March 2023

# Remedial Environmental Impact Assessment Report – Volume 2

# Substitute Consent Application, Scotshouse Quarry

## Scotshouse Quarries Ltd

## Aghnaskew, Scotshouse, Co. Monaghan

MALONE O'REGAN

# Form ES - 04

MALONE O'REGAN ENVIRONMENTAL

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**Title: Remedial Environmental Impact Assessment Report – Volume 2, Substitute Consent Application, Scotshouse Quarry, Scotshouse Quarries Ltd, Aghnaskew, Scotshouse, Co. Monaghan**

**Job Number: E2037**

**Prepared By: Ruth Crumpton** **Signed:** _____

**Checked By: David Dwyer** **Signed:** _____

**Approved By: Kenneth Goodwin** **Signed:** _____

## Revision Record

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**Remedial Environmental Impact Assessment Report – Volume 2**

**Substitute Consent Application, Scotshouse Quarry**

**Aghnaskew, Scotshouse, Co. Monaghan**

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# 1 GENERAL

## 1.1 Introduction

Malone O'Regan Environmental (MOR) have been commissioned by Scotshouse Quarries Ltd ('the Applicant') to prepare this remedial Environmental Impact Assessment Report (rEIAR).

The applicant was granted leave to apply for Substitute Consent by An Bord Pleanála (ABP) on the 14th of March 2022 in accordance with Section 177D of the Planning and Development Act, 2000, as amended, to include submission of an rEIAR. In light of exceptional circumstances, the Board considers it appropriate to permit the opportunity for regularisation of the Development, through the substitute consent process (Refer to Chapter 2 for further details). On 24th June 2022, ABP extended the deadline for the application for Substitute Consent to 31st March 2023.

Substitute Consent is being sought 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 which has been subjected to rock extraction and processing ('the Development'). This rEIAR has been prepared to support this application for substitute consent to the Bord.

