing View	VP Sensitivity	Visual Impact Magnitude (pre- and post-mitigation)	Significance/Quality/ Duration of Visual Impact
VP3	**Local road northeast of Site** – This location is on a quiet country road approx. 1km to the northeast of Scotshouse Quarry. This area is the one locale of the study area where relatively open views of the quarry can be attained from the public domain, albeit at approx.1km distance. This scene depicts a patchwork of rolling pastoral fields of small and medium-size, with a marshy hollow and small, partially visible loch within the mid-distance depression in the terrain. In this view, the dark, open faces and industrial infrastructure of the Scotshouse Quarry are noticeable as a result of its apparent change of land use, tone and landscape fabric in comparison to its surroundings. Notwithstanding this, the quarry does not transcend or obscure the primary ridgeline (i.e., skyline) in the distance, thereby maintaining a moderate visual presence in this location.	**Medium-low**	The Proposed Development will be located adjoining the existing Scotshouse Quarry on the slopes of a low hill in the background of the view. It will noticeably increase the lateral extent of the existing quarry-face, but it will not alter the profile of the ridgeline above it. The extension will darken the skyline ridge, detracting from the current verdant tones., A number of trees currently dotted across the ridge will be removed to accommodate the expansion but will be replaced by the vegetated berms. Thus, the expansion of the quarry will be noticeable, but due to the distance between this viewpoint and the Proposed Development the scale of the visual change is somewhat limited. The Proposed Development is therefore deemed to be co-dominant with the agricultural landscape in terms of visual presence. The Proposed Development serves to increase the lateral extent and intensity of an already established land use within this view. Whilst the quarry will become a more prominent feature, it is in the context of a broad vista across a productive rural landscape, within which it is compatible. On balance, the magnitude of visual impact will be **Medium-low**.	**Moderate-slight / Negative / Long Term**
VP4	**Local road southwest of Site** - This view is afforded from a point along a local road to the southwest of Scotshouse Quarry and is oriented northeast. The view looks out over a relatively typical rural scene of gently undulating pasture that inclines toward the backdrop of the view. The agricultural pastures within this scene are delineated by a mixture of low-clipped and mature treelined hedgerows. Several one-off houses and a farmstead are also present within this view.	**Medium-low**	The only element of the Proposed Development that will be visible from this location is the native planting along the berm to the south of the Site. The planting can be seen along the ridgeline in the distance but does not appear out of place in this already heavily vegetated rural scene. No other aspects of the Proposed Development are visible from here due to the degree of screening afforded by the intervening terrain. Therefore, the magnitude of visual impact is **Negligible** by default.	**Imperceptible / Neutral / Long Term**
VP5	**Local road southeast of Site** - This is a relatively narrow northwest-oriented view afforded from a point along a local road where there is a narrow gap in the	**Medium-low**	As with the previous view, the only element of the Proposed Development that will be visible from this location is the native planting along the berm to the southeast of the Site.	**Imperceptible / Neutral / Long Term**

VP NO.	Existing View	VP Sensitivity	Visual Impact Magnitude (pre- and post-mitigation)	Significance/Quality/ Duration of Visual Impact
	treeline. The view looks out over a roadside agricultural fence into a pasture which slopes downward toward a heavily vegetated depression in the terrain. Behind this patch of vegetation, the terrain begins to incline, peaking in the backdrop. The view is contained by a patchwork of fields lined by dense, mature, treelined hedges.		The planting can be seen just below the skyline, slightly darkening the ridge in the distance but does not appear out of place in this already heavily vegetated rural scene. No other aspects of the Proposed Development are visible from here due to the degree of screening afforded by the intervening terrain. Therefore, the magnitude of visual impact is **Negligible** by default.	
VP6	**R212 southwest of Site -** This is a roadside view afforded from a point along the R212, oriented northeast. The view looks toward roadside vegetation behind which the undulating pastoral terrain can be seen rolling in the distance, just below the skyline.	**Medium-low**	The Proposed Development will not be visible from here due to existing foreground screening. Therefore, the magnitude of visual impact will be **Negligible** by default.	**Imperceptible / Neutral / Long Term**

12.5 Proposed Mitigation Measures and/or Factors

The main mitigation by avoidance measure employed in this instance is the siting of the Proposed Development in a robust landscape context in lands adjacent to an existing operational quarry, meaning that the Proposed Development will not be an incongruous feature within the surrounding landscape.

Proposed landscape and visual mitigation measures were incorporated during the design stage and principally relate to the berms which will be planted with native vegetation, aiding the screening of the Site and associated operational activities. This mitigation is embedded within the overall design of the Proposed Development, as the berms will be formed using excavated topsoil/overburden from within the Site.

12.6 Cumulative and In-Combination Effects

The main cumulative effect in this instance is in relation to the existing Scotshouse Quarry. The in-combination effects of the existing Scotshouse Quarry and the Proposed Development has been the focus of the assessment already undertaken in respect of both landscape impacts and visual impacts in Section 12.4 above. Separate consideration of cumulative effects is, therefore, not considered necessary in this instance.

Overall, the cumulative landscape and visual impact of the Proposed Development is considered to be not significant.

12.7 Interactions with other Environmental Attributes

During both the construction and operational phases of the Proposed Development, effects from landscape and visual impacts have the potential to interact with the following environmental attributes:

- Chapter 5: Population and Human Health. The Proposed Development will not have a significant effect in terms of landscape and visual impact and therefore visual impact on population and human health will be not significant;
- Chapter 6: Biodiversity. Landscape and visual aspects have the potential to interact with biodiversity due to the changes to local habitats arising from the quarrying activities and the creation of the screening berms. These impacts are detailed in Chapter 6 (Biodiversity);
- Chapter 7: Land, Soils and Geology. The landscape changes arising from the Proposed Development are directly related to the soils and geological formations in and around the Site. The removal of these geological formations is assessed within this chapter; and,
- Chapter 13: Cultural Heritage. The creation of screen berms from soil excavated from the Site has the potential to impact cultural heritage. This is assessed in Chapter 13.

12.8 Indirect Effects

There are no anticipated indirect effects – all effects have been identified and are considered within this chapter.

12.9 Residual Effects

The proposed mitigation, in the form of planted perimeter embankments, were considered to be embedded within the design of the development and were therefore included in the photomontages and formed an integral part of the assessment of predicted impacts in Section 12.6. Thus, residual impacts are considered to be the same as predicted impacts in this instance (imperceptible to moderate), as it was considered unnecessary / confusing to assess pre-mitigation and post-mitigation views separately.

12.10 Monitoring

The arborist will monitor the success of the vegetation planted on the berm. Supplemental planting will be completed if deemed necessary.

12.11 Reinstatement

The restoration phase of the Proposed Development outlines how the site will be restored to an inert state. This phase and potential associated effects have been considered throughout this Chapter.

12.12 Difficulties Encountered in Compiling this Information

There were no difficulties encountered in the process of completing the LVIA.

13 CULTURAL HERITAGE

13.1 Introduction

This Chapter of the EIAR, commissioned by MOR on behalf of Scotshouse Quarries Ltd, addresses the impacts of the Proposed Development on the archaeological, architectural and cultural heritage of the Site and the surrounding area.

13.2 Methodology

This study complies with the requirements of Directive EIA 2014/52/EU. The chapter is an assessment of the known or potential cultural heritage resource within a specified area and includes the information that may reasonably be required for reaching a reasoned conclusion on the significant effects of the Proposed Development on the environment, taking into account current knowledge and methods of assessment. It consists of a collation of existing written and graphic information in order to identify the likely context, character, significance and sensitivity of the known or potential cultural heritage, including architectural and archaeological aspects using an appropriate methodology [8] [9]. It consists of the following study stages:

- Baseline Studies; and,
- Assessment of the proposed development area.

Criteria and definitions for describing effects are drawn from the EPA guidance document.

13.2.1 Baseline Study

The baseline study research has been undertaken in two phases, the paper study phase and the field inspection phase.

13.2.1.1 Paper Study

The first phase comprised a paper survey of all available archaeological, historical and cartographic sources. This involved a collation of existing written and graphical information to identify the likely context, character, significance and sensitivity of the known or potential cultural heritage, archaeological and structural resource using appropriate methodology, and a detailed investigation of the archaeological and historical background of the Site, the landholding and the surrounding area extending 1km from the development boundary (see Fig. 13-1 below). This was completed using information from the:

- The Monaghan County Development Plan 2019-2025 [27], which includes objectives and policies regarding cultural heritage that are relevant to this assessment;
- The Record of Monuments and Places [132] for Counties Monaghan and Cavan. This was established under section 12 (1) of the National Monuments (Amendment) Act, 1994 and provides that the Minister shall establish and maintain a record of monuments and places where the Minister believes there are monuments, such record to be comprised of a list of monuments and relevant places and a map or maps showing each monument and relevant place in respect of each county in the State. The associated files contain information of documentary sources and field inspections where these have taken place;
- The National Inventory of Architectural Heritage (NIAH) [133]. This is a state initiative under the administration of the Department of Culture, Heritage and the Gaeltacht and established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999. The purpose of the NIAH is to identify, record, and evaluate the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage. NIAH surveys provide the basis for the

recommendations of the Minister for Culture, Heritage and the Gaeltacht to the planning authorities for the inclusion of structures in their Record of Protected Structures (RPS);

- The Sites and Monuments Record [134]. This is maintained by the Department of Housing, Local Government and Heritage and contains information on Recorded Monuments and additional unprotected sites that have been identified since the Record of Monuments was issued;
- Aerial photographs. These may record cropmarks, soil marks and earthworks that may have not been previously detected;
- Cartographic Sources - this includes seventeenth century mapping as well as the 1st and 2nd editions of the Ordnance Survey six-inch maps;
- Excavation reports listed on the Database of Irish Excavation Reports, which lists summary accounts of all licensed archaeological excavations carried out within the island of Ireland from 1970 onward [135]; and,
- Documentary Sources. These provide more general historical and archaeological background.