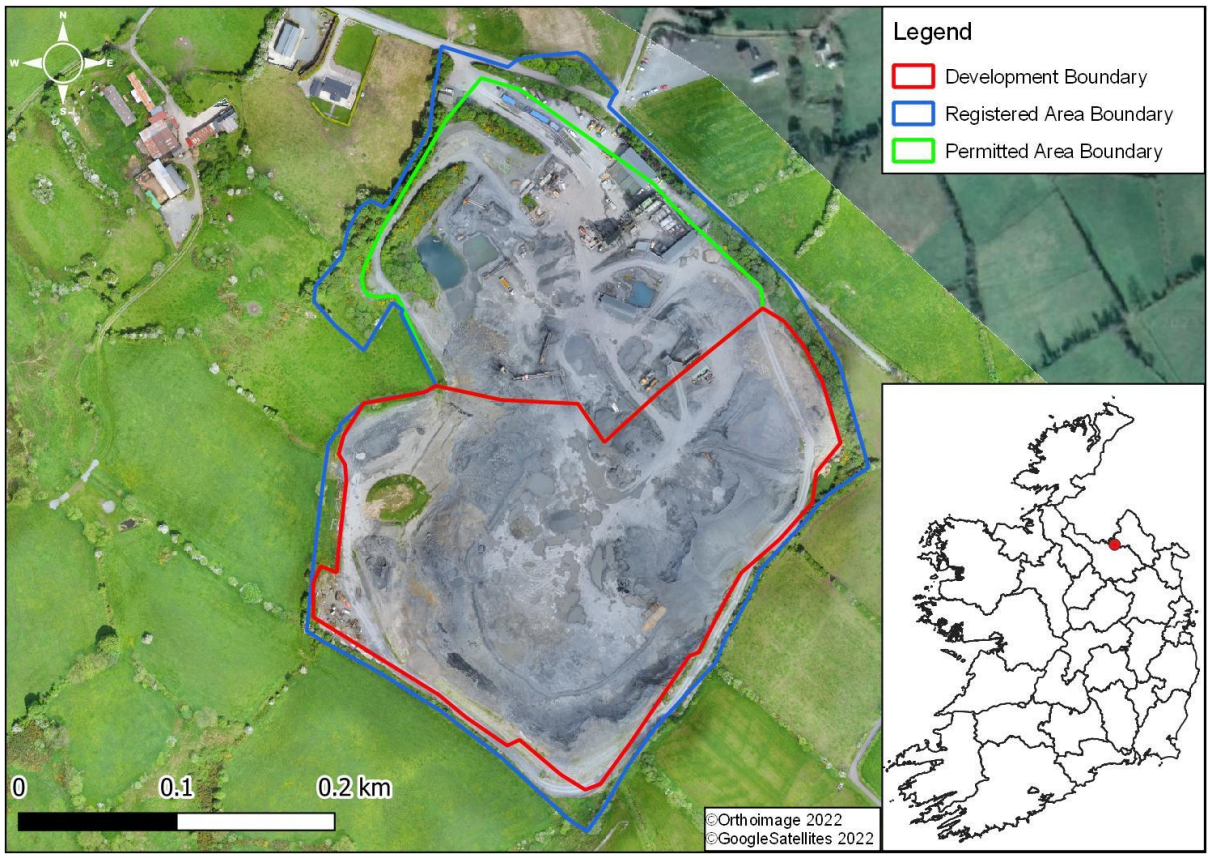
## 1.2 The Development

The Registered Area lies in the townland of Aghnaskew, in the Barony of Dartree (Dartree By), Scotshouse, County Monaghan (ITM 649474 818324), covering an area of 11.5ha (the 'Quarry Site').

On 25th of July 1983, planning permission (Planning Reference: 83/09) was granted for quarry development covering an area of 3.3ha which is within the wider Registered Area (shown as the Permitted Area in Figure 1-1 below) but which does not form part of the Substitute Consent application. The Permitted Area has a substantial history of quarrying, with known pre-1963 origins.

The entire landholding (11.5 ha) of the operator at that time was subsequently registered on 12th of April 2005 under Section 261 of the Planning and Development Act, 2000 as amended (S261), and given quarry reference QY1 (Registered Area). A total of 10ha within the Registered Area was identified for extraction). To date, ca. 8.9 hectares of the Site have been subject to extraction activities. Of this, ca. 5.6ha occurs outside the Permitted Area as defined under 83/09 (Refer to Figure 1-1 below). This 5.6ha of land is the subject of this substitute consent application and henceforth is referred to as the 'Site'. The extraction activities which occurred within the Site are henceforth referred to as the 'Development'.

**Figure 1-1: Site Location**




This rEIAR is structured as follows:

- Volume 1 – Non-Technical Summary
- Volume 2 – Main Report (this document)
- Volume 3 – Appendices with supporting technical reports, drawings and historical documents.

## 1.3 Applicant

The Applicant is Scotshouse Quarries Limited, under Managing Director Mr Paddy Connolly. Scotshouse Quarries Limited 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 (high PSV) washed chips used for surface dressing and roadmaking by local authorities and contractors.

Scotshouse Quarries Limited is the largest manufacturer of bituminous materials in Co Monaghan. Scotshouse Quarries Limited are local employers, 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 Site Description and Setting

The Registered Area has been used to extract and process greywacke stone, with origins prior to 1963. The entrance to the Registered Area is located in the northernmost corner, opening onto local road L6280. The entrance is within the Permitted Area which encompasses the northern portion of the Registered Area. The Permitted Area includes the following components:

- ESB substation
- Site office;
- Vehicle parking;
- Staff welfare facilities;
- Weighbridge;
- Wheel wash;
- Associated settlement ponds;
- Crushing/screening plant; and,
- Hot-mixed macadam plant.

The Site covers the central and southern portions of the Registered Area. The Site is primarily comprised of exposed bedrock. The western, southern and eastern boundaries of the Site are comprised of exposed quarry faces.

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

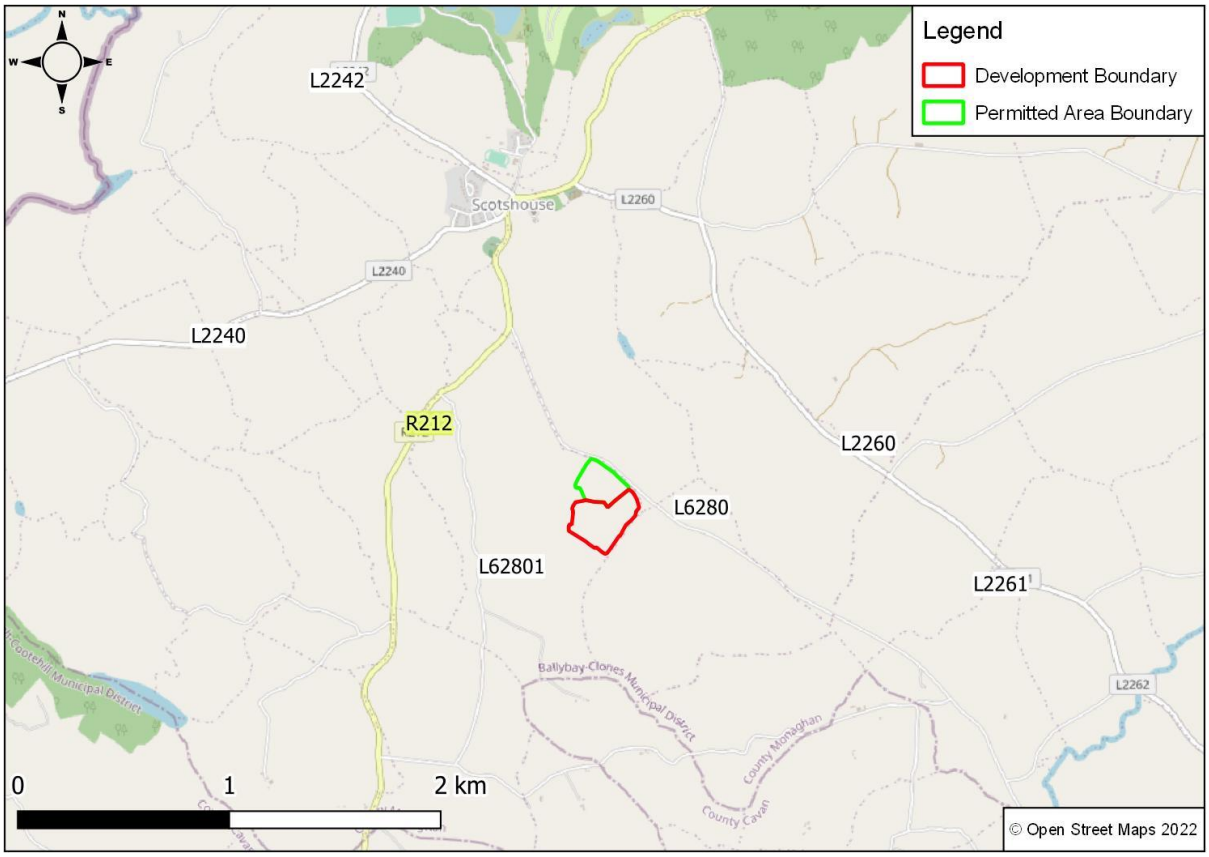
'Monaghan' derives from the Irish for 'little hills', a reference to the drumlin topography that makes up much of the county, including the area around the Registered Area. Drumlins [1] are oval-shaped hills largely composed of glacial drift which tend to occur in large clusters, giving rise to an egg-basket 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 Registered Area occupies one of the higher points in the immediate area with the land descending on all sides from an elevation of ca.130m OD on the southern, western and eastern ridges to ca.105m OD on the quarry floor.

Monaghan Town is ca.30 km to the northeast, approached via the R212 and the N54. The lands around the Registered Area are primarily agricultural with scattered single-dwelling developments on all sides. There are several residential dwellings in proximity, with the nearest being ca.50m from the northwest boundary of the Registered Area, on the western aspect of the L6280.

The planning history of the Registered Area is complex and is presented in more detail in Chapter 2. The current Site boundaries and its setting within the local road infrastructure are shown in Figure 1-2 below.