13.2.1.2 Field inspection

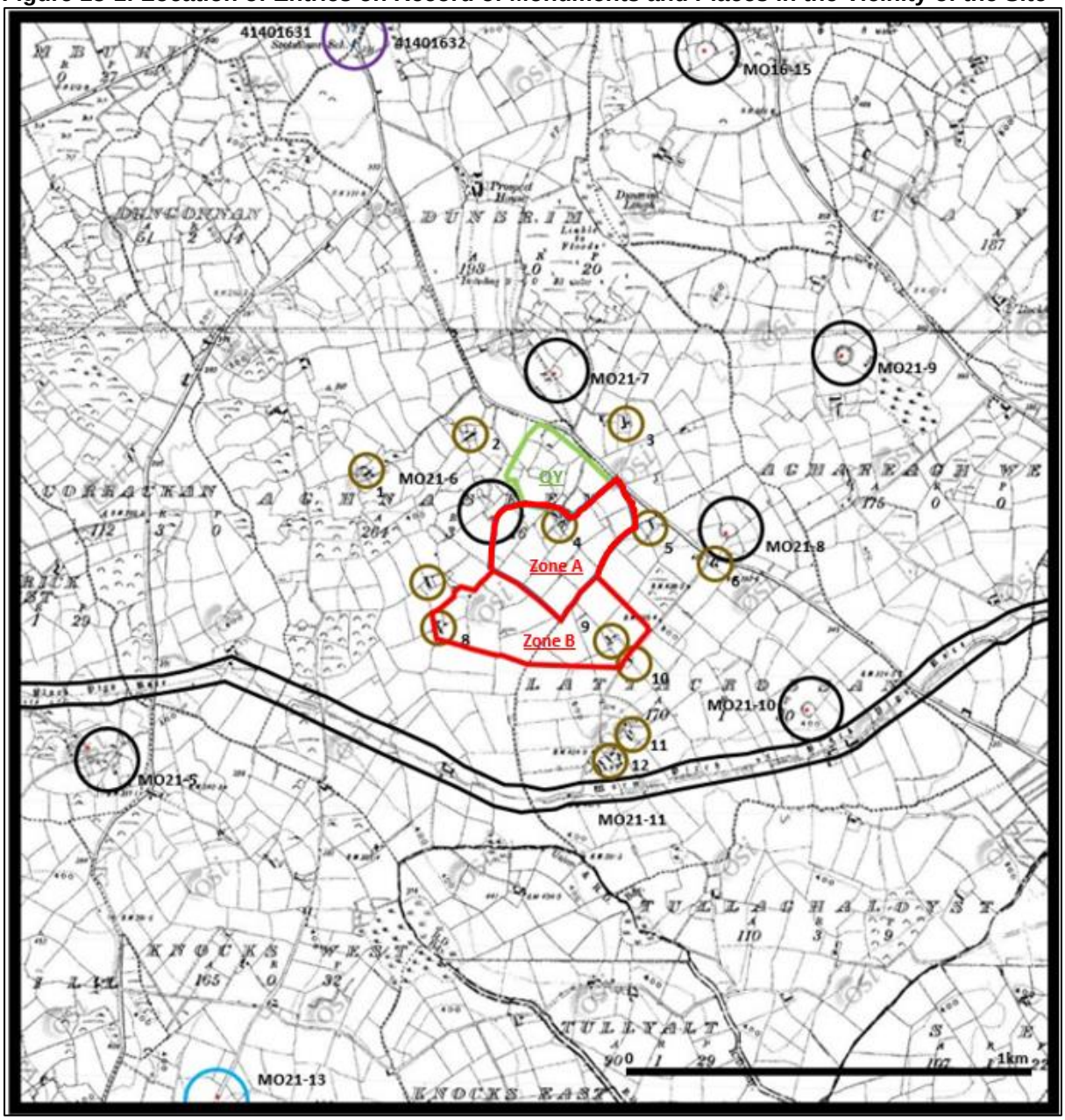
A field inspection was carried out on the 17th November 2022 to identify and assess any known archaeological sites and previously unrecorded features and portable finds within the application area.

13.2.2 Assessment of the Proposed Development

An impact assessment and mitigation strategy have been prepared. An impact assessment is undertaken to outline potential adverse impacts that the Proposed Development may have on the cultural resource, while a mitigation strategy is designed to avoid, reduce or offset such adverse impacts. Extracts from the Record of Monuments and Places for County Monaghan are presented in Figure 13-1 below.

RMP sites included on the Records of Monuments and Places statutory mapping are identified by black circles, SMR sites with blue circles, NIAH sites with purple circles and undesignated buildings in the vicinity of the application area with brown circles. The application area is shown with a red line.

Figure 13-1: Location of Entries on Record of Monuments and Places in the Vicinity of the Site



13.3 Receiving Environment

The application site is located in the Aghnaskew and Lattacrossan, Co. Monaghan, on OS Six Inch sheets No. 21, c.0.85km to the south of the town of Scotshouse and directly south of the L6280 road. The local soil is a Killrush series fine loamy drift with siliceous stones overlying drift with siliceous stones [77]. The lands are currently in use for pastoral agriculture.

13.3.1 Historical and Archaeological Background

The following is a summary of the archaeological and historical development of the study area and the main types of sites, monuments and structures that are known from the surrounding area. The purpose of this approach is to place the types of sites, monuments and structures in the study area in a cultural and chronological context to assist the assessment. The application area is situated in the townland of Aghnaskew, in the civil parish of Currin and the

barony of Dartree. Note the original spellings of placenames recorded in source material are retained in the text.

13.3.1.1 The Prehistoric Period

The evidence for prehistoric activity in the study area is the presence of a Linear earthwork known as the Black Pig's Dyke (RMP MO021-011---- see Fig 13-1 above and Appendix 13-1) that extends from east to west through the study area through Skerrick West, Corrackan, Aghnaskew, Lattacrossan, and Aghareagh West townlands. This earthwork was constructed in the Iron Age between of 310 cal. BC to cal. AD 140. A cairn (MO021-005----) in Sherrick West townland may also be prehistoric in date.

13.3.1.2 The Early Medieval Period

In the Early Medieval period (500 AD-1170 AD) the study area formed part of the Kingdom of Dartraige which formed part of the trícha (Local Kingdom) of Clonys (Clones) under the overlordship of the Fir Fhernmaige of Airgialla [136]. Classically, settlement in the Early Medieval period is indicated by the presence of enclosed farmsteads known as ringforts. There are several ringforts in the study area in the townlands of Lisnalee (RMP Lisnalee), Aghnaskew (RMP MO021-006----), Dunsrim (RMP MO021-007----), Lattacrossan (RMP MO021-008---- and MO021-010----) and Aghareagh West (RMP MO021-009----) that indicate settlement during the early medieval period.

13.3.1.3 The Medieval period

With the arrival of the Anglo-Normans in Leinster and Meath after 1169 the Lords of Meath began to exert authority in Monaghan. About 1190 Peter Pippard was granted the barony of Dartry by Prince John [137]. It is not clear if there was any Norman infeudation in the study area. The process of sub-infeudation is normally associated with the construction of timber castles, known as Motte and Baileys. These earthwork fortifications were used to house and defend the Norman lords and their retinues while they set about the process of pacifying and organizing their new fiefs. However, there are no mottes in the study area and the closest example is in Clones (RMP MO011-008001-) 7km to the north.

Manorialism describes the organisation of the feudal rural economy and society, characterised by the vesting of legal and economic power in a lord supported economically from his own direct landholding and from the obligatory contributions of a legally subject part of the peasant population under his jurisdiction. In Ireland the Lord's manor house was also sometimes enclosed by a rectangular moat and these sites are referred to as moated sites. They are a useful indicator of Anglo-Norman settlement. However, there are no moated sites in the study area and the closest example is at Nook (RMP MO012-019----) 11.5km to the north-east.

In the thirteenth century a sub-branch of the O'Carroll's, the MacMahons, rose to prominence in Monaghan and in 1273 Eochaich MacMahon became King of Airgialla. From this period the MacMahon's wrested control of Monaghan from the Pippards.

13.3.1.4 The Post-medieval period

The Down Survey [138] records that in 1641 Aghnaskew was held by Andrew McMahon but in 1670 was in the hands of John Viscount Massereene Clotworthy. Griffiths Primary valuation of Ireland 1847-64 [139] records that in the mid-nineteenth century the application area was held by the representatives of John Ronaldson and leased to several tenants.

13.3.2 Monaghan County Development Plan 2019-25

Chapter 6 of the Monaghan County Development Plan (CDP) 2019-25 sets out the policies on cultural heritage within the County [27].

13.3.2.1 Architecture and Protected Structures

There are several policy objectives outlined in Section 6.17 of the CDP [27] in respect of Architectural Heritage:

- **BHP1** To protect and conserve all structures included in the Record of Protected Structures and to encourage the sympathetic re-use and long-term viability of such structures without detracting from their special interest and character;
- **BHP2** To contribute, as appropriate, towards the protection and sympathetic enhancement of archaeological heritage, in particular by implementing the relevant provisions of the Planning and Development Act 2000 (as amended) and the National Monuments Act, 1930 (as amended);
- **BHP3** To contribute towards the protection of architectural heritage by complying, as appropriate, with the legislative provisions of the Planning and Development Act 2000 (as amended) in relation to architectural heritage and the policy guidance contained in the Architectural Heritage Protection Guidelines 2011 (and any updated/superseding document);
- **BHP4** To maintain and update the Record of Protected Structures in consultation with the National Inventory of Architectural Heritage and to encourage the sympathetic conservation, renewal and repair of these structures;
- **BHP5** Planning permission for the demolition of any protected structure shall not be granted except in exceptional circumstances and in accordance with Section 57(10)(b) of the Planning and Development Act 2000;
- **BHP6** To ensure that any new development proposed to or in the vicinity of a Protected Structure will complement and be sympathetic to the structure and its setting in terms of its design, scale, height massing and use of materials and to resist any development which is likely to impact on the building's special interest and/ or any views of such buildings and their setting;
- **BHP 7** To facilitate the retention and sympathetic re-use of protected structures and their settings in circumstances where the proposal is compatible with their character and special interest. In certain instances, land use zoning restrictions and site development standards may be relaxed to secure the conservation and reuse of a protected structure and to provide a viable use for any building which is at risk by virtue of being derelict or vacant;
- **BHP 8** To require that proposals for works to a protected structure shall be carried out in accordance with best practice as advocated in the Architectural Heritage Protection Guidelines 2011(and any subsequent guidelines);
- **BHP 9** To use the provisions of the Planning and Development Act 2000 and the Derelict Sites legislation to prevent the loss or deterioration of the County's Architectural Heritage;
- **BHP 10** The Council aims to conserve the built fabric of the Ulster Canal, Great Northern Railway, historic mills and other industrial heritage structures throughout the county and planning permission will be required for their removal or alteration;
- **ACP 1** To prepare character appraisals for each of the designated Architectural Conservation Areas in the County to guide new development proposals and environmental improvements by identifying the character of each ACA and designing objectives to ensure that their distinctiveness and special interest are preserved and enhanced; and
- **ACP 2** To resist development that would adversely affect the character and appearance of the Architectural Conservation Area. New development or alterations to existing building(s) in an ACA shall reflect the historic architecture in terms of scale, design and materials used. Regard shall be had to any objectives contained in the character appraisals (where applicable).