**Figure 1-2: Site Boundaries and Local Infrastructure**




## 1.5 Environmental Impact Assessment Report (EIAR)

This remedial EIAR has been prepared considering the requirements of the following legislation and guidance documents:

- Government of Ireland, Planning and Development Regulations 2001 to 2022 (Part 10) [2]
- EC "European Communities (Environmental Impact Assessment (EIA)) (Amendment) Regulations, 1999 (S.I. No. 93 of 1999) [3]
- European Union (EU) (Planning and Development) (Environmental Impact Assessment) Regulations, 2018 [4]
- European Union "EU Guidance on EIA: EIS Review", 2001 [5]
- EC 'Guidance on the preparation of the Environmental Impact Assessment Report', 2017 [6]
- EPA 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports', 2022 [7]
- EPA 'Advice notes on current practice in the preparation of Environmental Impact Statements', 2003 [8];
- European Commission Interpretation of Definitions of Project categories of Annex I and II of the EIA Directive', 2015 [9];
- Department of Housing, Planning and Local Government (DoHPLG) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment 2017 [10]
- Department of Environment Heritage and Local Government (DEHLG): Guidelines for Planning Authorities, 2004 [11] and

- European Commission 'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions', 1999 [12]

### 1.5.1 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 2011 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[1] and gave effect to Directive 2011/92/EU as amended by the EIA Amendment Directive 2014.

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:

a) The baseline environment;

b) 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,

c) A description of any control and mitigation measures required to avoid, reduce or eliminate such potential effects.

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

## 1.6 Scope of the rEIAR

The specific legislation pertaining to the issue of a remedial EIAR states:

*[Section] "177F (1) A remedial environmental impact statements shall contain the following:*

*(a) A statement of the significant effects, if any, on the environment, which have occurred, or which are occurring or which can reasonably be expected to occur because the development the subject of the application for substitute consent was carried out;*
*(b) Details of*
*(i) Any appropriate remedial measures undertaken or proposed to be undertaken by the applicant for substitute consent to remedy any significant adverse effects on the environment;*
(ii) *The period of time within which any proposed remedial measures shall be carried out by or on behalf of the applicant.*
*(c) Such information as may be prescribed under section 177N"*

In accordance with relevant best practice guidelines and the specific legislation pertaining to rEIARs, the following attributes of the receiving environment and their interactions will be addressed within this rEIAR:

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

## 1.7 Structure of the rEIAR

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

**Table 1-1: Structure and Description of the rEIAR**

| Title | Description |
|---|---|
| **Volume 1: Non-Technical Summary (NTS)** | |
| NTS | The NTS contains an overview of the Site 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 Site, describes the Proposed Works, the need for the Proposed Works and the alternatives considered. |
| Chapters 5-14 | Chapters 5-14 comprise of the assessment of environmental impacts, together with an evaluation of their significance and a description of any mitigation measures proposed to minimise impacts.<br>It also takes into account the interactions between the various attributes.<br>Chapters 5-14 will generally follow this structure:<br>1. A brief introduction to the chapter;<br>2. An outline of the methodology employed;<br>3. A description of the receiving existing environment relevant to the environmental topic under consideration including *"retrospective and baseline assessment, based solely on available scientific data, of the likely and significant effects that fill materials at this location had and is having on the receiving environment*";<br>4. A description of the characteristics and predicted impacts of the Development on the receiving environment;<br>5. A description of the reductive or mitigation measures that were employed;<br>6. A description of the cumulative and in-combination impacts which have occurred with the Development;<br>7. A description of the interactions with other environmental attributes;<br>8. A description of the indirect and residual impacts of the Development;<br>9. Details of any monitoring conducted; and,<br>10. Difficulties encountered in undertaking the assessment. |
| Chapter 15 | Chapter 15 will outline an overall summary of the interactions between impacts on different factors. |
| Chapter 16 | Chapter 16 will outline the full list of commitments as presented throughout the rEIAR. |
| **Volume 3: Appendices** | |
| Appendices | Relevant A3 drawings, photomontages and topic specific supporting documentation are contained within the Volume 3. |

### 1.7.1 Difficulties Encountered Across the rEIAR

A common difficulty encountered throughout the rEIAR was the issue of attempting to identify potential historic impacts which may have once existed, but which are now absent or which may have reduced over time. Similar difficulties arose regarding the establishment of any historic periods when certain impacts may have become apparent only to subsequently abate. The rEIAR has been limited by the availability, completeness and accessibility of publicly available data from the period of time applicable to the Development subject to the substitute consent.