13.3.2.2 Archaeological Heritage

There are several policy objectives outlined in Section 6.18 of the MCDP [27] in respect of Archaeological Heritage which state:

- **PMP1** To protect the Record of Monuments and Places listed in Appendix 5 (and any subsequent additions by the National Monuments Service) to ensure that the setting of the recorded monument or site is not materially injured and to co-operate with all recommendations of Statutory bodies in the achievement of this objective;
- **PMP2** To ensure that any development adjacent to an archaeological monument or site shall not be detrimental to the character of the archaeological sites or its setting and shall be sited in a manner which minimises the impact on the monument and its setting. Development which is likely to detract from the setting of such a monument or site shall be resisted;
- **PMP3** To protect archaeological sites and monuments which are listed in the Record of Monument and Places and to require their preservation in situ (or at a minimum preservation by record) through the planning process;
- **PMP 4** When considering new development in the vicinity of archaeological monuments/sites the planning authority may require one or more of the following to ensure the preservation and enhancement of the recorded monument:
    a. The provision of an appropriate buffer between the proposed development and the archaeological monument/ site;
    b. The submission of a Visual Impact Assessment to assess the potential impact on the setting of the recorded monument;
    c. The carrying out of an onsite archaeological investigation prior to a permission being granted; and
    d. Revisions to the proposed development to reflect any advice and/or recommendations made by the Department of the Arts, Heritage & the Gaeltacht (and any other relevant statutory consultee).
- **PMP 5** To identify where appropriate Archaeological sites in the Plan area to which public access could be provided or improved in consultation with landowners;
- **PMP 6** To contribute, as appropriate, towards the protection of archaeological sites and monuments and their settings, archaeological objects and underwater archaeological sites that are listed in the Record of Monuments and Places, in the ownership/guardianship of the State, or that are subject of Preservation Orders or have been registered in the Register of Historic Monuments. Contribute, as appropriate, towards the protection and preservation of archaeological sites, which have been identified subsequent to the publication of the Record of Monuments and Places. To contribute, as appropriate, towards the protection and preservation of underwater archaeological sites in riverine or lacustrine locations; and
- **PMP 7** To consult with the National Monuments Service in relation to proposed developments adjoining archaeological sites.

13.3.3 Buildings

13.3.3.1 Designated structures

The Monaghan CDP [27] and the Cavan County Development Plan 2022-2028 [131] were reviewed as part of the baseline study for this EIAR chapter. The review established that there are no structures within the Proposed Development Site listed in the Records of Protected Structures. There are also no structures in the study area listed in the Records of Protected Structures

13.3.3.2 Structures National Inventory of Architectural Heritage

The National Inventory of Architectural Heritage (NIAH) which is maintained by the Dept. of Housing, Local Government and Heritage was examined for this chapter [133]. The review established that there are no structures within the application area listed in the NIAH. There are two structures in the study area listed in the NIAH (see Table 13-1 below).

Table 13-1: Structures in the NIAH in the study area

Categories	Details
41401631	
Structure type	Grave monument
Townland	Scotshouse
Designation	None
Data source	National Inventory of Architectural Heritage
Perceived Significance:	Regional
Type of impact:	None
Significance & quality of impact	None
Description	Moulded granite sarcophagus, carved c.1880, having lion's feet base, set on plain stone slab, marking grave of members of Madden family. Moulded granite lid with bronze soldier's hat and scabbard. Inscriptions to each side of tomb. Set within enclosure bounded by cast-iron spearheaded railings on rendered plinth with dressed sandstone coping, having cast-iron pedestrian gate to front (east) elevation. Other family graves also contained within enclosure, including two cross memorials, and variously-shaped marble and limestone headstones.
Mitigation proposal	None required
41401632	
Structure type	School House
Townland	Scotshouse
Designation	None
Data source	National Inventory of Architectural Heritage
Perceived Significance:	Regional
Type of impact:	None
Significance & quality of impact	None
Description	Detached seven-bay two-storey schoolhouse, built c.1800, having gabled porch to front (east) elevation and external stone steps to north gable. No longer in use. Pitched slate roof, with red brick chimneystacks, cast-iron rainwater goods and clay ridge tiles. Roughcast rendered walls, coursed rubble stone visible in areas. Square-headed window openings to front, with painted stone sills, boarded up and some painted. Square-headed window opening to rear, having tooled stone sill and six-over-six pane timber sliding sash window. Square-headed timber battened doors to north elevation of porch and to top of steps, latter having rendered parapet.
Mitigation proposal	None required

These two structures are located more than 1km north-west of the Site and are considered to be too far distant to be directly or indirectly impacted by the proposal.

13.3.3.3 Field inspection

On the 17th November 2022 fieldwork was carried out to identify any additional non-designated upstanding structures in the vicinity of the application area. This involved assessing all upstanding structures that are marked on the 1908 edition of the six-inch Ordnance Survey mapping within 0.3km of the application area (see Fig. 13-1 above). There are twelve of these structures in this area, none of which are considered to be of special architectural significance (see Table 13-2 below). Figures 13-2 to 13-12 below provide a visual of the buildings.

Table 13-2: Buildings in the study area marked on 1908 OS Map

Categories	Details
Building 1	

Categories	Details
Structure type	House
Townland	Aghnaskew
Designation	None
Data source	1908 edition of the six-inch Ordnance Survey map
Perceived Significance:	None
Type of impact:	None
Significance & quality of impact	None
Description	Located on private gated road away from public road, access not possible.
Mitigation Proposal	None required
Figure	Not possible - see description
Building 2	
Structure type	House
Townland	Aghnaskew
Designation	None
Data source	1908 edition of the six-inch Ordnance Survey map
Perceived Significance:	None
Type of impact:	None
Significance & quality of impact	None
Description	Located on private gated road away from public road, access not possible.
Mitigation Proposal	None required
Figure	Not possible – see description
Building 3	
Structure type	Cottage
Townland	Dunsrim
Designation	None
Data source	1908 edition of the six-inch Ordnance Survey map
Perceived Significance:	None
Type of impact:	None
Significance & quality of impact	None
Description	Three-bay cottage with slate roof and two brick chimneys. No special architectural interest.
Mitigation Proposal	None required
Figure	Figure 13.2
Building 4	
Structure type	House
Townland	Aghnaskew
Designation	None
Data source	1908 edition of the six-inch Ordnance Survey map
Perceived Significance:	None
Type of impact:	None
Significance & quality of impact	None
Description	Structure removed.
Mitigation Proposal	None required
Figure	Not possible – see description

Categories	Details
Building 5	
Structure type	House
Townland	Lattacrossan
Designation	None
Data source	1908 edition of the six-inch Ordnance Survey map
Perceived Significance:	None
Type of impact:	None
Significance & quality of impact	None
Description	Two-bay one-storey house corrugated and with inline two-bay extension with brick chimney and corrugated roof and inline shed at south. No special architectural interest.
Mitigation Proposal	None required
Figure	Figure 13-3
Building 6	
Structure type	House
Townland	Lattacrossan
Designation	None
Data source	1908 edition of the six-inch Ordnance Survey map
Perceived Significance:	None
Type of impact:	None
Significance & quality of impact	None
Description	Three-bay two-storey house with slate roof, single chimney and enclosed porch with flat rood. Rebuilt shed at east. No special architectural interest.
Mitigation Proposal	None required
Figure	Figure 13-4
Building 7	
Structure type	House
Townland	Aghnaskew
Designation	None
Data source	1908 edition of the six-inch Ordnance Survey map
Perceived Significance:	None
Type of impact:	None
Significance & quality of impact	None
Description	Structures demolished except for north gable incorporated into field boundary. No special architectural interest.
Mitigation Proposal	None required
Figure	Figure 13-5
Building 8	
Structure type	House
Townland	Aghnaskew
Designation	None
Data source	1908 edition of the six-inch Ordnance Survey map
Perceived Significance:	None
Type of impact:	None
Significance & quality of impact	None

Categories	Details
Description	Structures mostly demolished with remains of low stone wall. There are ruined outhouses to the south and east. No special architectural interest.
Mitigation Proposal	None required
Figure	Figures 13-6 to 13-8
Building 9	
Structure type	House
Townland	Lattacrossan
Designation	None
Data source	1908 edition of the six-inch Ordnance Survey map
Perceived Significance:	None
Type of impact:	None
Significance & quality of impact	None
Description	Structure has been completely levelled.
Mitigation Proposal	None required
Figure	Figure 13-9
Building 10	
Structure type	House
Townland	Lattacrossan
Designation	None
Data source	1908 edition of the six-inch Ordnance Survey map
Perceived Significance:	None
Type of impact:	None
Significance & quality of impact	None
Description	Structures demolished except for part of south gable.
Mitigation Proposal	None required
Figure	Figure 13-10
Building 11	
Structure type	House
Townland	Lattacrossan
Designation	None
Data source	1908 edition of the six-inch Ordnance Survey map
Perceived Significance:	None
Type of impact:	None
Significance & quality of impact	None
Description	Three-bay two-storey house with gabled slate roof and two brick chimneys. Extension to south with gabled roof. No special architectural interest.
Mitigation Proposal	None required
Figure	Figure 13-11
Building 12	
Structure type	House
Townland	Lattacrossan
Designation	None
Data source	1908 edition of the six-inch Ordnance Survey map
Perceived Significance:	None
Type of impact:	None

Categories	Details
Significance & quality of impact	None
Description	The map indicates several structures in this location. Most have been levelled leaving just one ruined shed with partly collapsed corrugated roof. No special architectural interest.
Mitigation Proposal	None required
Figure	Figure 13-12

Figure 13-2: Building Three (looking west)

Figure 13-3: Building Five (looking southwest)

Figure 13-4: Building Six (looking southwest)

Figure 13-5: Remnants of Building Seven (looking west)

Figure 13-6: Site of Building Eight (looking west)

Figure 13-7: Building Eight Out-house 1 (looking west)

Figure 13-8: Building Eight Out-house 2 (looking west)

Figure 13-9: Site of Building Nine (looking south)

Figure 13-10: Remnants of Building Ten (looking southeast)

Figure 13-11: Building Eleven (looking southeast)

Figure 13-12: Location of Building Twelve (looking north-east)

13.3.4 Archaeological Assessment

13.3.4.1 Recorded Monuments

Examination of the Record of Monuments and Places [132] indicated that there are no Recorded Monuments in the application area. Externally, the closest Recorded Monument to the application area is MO021-006---- (see Fig. 13.1 above, and Figures 13-13 to 13-15 below). This is described in the Record of Monuments as:

> *"MO021-006---- Aghnaskew Ringfort – rath*
>
> *Situated on a shelf on a N-facing slope. It is not depicted as a rath on any map but it was described c. 1940 as a subcircular area (dims c. 35m E-W; c. 33m N-S) defined by a stony bank (Wth c. 1m; H c. 0.6m) and hedge E-S-W with no visible fosse."*

This monument is located c.115m north of the Site. Note that remediation of the impact on the setting of the monument by the existing quarry development has already been carried out in relation to the substitute consent (APB 316144). Any potential impact on the setting of the monument presented by the Proposed Development will be slight, as screening is provided by the mitigation measures undertaken under APB 316144, as well as two intervening field boundaries with hedgerow and trees. The slight impact will be capable of mitigation with the construction of a landscaped screening berm.