Where relevant, this rEIAR therefore utilises best practice in risk assessment and prediction to characterise likely impacts, based on the information known regarding the Development.

## 1.8 Methodology

### 1.8.1 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 1.4 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 rEIAR.

The criteria for determining the significance of impacts and the effects are set out in Figure 1-3 below, taken from EPA Guidance, *Guidelines on the Information to be contained in an EIAR* [7]. Definitions of impact as outlined by the EPA are included below. These definitions are used throughout the rEIAR. 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 1-3: Description of the Environmental Impacts**

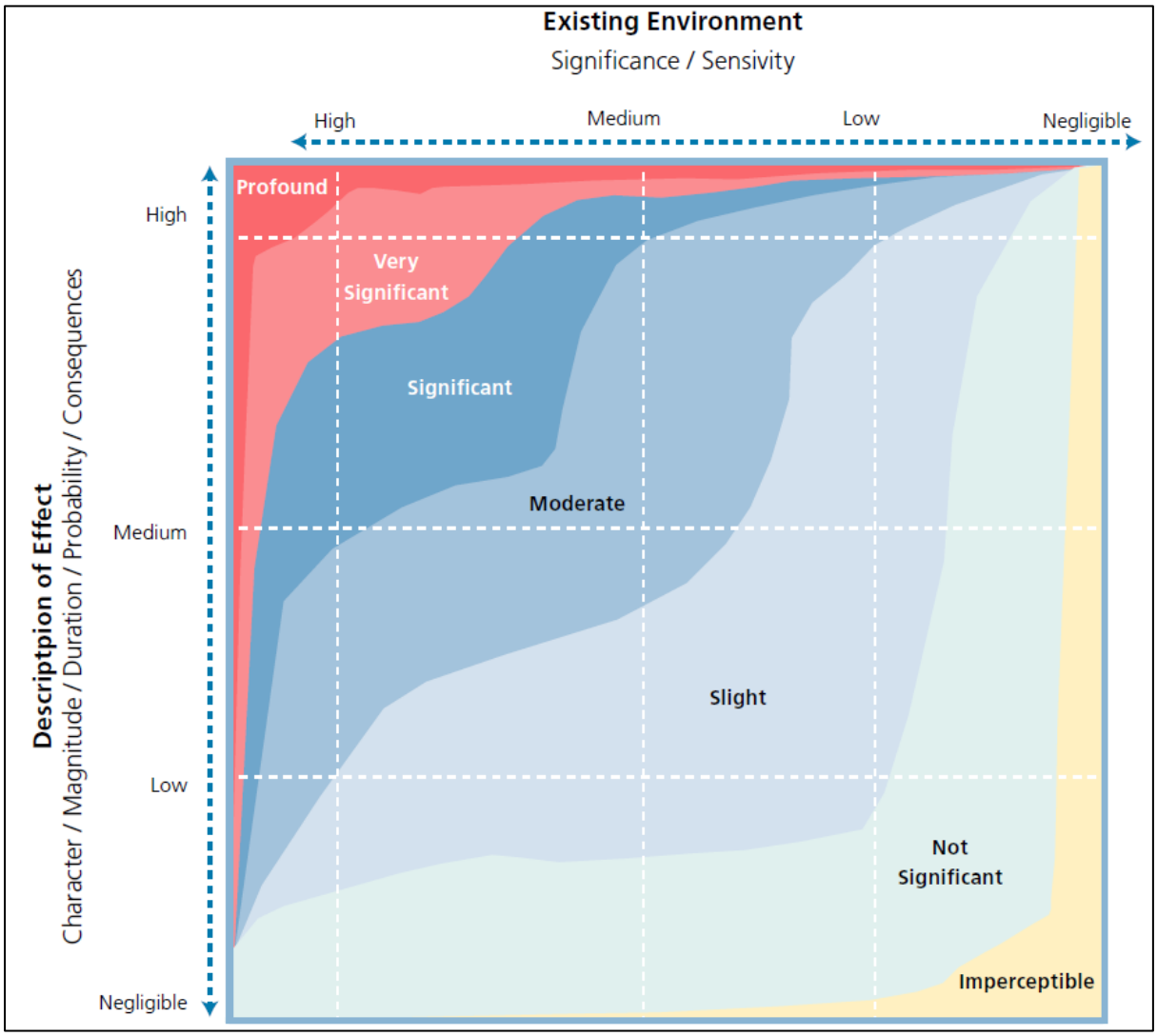



Table 1-2 defines the quality of effect of a Proposed Development on the environment ranging from positive to negative.

**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 noticeable consequences. |
| **Not Significant** | An effect which causes noticeable changes in the character of the environment 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 impact 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). |
| **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 significant 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. |

## 1.9 Assessment of Cumulative Impacts

Annex IV(5) subsection (e) 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."*

## 1.10 Assessment of the Risks of Accidents and Unplanned Events

In accordance with the EPA guidance [7] 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 rEIAR. A risk-based approach was employed for these assessments.

## 1.11 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.<br>Project Director. | BSc, PgD & DI Acoustics, Full Member IOA, IEMA Practitioner, 18+ years' experience | Chapter 10 – Noise and Vibration |
| Klara Kovacic | Associate Director,<br>Air, Climate and Sustainability | MEng, MSc, MIEMA, CEnv, 17+ years' experience | Chapter 9 – Air and Climate |