Figure 13-13: Interior of MO021-006---- (looking south)

Figure 13-14: View of the drystone wall enclosing of MO021-006---- (looking south)

Figure 13-15: External View of MO021-006 (looking north)

The next closest Recorded Monument externally to the Site is MO021-008----. This is described in the Record of Monuments as:

> *"MO021-008---- Lattacrossan Ringfort – rath*
>
> *Situated on a rise which is on a NE-facing slope and overlooking a col with a hill rising to the NE. This rath is the more northerly of two at Lattacrossan represented on McCrea's Map of County Monaghan (1793), and it is also depicted on the 1834 and 1907 editions of the OS 6-inch map. This is an oval and domed grass-covered area (dims 38m NNW-SSE; 32.3m ENE-WSW) defined by a scarp (Wth 1.5m; H 1m at N to 3m at SE) that is incorporated into an overgrown field bank and hedge SE-W-NW. There is no visible fosse and the original entrance is not identified. The perimeter is damaged by quarrying SSE-SSW."*

This monument is located c.290m east of the Site boundary and will not be directly or indirectly impacted by the Proposed Development. The setting of the monument will not be impacted as the monument is screened from views of the Proposed Development by several intervening field boundaries with mature hedgerow and trees.

The next closest Recorded Monument externally to the Site is MO021-007----. This is described in the Record of Monuments as:

> *"MO021-007---- Dunsrim Ringfort – Cashel*
>
> *Located on a rise on a NE-facing slope, with the headwaters of a small SE-NW stream c. 50m to the SW. It is depicted only on the 1907 edition of the OS 6-inch map as a D-shaped enclosure defined by field walls. This is an oval grass-covered area (dims 28.5m N-S; 22.5m E-W) defined by a grass-covered stone spread (Wth c. 4m; int. H c. 0.2m; ext. H 1.2-1.5m) but no facing stones are identified. The original entrance is not recognised, but the perimeter is slightly clipped by a NW-SE field wall at SW."*

This monument, which is located c.300m north of the Site boundary, has been levelled and is no longer visible at ground level. The monument will not be directly or indirectly impacted by the Proposed Development.

The next closest Recorded Monument externally to the Site is MO021-011---- a linear earthwork known as the Black Pig's Dyke which runs through the townlands of Skerrick West, Corrackan, Aghnaskew, Lattacrossan and Aghareagh West and is c.280m south of the Proposed Development at its closest point. This is described in the Record of Monuments [132] in the following way[9]:

> *"MO021-011---- Aghareagh West, Aghnaskew, Annagheane, Cornapaste, Corrackan, Corrinary, Corrinshigo, Drumavan, Drumgrone, Fastry Or Racreeghan, Killark, Lattacrossan, Skerrick West Linear earthwork*
>
> *The Black Pig's Dyke is a name that is generally applied to a number of linear earthworks in the south Ulster and north Connaught regions by the map-makers. They form discontinuous sections extending mostly through drumlin country from Donegal Bay in the west almost as far as Dundalk Bay in the east. Other names are the 'Worm's Ditch' or the 'Worm's Cast', and in Co. Cavan the 'Duncla'. Similar earthworks, like the Dane's Cast and the Dorsey in Co. Armagh, could be part of the same phenomenon. Linear earthworks have been regarded as providing border defence, but their entire length could hardly have been defended, and it might be more reasonable to suggest that they were constructed to control access points and to hinder cattle raiding (Raftery 1994, 87). Linear earthworks can date from the Late Bronze Age up to the high medieval period, but the Black Pig's Dyke dates mainly to the Iron Age (c. 500BC-c. 500 AD). It has recently been studied in detail (Ó Drisceoil et al. 2014), and an article on the Monaghan section is published (Ó Drisceoil 2017).*
>
> *In Co. Monaghan, apart from two short sections (MO025-044----; MO025-046----) at the E edge of the county close to the Armagh boundary, one long section extends E from a NE-SW section of the Finn river, south of Scotshouse, at the most western point of the county. From the river at Cornapaste – Corr na Péiste, the hill or hollow of the worm – it runs SE through Annagheane and Killark connecting Laurel Lough and Drumcor Lough. From the E end of Drumcor it turns NE (L c. 670m), rising up Doon Hill in Drumavan, before resuming a meandering eastward course through Skerrick West and Corrackan to Aghernaskew. The section to Aghernaskew is poorly preserved and represented as a dotted line on the 1907 edition of the OS 6-inch map. Eastwards from Aghernaskew it survives in generally good condition through the townlands of Lattacrossan, Aghareagh West, and Corrinary where it takes another turn to the N (L c. 300m) before curving eastwards through Drumurcher where it doesn't survive visibly and connects with a small pot lake meeting with Drumgrone, on the E side of which it crosses the NE-SW Bunoe River and comes to an end (total L c. 6.8km).*
>
> *The earthwork was usually positioned in the valleys and hollows between drumlins, and where it is on a slope it is generally S-facing. Where it survives intact it consists of two banks with associated fosses on the up-slope side or a bank with fosses on either side. Where two banks are present the northern is invariably the stronger. Modern investigations of this earthwork began with Walsh's excavation of a NE-SW portion at Aghareagh West in 1982, which provides a good sample of its original appearance (Walsh 1987; 1991). Before excavation and from the NW it consisted of a fosse (Wth of top 7m; ext. D c. 1m), the wide N bank (Wth of base c. 7m; H over NW c. 3m; H over*

[9] Historic Environmental Viewer sources this to an unpublished 2005 report for Archaeological Consultancy Services by O'Hara entitled 'Archaeological Assessment. Cornapaste, Co. Monaghan' under licence 05E06557. The references within are the chapter author's own references and can be sourced from the Historic Environmental Viewer.

SE c. 3m) separated by a rounded fosse (Wth of top c. 8.5-9m) from the SE bank (Wth of base 4.5m; H over NW and SE c. 1.2-1.4mm), and the earthworks have a total width of c. 24m. A palisade trench (Wth 0.5m; D 0.9m) that had been burnt was found outside the NW fosse. No artefacts were recovered from the excavation, but samples of carbon from the palisade trench produced a revised C14 date of 310 cal. BC to cal. AD 140 (Ó Drisceoil 2014, 78-9). A gradiometer survey (19R0233) by H. Gimson (2019) of the fields to the NW and SE of Walsh's excavation recorded intimations of numerous pits and possible enclosures.

Archaeological testing (98E0245) uncovered an area of brushwood just S of the line of the earthwork at the W edge Cornapaste townland (Moore 2000), but further testing (05E0657) S of its line in the same area produced no related material (O'Hara 2005). However, archaeological testing (05E0915) adjacent to a section at the E end of Lattacrossan townland on the N side of the earthwork produced evidence of a palisade in a layer of burnt clay running parallel with the earthwork which was preserved in situ (Meenan 2008). A remote sensing survey conducted at Corrinary as part of the regional study confirmed the form of the linear earthwork as a double ditch feature with evidence of a burnt palisade trench outside the N ditch (Grimson 2014). As confirmation of these features Meehan (2008) in a limited test excavation (05E0915) at Lattacrossan recorded a spread of burnt clay running parallel with a NE-SW section of the linear earthwork on the NW side."

The Proposed Development will have no direct or indirect impact on the monument. The setting of the monument will not be impacted as the monument is screened from views of the Proposed Development by a ridge of high ground that extends from north-east to south-west at the north of the monument between it and the Proposed Development, and by several intervening field boundaries with mature hedgerow and trees.

The remaining Recorded Monuments listed in the study area are all considered to be too far distant to be directly or indirectly impacted by the proposal.

13.3.4.2 The Sites and Monuments Record

Examination of the Sites and Monuments Record (SMR) [134] indicated that there are no SMR sites within the Proposed Development boundary. There is one SMR in the study area: MO021-013---- (see Appendix 13-2). This SMR is described as:

"MO021-013---- Knocks West Mass-rock

Located at a break in slope on a S-facing slope and on the E side of a NNE-SSW field bank. In the 1960s the landowner and a local priest built a concrete wall around the mass-rock, which is still present creating a bay (dims 1.05m NE-SW; 0.7m NW-SE; H 0.7m) open to the SE and with the stump of an iron cross still present, but the mass rock is no longer present."

This monument is located c.1.25km south of the Site and is considered to be too far distant to be directly or indirectly impacted by the Proposed Development.

13.3.5 Cartographic Sources

Ordnance Survey 1st and 3rd edition six-inch maps and the first edition 25-inch maps of the area were examined. This analysis did not indicate any previously unrecorded archaeological sites or cultural heritage material in the application area.

13.3.6 Place name evidence

The place names were extracted from the cartography in order to facilitate the search for structures and monuments and small finds, to help identify any unrecorded monuments or structures, to search for any published papers and documents related to the study area and

to assist in the study of the historical development of the area. The place names were looked up in the Placenames Database of Ireland [140] (see Table 13-3 below). The placenames refer primarily to topographical features and landcover. 'Lattacrossan' refers to a *leacht*, an early medieval small stone structure used to mark a grave, but no such monument is known in the townland. 'Dungonnan' refers to a fort, but there is no fort known in the townland. 'Dunsrim' refers to a circular fort which is probably the Cashel RMP MO021-007----. 'Lisnalee' also refers to a circular fort which is probably RMP MO016-015----. The placenames do not indicate any additional heritage sites within the study area.

Table 13-3: Townland Names in the Study Area

Townland name	Translation
Aghnahola	Field of the wool
Aghareagh West	Streaked or grey field
Aghnaskew	Field of the white thorns
Callowhill	Hazelwood
Cavany	Round hills
Corrackan	Quarrelsome
Corrinary	Shepherd's hill
Drumbure	Ridge of the water
Dungonnan	Gannon's fort
Dunsrim	Fort of the circle or rim
Knocks West and East	The hills
Lattacrossan	Crossan's monument
Lisnalee	Fort of the calves
See	Bishop's land, at one time part of the see lands of the Bishop of Kilmore.
Skerrick West	Rocky place
Tullaghaloyst	Hill of the kneading trough
Tullyalt	Hill of the glen

13.3.7 Aerial photography

Online Ordnance Survey aerial photography taken in 1995, 1999-2000 and 2004-2005, 2005-6 and 2013, Google Earth imagery from 2009, 2014, 2015, 2017, 2020 and 2022, and Microsoft Bing imagery from 2011 were reviewed. There are no additional archaeological sites visible in the imagery (see Figure 13-16 below).

Figure 13-16: Aerial View of Site

13.3.8 Other Sources

Examination of archaeological corpus works on prehistoric artefacts [141] [142] [143] [144] [145] [146] did not reveal any additional material from the study area.

13.3.9 Previous Archaeological Investigations

Examination of the Excavations Bulletin at Excavations.ie [135] indicated that there have been no licensed excavations carried out the application area. There have been two investigations carried out in the study area (see below).

13.3.9.1 Aghareagh West Linear Earthwork

In 1982 of a NE-SW portion of the Black Pig's Dyke was carried out in Aghareagh West townland [147]. Before excavation and from the north-west it consisted of a fosse (Width of top 7m; external Depth c. 1m), the wide northern bank (Width of base c. 7m; height over north-west c. 3m; height over south-east c. 3m) separated by a rounded fosse (Width of top c. 8.5-9m) from the south-east bank (Width of base 4.5m; height over north-west and south-east c. 1.2-1.4mm), and the earthworks have a total width of c. 24m. A palisade trench (Width 0.5m; Diameter 0.9m) that had been burnt was found outside the north-west fosse. No artefacts were recovered from the excavation, but samples of carbon from the palisade trench produced a revised C14 date of 310 cal. BC to cal. AD 140.

13.3.9.2 Lattacrossan (Vicinity of Black Pig's Dyke) 05E0915

Test-trenching was carried out on a site at Lattacrossan, Scotshouse, in response to a request for further information before a grant of planning permission was issued for a dwelling house. The southern limit of the site is formed by the line of the earthwork known as the Black Pig's Dyke (Worm Dyke), SMR 21:11. This earthwork has been associated with the defence of

Ulster in late Iron Age and early medieval times and features in folklore, where various legends attribute its construction to a Black Pig/a serpent/the Danes. Seven test-trenches were excavated on the footprint of the house, garage, driveway, etc. A line of burnt clay, running approximately parallel with the line of the Black Pig's Dyke along the eastern side of the site, was exposed. This was interpreted as the same palisade-type feature as was exposed in the 1987 excavations by Aidan Walsh on the Black Pig's Dyke further to the north in Aghareagh West townland [148].

When the owner was granted planning permission, he was required to have monitoring of ground disturbance carried out. Ground reduction for the driveway and the locations of the house and garage was supervised. In the area of the entrance, the sod and a layer of topsoil were removed. Subsoil was not revealed and the burnt palisade feature, exposed during testing, was not exposed.

13.3.10 Field Inspection

A Field inspection was carried out on the 17th November 2022. This involved an inspection of all the lands in the application area (see Figure 13-1 above). The Proposed Development lands were divided into eight sections (see Figure 13-6 above). There was no visible indication of any significant archaeological or cultural heritage materials at ground level in any of the areas. Further details are available in Appendix 13-3.

13.4 Characteristics and Potential Impacts of the Proposed Development

13.4.1 Construction and Operational Stage

13.4.1.1 Direct Impacts

There will be a slight potential impact on the setting of the RMO MO021-006---- Aghnaskew Ringfort – rath. Note that remediation of the impact on the setting of the monument by the existing quarry development has already been carried out in relation to the substitute consent (APB 316144).

13.4.1.2 Indirect Impacts

There will be no indirect impacts on any known items of archaeology, cultural heritage or buildings of heritage interest in the application area or the vicinity during the construction and operational phase of the Proposed Development.

13.4.1.3 Interaction with other Impacts

No interactions with other impacts have been identified.

13.4.1.4 'Do Nothing' Impact

If the Proposed Development were not to proceed there would be no negative impact on the cultural heritage.

13.4.1.5 'Worst Case' Impact

In the worst-case scenario, soil stripping in the Proposed Development has the potential to have a permanent, very significant, irreversible, total, negative/adverse impact on previously unknown archaeological deposits or artefacts without preservation by record taking place.

13.4.1.6 Cumulative Impact

There will be no cumulative impact upon any archaeological, architectural or cultural heritage sites in combination with other plans or projects.

13.4.1.7 Major Accidents

No impacts on any known items of archaeological, architectural or cultural heritage in the application area or the vicinity arising from unplanned events associated with the Proposed Development have been identified by the assessment.

13.4.2 Closure Stage

13.4.2.1 Direct Impacts

There will be no direct impacts on any known items of archaeological, architectural or cultural heritage in the application area or the vicinity during the closure phase of the Proposed Development.

13.4.2.2 Indirect Impacts

There will be no indirect impacts on any known items of archaeological, architectural or cultural heritage in the application area or the vicinity during the closure phase of the Proposed Development.

13.4.2.3 Interaction with other Impacts

No interactions with other impacts have been identified.

13.4.2.4 'Do Nothing' Impact

If the Proposed Development were not to proceed there would be no negative impact on archaeological, architectural or cultural heritage.

13.4.2.5 'Worst Case' Impact

No worst-case scenario has been identified at closure stage.

13.4.2.6 Residual Impacts

After the proposed mitigation measures have been implemented, there will be no residual impacts on archaeological, architectural or cultural heritage present within the application site or the vicinity.

13.5 Proposed Mitigation Measures and/or Factors

The slight impact on the setting of the Recorded Monument MO021-006---- a Ringfort – rath should be mitigated by the construction of a landscaped screening on the north-west edge of the application area that is visible from the monument.

Due to the potential survival of previously unknown sub-surface archaeological deposits or finds within the Site, all soil-stripping in areas should be monitored by a qualified archaeologist. Any archaeological material identified during monitoring should be preserved by record under licence from the National Monuments Service in advance of development.

13.6 Cumulative and In-Combination Effects

No significant or likely cumulative and in-combination effects have been identified.

13.7 Interaction with Other Environment/al Attributes

Cultural heritage can have interactions with other environmental attributes in the following manner:

Chapter 5 – Human Health and Population: The loss of cultural heritage deprives populations of knowledge and understanding of the past. The Proposed Development has been assessed and no effect on cultural heritage is anticipated; and

Chapter 12 – Landscape and Visual Assessment. The creation of the screen berms that are part of the landscape and visual impact mitigation have the potential to negatively impact cultural heritage. This has been assessed in Chapter 13, with no likely negative impacts expected.

13.8 Indirect Effects

No indirect effects on cultural heritage are expected to arise as a result of the Proposed Development.

13.9 Residual Effects

Based on the information outlined in this chapter, it is considered that with the mitigation measures outlined in section 13.5 above in place, the Proposed Development will not result in significant residual effects on cultural heritage within or in the vicinity of the Site.

13.10 Monitoring

No additional monitoring, other than that required for mitigation, will be required.

13.11 Reinstatement

The restoration phase of the Proposed Development outlines how the site will be restored to an inert state. This phase and potential associated effects have been considered throughout this Chapter.

13.12 Difficulties Encountered in Compiling this Information

No difficulties were encountered during the desktop study, field survey or in the preparation of this report.

14 MATERIAL ASSETS – TRAFFIC AND TRANSPORT

14.1 Introduction

The objective of this Chapter is to assess the potential impacts and effects associated with the traffic from the Proposed Development at the application site located at Scotshouse Quarry, Co. Monaghan. This assessment will consider the impacts and effects associated with the operation and decommissioning phases on the existing and future traffic and transport infrastructure at local and regional levels.

14.2 Methodology

The Proposed Development is an extension of the existing quarry and as such there is no specific construction phase. The works to be completed in the construction phase (site preparation) will be carried out by on-site plant and personnel. As such, no addition traffic is anticipated for this phase of the works. A Construction Traffic Management Plan (CTMP) has therefore deemed unnecessary and has not been prepared. Consequently, there are no impacts to assess or mitigation measures to be provided in the context of traffic management.

The Proposed Development will be accessed via the existing access gate onto the L6280, located in the northeast of the existing quarry. There will no increase in the permitted annual extraction volumes associated with the existing quarry as a result of the Proposed Development. The impacts are assessed with mitigation measures proposed to manage the operational phase impacts associated with the Proposed Development.

14.2.1 Desktop Study

This section provides an overview of the location and environmental setting of the Proposed Development, describing key features of the natural and built environment which fall within or in proximity to the Proposed Development.

The study area comprises of the single site access route and the existing haul road (L6280) during operation. The quarry is situated in a rural area with one-off houses and farmsteads located along roads in the vicinity of the quarry. Land-use in the vicinity of the application area and existing quarry consists mainly of agricultural land with livestock farming being the predominant sector practiced.

The closest urban centre is Clones, which is located approximately 9.1 km to the north of the application area.

14.2.1.1 Relevant Guidelines, Policy and Legislation

The following guidance documents have been utilised in the assessment of the potential traffic and transport related impacts on the regional and local road network:

- EPA *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (2022) [8];
- Transport Infrastructure Ireland (TII, formerly National Roads Authority) *Traffic and Transport Assessment Guidelines* (2019) [149]; and,
- IEMA *Guidelines for the Environmental Assessment of Road Traffic* (1994) [150].

A summary of the relevant traffic and transport related policy context in relation to the quarry is outlined below.