| David Dwyer | Principal Consultant<br>Project Manager | MSc, BA, 9+ years' experience | All MOR chapters |
| Ruth Crumpton | Author<br>Environmental Consultant | MSc, BA | All MOR chapters |
| Nuria Manzanas | Senior Consultant.<br>Senior Geologist | BSc Geology, MSc, PgEOL, 9+ years' experience | Chapter 7 – Land. Soils & Geology<br>Chapter 8 – Water |
| Adam Bermingham | Environmental Consultant | PhD Environmental Sciences,<br>MSc Climate Change, MIEnvSc Full Member | Chapter 9 &10– Air Quality & Climate Change |
| Patricia Redondo | Environmental Consultant | BEng, MSc Acoustics. Associate Member IOA | Chapter 10 – Noise and Vibration |

| Name | Role | Relevant Qualifications | Chapter(s) |
|---|---|---|---|
| Damien Teague | Environmental Consultant | MSc, BA, 3+ years' experience | Chapter 7 – Land. Soils & Geology<br>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 |
|---|---|---|---|
| Sean O'Donnell | Earth Science | BEng (Hons.), BEng (Hons.) Civil, Member of Institution of Engineers of Ireland | Engineering Drawings and Restoration Plan |
| Dr Charles Mount | N/A | MA and PhD in Archaeology, MBA, Dip EIA & SEA Management<br>Member of Institute of Archeologists of Ireland. | Chapter 13 – Cultural Heritage |
| Maria Rooney | Tobin Consulting Engineers | Roads and Traffic Engineer.<br>Chartered Engineer<br>BEng Civil Engineering<br>MEng Roads and Transport Engineering | Chapter 14 – Traffic & Transport |
| Gabriela Iha | | BEng Civil Engineering<br>MSc Sustainable Transport and Mobility | Chapter 14 – Traffic & Transport |
| Jamie Bell | Macro-works | BA Hons Landscape Architecture | Chapter 12 – Landscape & Visual |
| Maeve Riley | Apem | Senior Ecologist.<br>MCIEEM, MSc, BSc | Chapter 6 – Biodiversity |
| Jason Guile | | Principal Ecologist<br>BSc | |

# 2 PLANNING AND POLICY CONTEXT

## 2.1 Introduction

This Chapter sets out the context for the Site through analysis of the site history and most recent development plans, planning guidelines, policy frameworks and reports issued by the county, State and semi-state bodies. It also includes the reasons or need for the Development, described in Chapter 3.