14.2.1.2 Monaghan County Development Plan

In accordance with the Monaghan County Development Plan 2019-2025 [27], the following objective are applicable to quarries:

Section 15.25 Extractive Industry -- *Any application for an extractive industry should have regard to the Quarrying and Ancillary Activities (DEHLG 2004), Guidelines for Environmental Management in the Extractive Sector (EPA, 2006), Guidance on Biodiversity in the Extractive Industry (NPWS), GSI's Geological Heritage Guidelines for the Extractive Industry, the Archaeological Code of Practice and the Irish Concrete Federation Environmental Code (2005) and any other relevant superseding policy guidance.*

14.2.2 Data Collection Methods

In order to assess the traffic and transportation impacts associated with the Proposed Development, the following approach was adopted:

- Scoping of the Proposed Development and assessment requirements with Local Authorities;
- Desktop assessment in the vicinity of the quarry;
- Determination of existing road characteristics, traffic levels and collision statistics (Baseline Conditions); and,
- Determination of the impacts of the continuation of use of the existing quarry (Predicted Impacts).

14.2.2.1 Traffic Counts

In order to determine the magnitude of the existing traffic flows, the results of a manual classified junction turning count was used. The traffic surveys were carried out by Traffinomics Limited. The junction count was undertaken on Wednesday 30th November 2022 between the hours 07:00 and 19:00.

The count information was obtained for the L6280/Quarry Access junction.

This survey distinguished between light good vehicles and heavy good vehicles. The traffic count data is included in Appendix 14-1 of this report. The results of this survey indicated that the peak traffic levels through the junction occurred between the hours of 07:45 and 08:45 and between 16:45 and 17:45.

14.2.2.2 Consultation/Scoping

In order to ensure the scope of this report was to the satisfaction of Monaghan County Council, a scoping document was issued on the 18th November 2022 to Monaghan County Council Roads Department (Appendix 14-2).

14.3 Receiving Environment

The Zone of Influence of both the Proposed Development and Scotshouse Quarry in relation to traffic and transport include the single access point onto the L6280 local road.

14.3.1 Site Location

The Site is immediately south of Scotshouse Quarry, which lies on the southwest side of the L6280 local road. The Site will be accessed via Scotshouse Quarry, which is accessed in turn via the L6280 – see Figure 14-1 below.

Figure 14-1: Site Access

14.3.2 Existing Road Network

The speed limit along this section of the L6280 is 80km/h. The L6280 has an approximate carriageway width of 5.5m, with no hard strip and no verge in the vicinity of the quarry entrance. There is no lighting along this section of road.

14.3.3 Existing Haul Routes

The site is accessed via the L6280. The road infrastructure in the vicinity of the quarry consists of a series of regional and local roads which connects villages and towns in the region. The closest element of national road network is the N54, approx. 8km distant.

14.4 Characteristics & Potential Impacts of the Proposed Development

The following section outlines the Traffic and Transportation Assessment undertaken in accordance with the TII Traffic and Transportation Assessment Guidelines [151].

14.4.1 Assessment Periods

14.4.1.1 Assessment Year

TII guidance [151] sets out the required assessment years and time periods to be assessed. In accordance with this guideline document, the following sections detail those proposed in this assessment.

14.4.1.2 Operational Phase

For this application, the Operational Phases as per TII guidance [151] are:

- Envisaged Year of Opening – 2023;
- Year of Opening plus 5 years – 2028; and,

- Year of Opening plus 15 years – 2038.

14.4.2 Review of Road Collision Data

As of the time of writing (March 2024), Road Traffic Collision (RTC) data is not currently available on the Road Safety Authority Database [152], and therefore the design team has no access to the historical collision information for this development and / or adjacent roads.

14.4.2.1 Construction Phase

The assessment years assessed typically include both the Construction Phase and the Operational Phase. For this Project, there is no Construction Phase related, but merely a site preparation phase.

14.4.3 Traffic Growth

In order to undertake a robust and comparable traffic assessment, it is necessary for baseline traffic data to be factored based on the nationally adopted growth rates detailed in the TII PAG Unit 5.3 Travel Demand Projections [153]. As a precaution, a high-growth factoring of the traffic data from the year the traffic counts were undertaken was adopted for the assessment years for the Project.

Table 14-1 below shows the associated central sensitivity growth rates from the TII PAG Unit 5.3 [153] utilised in the traffic assessment. These factors have been applied to the seasonally adjusted baseline traffic flows on the existing road network.

Please note the following definitions as per the TII PAG [149]:

- LV – Light Vehicle (cars and light goods vehicles); and,
- HV – Heavy Vehicle (Ordinary Goods Vehicle 1 & 2)

Table 14-1: Anticipated Growth Rates

County	2016-2030		2030-2040	
	LV	HV	LV	HV
Monaghan	1.012	1.025	1.005	1.011

14.4.3.1 'Do Nothing' Scenario

It shall be noted that the Do-Nothing scenario is equivalent to the baseline environment. The assessment of the existing environment/Do Nothing Scenario would be a scenario with the existing quarry utilising their reserve of material available (i.e., if the extension was not to proceed, the quarry would continue to extract the available reserve of material within the area permitted under the original 83/9 planning permission). The site access would therefore remain operational.

14.4.3.2 Baseline Traffic

Traffic count data have been utilised in accordance with the Transport Infrastructure Irelands (TII) Project Appraisal Guidelines (PAG) Unit 16 [154] in order to estimate the Annual Average Daily Traffic (AADT)[10] two-way traffic flow on the associated road network. This method is an industry standard as it takes account of seasonal variations typically experienced during national public holidays and tourist seasons. In turn, this allows for an informed and representative basis for comparison of project related impacts.

[10] Annual Average Daily Traffic (AADT) is defined as the total two-way traffic volume passing a point or segment of a road for one full calendar year, divided by the number of days in a year (365).

14.4.3.3 Construction Phase Assessment

None envisaged. No construction phase involving external traffic movements is associated with this development.

14.4.3.4 Operational Phase Assessment

The Operational Phase has the largest impact. The traffic associated with the Operational Phase is based on:

- Cars for the staff numbers at the existing quarry from traffic count data;
- Light Vehicles for staff and material collections from traffic count data; and,
- Client data and traffic count data for Heavy Vehicles (HV).

A summary of the predicted peak activity at the quarry is provided below in Table 14-2.

Table 14-2: Peak Traffic Volumes at Quarry Access on L6280

Quarry Traffic at Site Entrance – Peak Activity 2022 Traffic Count				
	AM Peak		PM Peak	
Time	07:45-08:45		16:45-17:45	
	Arrivals	Departures	Arrivals	Departures
LV	20	0	0	20
HV	8	8	8	8

The following assumptions have been made in the development of the Operational Phase Generated traffic:

- All operational staff will arrive in the AM peak (07:45-08:45) and depart in the PM peak (16:45-17:45);
- All HGV will arrive empty and depart full;
- Assumed that operational staff will travel to work in their own vehicle (single occupancy); and,
- Assume HGV operations within an 8-hour period per weekday.

14.4.4 Operational Assessment Conclusions

The JUNCTION 10 (PICADY) assessment of the quarry access onto L6280 are shown in Table 14-3 below. A complete set of outputs from JUNCTION 10 are included in Appendix 14-3.

Table 14-3: Junction 1 - Existing T-Junction L6280

	AM				PM			
	Queue (Veh)	Delay (s)	RFC	Junction LOS	Queue (Veh)	Delay (s)	RFC	Junction LOS
	2022 Base Year							
Stream B-C	0.0	12.83	0.02	A	0.0	0.00	0.00	A
Stream B-A	0.0	0.00	0.00		0.0	0.00	0.00	
Stream C-AB	0.0	8.41	0.01		0.0	0.00	0.00	

	AM				PM			
	Queue (Veh)	**Delay (s)**	**RFC**	**Junction LOS**	**Queue (Veh)**	**Delay (s)**	**RFC**	**Junction LOS**
	2023 Do Nothing-YoO							
Stream B-C	0.0	12.83	0.02		0.0	0.00	0.00	
Stream B-A	0.0	0.00	0.00	A	0.0	0.00	0.00	A
Stream C-AB	0.0	8.47	0.01		0.0	0.00	0.00	
	2023 Do Something-YoO							
Stream B-C	0.1	13.29	0.05		0.1	9.98	0.06	
Stream B-A	0.0	0.00	0.00	A	0.0	8.53	0.03	A
Stream C-AB	0.0	8.83	0.04		0.0	12.58	0.02	
	2028 Do Nothing YoO+5							
Stream B-C	0.0	12.89	0.02		0.0	10.71	0.01	
Stream B-A	0.0	0.00	0.00	A	0.0	8.26	0.00	A
Stream C-AB	0.0	8.55	0.01		0.0	0.00	0.00	
	2028 Do Something YoO+5							
Stream B-C	0.1	13.36	0.05		0.1	10.09	0.06	
Stream B-A	0.0	0.00	0.00	A	0.0	8.54	0.03	A
Stream C-AB	0.0	8.84	0.04		0.0	12.55	0.02	
	2038 Do Nothing YoO+15							
Stream B-C	0.0	12.94	0.03		0.0	10.84	0.01	
Stream B-A	0.0	0.00	0.00	A	0.0	8.26	0.00	A
Stream C-AB	0.0	8.70	0.01		0.0	0.00	0.00	
	2038 Do Something YoO+15							
Stream B-C	0.1	13.41	0.06		0.1	10.09	0.06	
Stream B-A	0.0	0.00	0.00	A	0.0	8.54	0.03	A
Stream C-AB	0.0	8.86	0.04		0.0	12.55	0.02	

The quarry access will operate below the maximum desired 0.85 RFC in all scenarios analysed, including the design year of 2038, considering quarry-generated traffic.

Sufficient car parking spaces are provided within the quarry for current staff levels. The Proposed Development will not result in an increase in staff levels. This ensures that parking associated with the quarry does not occur along the public road network.

14.5 Proposed Mitigation Measures and/or Factors

14.5.1 Construction Phase

None envisaged. No construction phase involving external traffic movements is associated with the Proposed Development.

14.5.2 Operational Phase

The following mitigation measures have been and will be implemented to minimise the impacts of the quarry:

- Sufficient car parking spaces are provided within the quarry for current staff levels. The Proposed Development will not result in an increase in staff levels and as such this ensures that parking associated with the quarry does not occur along the public road network;
- Sufficient space has been provided between the L6280 carriageway edge and the gates at the existing access to accommodate 1 HGV clear of by-passing traffic on the mainline;
- Pedestrian facilities are provided where required within the existing quarry to facilitate safe pedestrian movements in accordance with the Quarry Health and Safety Plan, and such facilities will be provided within the Proposed Development;
- Maintenance of existing visibility splays shall be undertaken in accordance with the Monaghan Development Plan at the quarry access; and,
- An existing wheel wash is located within the quarry.

14.5.3 Traffic Management Policy

Traffic management of the proposed project relates to the Operational Phase of the Proposed Development. As outlined in section 14.5.2 above, a number of measures have been implemented to manage the vehicles entering and exiting the existing access.

14.6 Cumulative and In-Combination Effects

An examination of the Monaghan County Council planning website [19], the DoHLGH EIA portal [2] and the Northern and Western Regional Assembly RSES [25] demonstrate that at the time of writing (March 2024) there is no planned development that is likely to have a cumulative or in-combination impact on the road network immediately around the Site. Any increase in traffic over the time period considered in this traffic assessment is therefore likely to be accounted for in the baseflow central/medium growth factors.

14.7 Interactions with other Environmental Attributes

- Chapter 5 – Population and Human Health. Traffic can have an impact on the local population. As the study of traffic and transport arising from the Proposed Development has shown that the quarry access will operate below the maximum desired 0.85 RFC in all scenarios analysed, including the design year of 2038 and in light of the mitigation measures outlined in section 14.5.2 above, it is not considered that there will be any significant impact on the local population as a result of the Proposed Development;
- Chapter 9 – Air Quality: Traffic volumes impact on air quality. This was assessed in detail in this chapter, with the conclusion that as traffic volumes associated with the Site were low, there would be no effect on local air quality;

- Chapter 10 – Climate Change: Traffic can give rise to GHG emissions. This has been assessed in this chapter, with the conclusion that the effects of GHG emissions from HGV movements will be “not significant”; and,
- Chapter 11 – Noise and Vibration. Noise can be generated from traffic movements. This has been assessed in chapter 11 with the conclusion that the impact of noise would be neutral.

14.8 Indirect Effects

There are no indirect effects on traffic and transport expected as a result of the Proposed Development.

14.9 Residual Effect

The mitigation measures outlined in section 14.5 will minimise any residual impacts. Operational traffic associated with the quarry was assessed at the site access onto the L6280. Traffic arriving and departing for the quarry will have a high content of HGV movement. The assessments indicate that the site access is expected to operate well within capacity in all the assessment years including the continuation of the quarry traffic. Therefore, the Proposed Development will have an imperceptible effect on the existing site access and a not significant effect on the road network.

14.10 Monitoring

As outlined in section 14.5.2 above, mitigation measures will be implemented to ensure regular maintenance of the existing access onto the L6280 ensure a safe access and egress for all vehicles.

14.11 Reinstatement

The restoration phase of the Proposed Development outlines how the site will be restored to an inert state. This phase and potential associated effects have been considered throughout this Chapter.

14.12 Difficulties Encountered in Compiling this Information

At the time of the preparation of this report, it is envisaged that the extraction will continue at the extended quarry beyond the date of the final assessment year of 2038 under new/subsequent application to approximately the year 2058.

The TII PAG Unit 5.3 [153] currently does not project this far into the future. For this reason, the assessment of the Decommissioning Phase has been compared to the Operational Phase throughout this report.

15 INTERACTIONS OF THE FOREGOING

The major interactions between the environmental impact topics are assessed within the above chapters of this EIAR. Table 15-1 below demonstrates a matrix to summarise the interactions between impacts on the various topic areas.

Table 15-1: Matrix of Interactions

Description	Population & Human Health	Biodiversity	Land, Soils & Geology	Water	Air Quality	Climate	Acoustics (Noise & Vibration)	Landscape & Visual	Cultural Heritage	Material Assets – Traffic & Transport
Population & Human Health		X	X	✓	✓	✓	✓	✓	✓	✓
Biodiversity	X		✓	✓	✓	✓	✓	✓	X	X
Land, Soils & Geology	X	✓		✓	✓	X	X	✓	X	X
Water	✓	✓	✓		X	✓	X	X	X	X
Air Quality	✓	✓	✓	X		X	X	X	X	✓
Climate	✓	✓	X	✓	X		X	X	X	✓
Acoustics (Noise & Vibration)	✓	✓	X	X	X	X		X	X	✓
Landscape & Visual	✓	✓	✓	X	X	X	X		✓	X
Cultural Heritage	✓	X	X	X	X	X	X	✓		X
Material Assets – Traffic & Transport	✓	X	X	X	✓	✓	✓	X	X	

16 SCHEDULE OF COMMITMENTS

Table 16-1 outlines the environmental commitment which will be undertaken as part of the Proposed Development.

Table 16-1: Schedule of Commitments

Commitment
General
• Activities associated with the Proposed Development will continue to comply with current permitted conditions and all relevant legislation and documented best practice to reduce any potential environmental impacts; • The Proposed Development will seek to utilise established ancillary infrastructure associated with the existing Quarry including the wheel wash, weighbridge, welfare facilities and offices; • The Proposed Development will utilise existing drainage infrastructure utilised during extraction activities; • The Proposed Development will utilise the existing discharge licence; • The Site manager shall ensure that all personnel working onsite are trained and aware of the mitigation measures detailed within the EIAR; • The Proposed Development will operate within the existing/previous combined capacity of HGVs per day; and, • The restoration will be done in line with a Restoration Plan.
Biodiversity
Existing Measure The following mitigation measures are a currently in place within Scotshouse Quarry: • Suppression of dust; • Limits on noise levels; • Prohibition of surface water flow onto the public road; • Storage of topsoil against future site restoration; and, • Planting of native trees / retention of hedges to act as a screen
Protection of Biodiversity by Design During Construction Phase To ensure no impacts occur to biodiversity as a result of the Proposed Development, the following mitigation measures will be put in place: • The overburden removed during the Construction Phase in Zone B1 will be used to create berms on the site boundaries; • These berms are proposed to be 4m wide and 2m high and will be planted up with native trees and shrub; • The berms will reduce emission effects to air and provide an area for biodiversity protection for the duration of the operation phase and will form part of the overall restoration plan; and,

- The extraction areas will maintain a buffer with adjoining lands, including ca. 4m for the erection of berms which will minimise disturbance from the works around the Site and to the immediate area.

Pollution Control Measures

To ensure no impacts occur from pollution as a result of the Proposed Development, the following mitigation measures will be put in place:

- All plant and HGVs are refuelled onsite on a concrete plinth which flows into settlement tanks and via a hydrocarbon interceptor before discharge to any watercourse;
- Fuel is and will continue to be stored within a double skinned tank purpose-built bunded tank inside a covered garage. All on-site mobile plant and equipment are refuelled on the concrete plinth next to the fuel garage by trained personnel, with suitable drip trays and easy access to emergency spill kit;
- Oils and other maintenance liquids are and will continue to be stored in the main site garage, on hard standing, in barrels and other containers;
- Any oil or lubricant changes or routine servicing of wheeled or tracked plant are and will continue to be undertaken outside of the Site boundary;
- All site plant will be inspected at the beginning of each day prior to use. Defective plant shall not be used until the defect is satisfactorily fixed;
- Vehicles entering the site will be in good working order, free from leakage of fuel or hydraulic fluid;
- It is proposed that summer and winter benching will be carried out within the Proposed Development to avoid working in the water table during any phase of works; and,
- During the Operational Phase, the phasing design will include for a low point on the Site to be maintained, thereby ensuring that water will remain on Site.

Stockpiled Soil Protection Measures

To ensure no impacts occur to stockpiled soil as a result of the Proposed Development, the following mitigation measures will be put in place:

- During the Construction Phase, the overburden will be stripped and used to create berms around the Proposed Development;
- These berms will be planted with fast growing native species to minimise the release of sediment;
- All stockpiled spoil will be stored in an area designated prior to works commencing; and,
- This area will be at least 10m from any open watercourse or waterbody including areas of groundwater recharge.

Protection Measures for Bats

To ensure no impacts occur to birds as a result of the Proposed Development, the following mitigation measures will be put in place:

- Site clearance will be carried out in a phased manner, with Phase 2 commencing first and Phase 6 unlikely to start for up to ten years thereafter pending market conditions (not including the derelict stone building – this will be removed during phase 2 preparation works);
- The mitigation measures to protect bats during all stages of work are outlined in the bat survey report (see Appendix 6-1);
- These measures include supervision of mature trees and supervision of the derelict building during demolition;
- All supervision will be done by a suitably qualified and licensed ecologist;
- The mitigation measures outlined in the bat survey report apply if works are to take place within 18 months of the survey; and,
- Should demolition works / tree felling be carried out more than 18 months after the survey, a reassessment of these features for suitability to support bats is recommended to confirm absence before works.

This recommendation is in line with the CIEEM advice note for survey and report validity and advice will be sought from a suitably experienced ecologist if required.

Other general mitigation measures to minimise/reduce disturbance to bats are described below:

- The timing for processing works is proposed to be between 08:00-19:00 on weekdays and shorter at weekends / public holidays;
- During the active bat season (April to October inclusive) quarrying and processing activities will predominantly be undertaken during hours of daylight when bats are typically roosting, thereby reducing the impact on foraging and commuting bats;
- Any lighting required for the works will be low level spot lighting and will be directed to works areas (i.e., vehicle loading and processing areas);
- No lighting will be directed on boundary features during either the construction or operational phases; and,
- The proposed landscape and restoration plans will be of benefit to local bat populations as the boundary hedgerow and treelines mature and disused areas revegetate over the long term.

Protection Measures for Birds

To ensure no impacts occur to birds as a result of the Proposed Development, the following mitigation measures will be put in place:

- No vegetation suitable to support nesting birds such as treeline, hedgerow and scrub will be cleared within the breeding bird season (March to August inclusive);
- If this is, however, unavoidable, a suitably experienced ecologist will be consulted to advise on how to proceed; and,
- If works to the quarry face are to be carried out within the breeding bird season, a breeding bird check should be carried out in the appropriate time of year before any works take place.

Protection Measures for Invasive Species

The following mitigation measures will be put in place to ensure no impacts occur from invasive species as a result of the Proposed Development:

- Wheel wash located at the only entrance to Scotshouse Quarry will be used by all vehicles leaving the Site.

Ecological Enhancement Measures

The following enhancement measures will be put in place:

- Vegetated berm: The sloped side of the 4mx2m berm will be 2.8m high and the total length of the berms will be ca. 1.5km. Both sides of the berm will be planted giving a total area of ca 8,500m^2. These berms will be well established before the cessation of operations;
- Open water: 10ha;
- Vegetated benches: There will a varying number of benches within and between extraction areas. Benches will be ca. 7 – 8 metres in width and up to 1.5km in length. The precise area cannot be known until the area is worked. Following the cessation of operations, the benches will be planted;
- Side slopes of quarry. During and after the restoration phase, the sides of the quarry will naturally vegetate to a certain degree;
- The passage of fauna from the wider area will be retained via mammal passes in the boundary security fence;
- A suitably qualified arborist will be consulted to advise on potential loss of trees/hedgerows within the Site and along the boundary where the berms will be erected;
- The arborist will visit and monitor the existing treeline/hedgerow and complete supplemental planting if necessary;
- The berms will be allowed to naturalise and further mature on cessation of the operation; and,
- Upon cessation of operations, bat and bird boxes are proposed to be erected around the perimeter of the quarry on advice from a suitably experienced ecologist informed by site specific surveys.

Land, Soils and Geology

Measures to protect soil/bedrock include:

- All plant and HGV will be refuelled on a concrete plinth in the existing quarry. This plinth flows into settlement tanks before reaching the interceptor prior to discharge;
- Items of plant unsuitable for travelling to the refuelling area (dry screening plant), will be refuelled utilising adequately sized and positioned drip trays;
- Spill kits will be available adjacent to all refuelling and fuel storage operations;
- Fuel will be stored in a double skin tank in the existing quarry and will be appropriately bunded. No fuel will be stored within the Site;
- Fuels, lubricants and hydraulic fluids for screening equipment used on the site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to best practice codes. These will be stored at the existing quarry;
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or recycling;
- Drip trays will be used under plant which has the potential for hydrocarbon or chemical leakage when located on permeable ground; and,
- Any spillage of fuels, lubricants, hydraulic oils, explosives or other chemicals will be immediately contained, and the contaminated soil will be removed from the site and disposed of in accordance with the relevant waste regulations.

Water

Mitigation measures for the prevention of groundwater and surface water contamination during all stages of the quarry are stated below:

- All plant and HGV will be refuelled on a concrete plinth in the existing Scotshouse Quarry. This plinth flows into settlement tanks before reaching the interceptor prior to discharge;
- Items of plant unsuitable for travelling to the refuelling area will be refuelled utilising adequately sized and positioned drip trays, outside of areas of the quarry below the groundwater table;
- Spill kits will be available adjacent to all refuelling and fuel storage operations;
- Fuel will be stored in a double skin tank in the existing quarry and will be appropriately bunded;
- No fuel will be stored within the Site;
- Fuels, lubricants and hydraulic fluids for screening equipment used on the Site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to best practice codes. These will be stored at the existing quarry;
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the Site for disposal or recycling;
- Drip trays will be used under plant which has the potential for hydrocarbon or chemical leakage when located on permeable ground;
- Any spillage of fuels, lubricants, hydraulic oils, explosives or other chemicals will be immediately contained, and the contaminated soil will be removed from the Site and disposed of in accordance with relevant legislation;
- Ensure blasting practice minimises the risk of occurrence of nitrate/ammonia residues by proper blast design and implementation, appropriate disposal of any excess explosives, and selection of the appropriate type of explosives;
- Water to be discharged will be collected in existing settlement ponds and onsite sumps before discharge to allow solids to settle out and reduce the suspended solids within the discharging waters; and,
- Installation of a flow monitor and penstock valve to prevent an exceedance of the discharge limit (360m^3/day) set out in the existing discharge licence is recommended. In the event of a shut-off, groundwater pumping onsite should cease to prevent overflow from the effluent discharge tanks.

Additionally, the phased design approach for extraction within the Proposed Development allows the low points not being extracted from in each phase of operation to act as sumps for onsite water retention. This allows for:

- Additional sediment settlement, removing suspended solids from the water column and limiting any increases in suspended solid entering the drainage network; and

- Increased capacity for the retention of onsite water in the case of storm events, preventing a breach of licence limits and limiting any contributions to potential flooding at offsite surface waters linked to discharge from the Site;

A permanent effect of the Proposed Development is an increase to the groundwater vulnerability across the Site, following Site closure. Measures taken to limit the risk associated with this increased vulnerability are:

- The retention and vegetation of onsite screening berms, which will limit the run-off from surrounding lands into the groundwater within the quarry; and,
- The retention of security fencing, which will limit unauthorised access to the Site.

Air Quality

The following mitigation measures will be put in place as part of the Proposed Development:

- The majority of works will be completed in the quarry void, below all sensitive receptors. This will provide an enclosed environment of the majority of the works associated with the Proposed Development;
- During initial extraction of Zone B, dust generating activities should be completed where possible to ensure maximum protection from nearby vegetation, sheltering features or topography;
- HGVs exiting the Site will be via the existing wheel wash; and,
- The peripheries of the quarry void are covered with well-established scrub/treeline, which will provide further screening to sensitive receptors from activities associated with the Proposed Development; and,
- Existing hedgerows will be kept as far as practicable to continue the current screening provided to sensitive receptors from dust.

Construction/Operational/Restoration Measures

The following mitigation measures will be implemented to minimise dust generation during all phases of the Proposed Development:

- All dust and air quality complaints will be recorded, their potential causes identified, and appropriate measures taken to reduce emissions in a timely manner;
- Electronic complaints will be maintained onsite available for review at any reasonable time;
- Speed restrictions within and around the Site will be limited to 15km/hr;
- Regular inspections of the Site will be completed to ensure basic good practice mitigation measures are implemented;
- Site stripping and reinstatement operation handling activities should be avoided during dry and windy conditions;
- A plant and equipment will be maintained to a high standard;
- Clearance of any spillages will be completed to avoid the accumulation of dry loose materials around the Site;
- Dampen the material extracted when possible;
- Use the mobile crushing plant and scalping screen within its design capacity;
- During initial extraction at Zone B, shelter material when possible to avoid dust dispersion if the materials are stored at ground level;
- Provide training to the site personnel on dust mitigation to be implemented on Site;
- Water spraying of conveyors/conveyor transfer points, stockpiles and roads;
- Use of wheel wash for vehicles leaving the Site, covering of fine dry loads; and,
- Regular inspections of public roads in the vicinity of the entrance and cleaning where required.

Climate

Mitigation measures to avoid, reduce, replace and offset carbon emissions associated with the Proposed Development will follow the mitigation hierarchy, which includes the following approaches:

- Avoid:
  - Extraction Efficiency: The Proposed Development will optimise extraction techniques to minimise the production of waste and maximise the extraction of quarry material; and,
  - Minimise Clearing: The Proposed Development will avoid any unnecessary vegetation clearance by planning extraction activities in a way that minimise the removal of trees and other carbon sequestering plants.
- Reduce:
  - Energy Efficiency: The Proposed Development will implement energy-efficient practices and, when available, equipment, including optimising lighting and reducing energy consumption during non-operational periods; and,
  - Fleet Management: The Proposed Development will employ fuel efficient vehicles when possible and ensure the vehicles are properly maintained to ensure fuel efficiency.
- Replace:
  - Renewable Energy: The client is currently investigating the potential for installing sources of renewable energy onsite (solar panels). This could provide a source of renewable energy for processes onsite;
  - Alternate Fuels: Vehicles and plant onsite will transition to low-carbon or carbon neutral fuels where feasible; and,
  - Electric Equipment: Diesel equipment can be upgraded to electrical equipment, where suitable alternatives are available.
- Offset:
  - Facilitate a landscape design that promotes tree and shrub growth as far as practicable.

Noise & Vibration

The following mitigation measures will be in place during construction:

- Site Preparation works will be designed to avoid noisy work outside the hours of
  - Monday to Friday 07:00 to 19:00; and,
  - Saturday 08:00 to 14:00
- Work occurring outside these hours will be subject to tighter construction stage noise limits, as per BS5228 (Section 11.2.2.3 of this EIAR);
- Nomination of a responsible person to accept and respond to complaints;
- Ensuring all plant and equipment is serviced and in good repair;
- Avoidance of plant or equipment left idling;
- Planning of works to ensure drop heights from equipment or during demolition are minimised to reduce noise generated; and,
- Noise monitoring programme during construction phase works.

The following mitigation measures will be in place during the Operational phase:

- All plant (fixed and mobile) is maintained to a high standard to reduce any tonal or impulsive sounds;
- All plant is throttled down or switched off when not in use;
- Drop heights of material are minimised;

- Rubber linings are used on chutes and transfer points;
- Where possible, plant and machinery are enclosed or cladded; and,
- Internal routes are reduced in gradients and routed to minimise noise emissions from vehicles on-site.

Methods to reduce ground borne vibration will include:

- Ensuring appropriate burden to avoid over or under confinement of the charge;
- Accurate setting out and drilling;
- Appropriate charging;
- Appropriate stemming with appropriate material such as sized gravel or stone chippings;
- Using delay detonations to ensure smaller maximum instantons charges;
- Using decked charges and in-hole delays;
- Blast monitoring to enable adjustment of subsequent charges;
- Designing each blast to maximise its efficiency and reduce the transmission of vibration; and,
- Avoiding the use of exposed detonating cord on the surface in order to minimise air overpressure.

The following mitigation measures will be in place during the Restoration Phase:

- All mobile plant will be maintained to a high standard to reduce any tonal or impulsive sounds; and,
- All mobile plant throttled down or switched off when not in use.

Landscape & Visual

The following mitigation measures will be put in place as part of the Proposed Development:

- The berms will be planted with native vegetation, aiding the screening of the Site and associated operational activities; and,
- The berms will be formed using excavated topsoil/overburden from within the Site.

Cultural Heritage

The following mitigation measures will be in place as part of the Proposed Development:

- The construction of a landscaped screening on the north-west edge of the application area to mitigate the slight impact on the setting of the Recorded Monument MO021-006---- a Ringfort – rath;
- All soil-stripping in areas should be monitored by a qualified archaeologist; and,
- Any archaeological material identified during monitoring should be preserved by record under licence from the National Monuments Service in advance of development.

Traffic & Transport

The following mitigation measures will be in place as part of the Operational Phase Proposed Development:

- Sufficient car parking spaces are provided within the quarry for required staff levels;
- Sufficient space has been provided between the L6280 carriageway edge and the gates at the existing access to accommodate 1 HGV clear of by-passing traffic on the mainline;
- Pedestrian facilities are provided where required within the existing quarry to facilitate safe pedestrian movements in accordance with the Quarry Health and Safety Plan, and such facilities will be provided within the Proposed Development;
- Maintenance of existing visibility splays shall be undertaken in accordance with the Monaghan Development Plan at the quarry access; and,
- An existing wheel wash is located within the quarry.

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