## 2.2 Planning Application History

The Registered Area has changed ownership over the years. The original 1983 planning application was made by Patrick Cunningham and the 2004 S261 registration was in the name of Thomas Leddy. In 2006, Paddy Connolly bought the Registered Area and in 2009 ownership passed to Mr Connolly's family-run company Scotshouse Quarries Limited, who retain ownership.

### 2.2.1 Planning Reference 83/09

The Registered Area has a substantial history of quarry activities, with evidence of pre-1963 origins. In 1983, the landowner at the time (Patrick Cunningham) applied to Monaghan County Council (MCC) for permission to operate a greywacke quarry at Aghnaskew, Scotshouse, Co Monaghan. Conditional permission was granted on 25th July 1983 (Planning Reference 83/09) for an area covering ca. 3.3 ha, referred to as the Permitted Area herein. Please refer to Figure 1-1 above for respective boundaries.

There were ten (10No) conditions attached to the planning permission, which are presented in Appendix 2-1: Planning 83/09. Condition 2 related to dust and stated in part:

> *"b) The dust outfall measured at any point at the site boundaries shall not exceed 150mg/m$^2$"*

Condition 2b would appear to refer to the 'Frisbee' collection method. This involves the collection of dust onto a disc shaped like an inverted Frisbee with an internal diameter of ca.227mm, an external diameter of ca.238mm and a collection depth of ca37mm. Dust is deposited onto the surface and washed into a collection bottle [13]. Although, there are currently no Irish Statutory limits or Guidelines relating specifically to dust deposition thresholds for inert mineral dust. The Bergerhoff Method (German Standard VDI 2119, 1972) specified in the German TA Luft Air Quality Standards is typically used for monitoring of dust deposition in Ireland. 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 developments.

### 2.2.2 Section 261 Registration

Although the extraction activities should have only been conducted within the Permitted Area, in 2004 the landowner (at the time Thomas Leddy) registered the entire Registered Area under Section 261 (S261) of the Planning and Development Act 2000, as amended. The applicant's paperwork very clearly states that the total site area was 11.5ha (split over Folio 13636 and Folio 14067) with an extractive area of 10ha.

The Registered Area was provided with a reference number of QY1. The application for registration was dated 11th November 2004 and is presented as Appendix 2-2: S261 Registration. The application shows that the Site was in regular and sustained use, as the hours of use were listed as "8am-6pm" and traffic level was listed as "*8-wheel tippers and 4 lorries 5 times a day*". The S261 outturn was the re-statement, modification and addition to the existing conditions under Section 261 (6)(a)(ii) in 2006 as per the provision of that process; this included conditions for continued operations within the registered area, which were added to the original conditions (83/09).

At this juncture, site clearance and aggregate extraction had extended beyond the Permitted Area as defined in planning reference 83/09. The original permission as modified by S261 then functioned as the permission governing activities at the entire Registered Area as far as both the operator and MCC were concerned and was enforced on that basis. This approach was confirmed by written acceptance by MCC of a restoration plan in 2006, submitted as part of a compliance response to condition 3 of the Section 261 (6)(a)(ii) conditions, indicating the entire Registered Area as requiring restoration.

Following the Section 261 process, MCC proceeded to grant permissions for the Registered Area, giving further credibility to the entire Registered Area being authorised. Please refer to Figure 1-1 above.

### 2.2.3 Planning Permissions Granted 2006 – 2012

The Registered Area was purchased by the Applicant in April 2006. The planning applications made in relation to the Registered Area from the date of quarry registration to 2012 are listed in Table 2-1 below. It should be noted that maps submitted with the applications under Planning Reference 08/787, 09/618 and 10/127 clearly showed the full extent of the Site in ownership. The application form for Planning Ref 10/127 stated the area of the Site is 10.65 ha.

**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 | Páraic Connolly | Portal Framework building & associated works | Granted | 25/03/2010 |
| 10/127 | Paddy Connolly | **Retention Permission** for:<br>Single-story pre-fab office building<br>Weighbridge<br>2.4m roadside fence | Granted | 23/06/2010 |

### 2.2.4 Section 261A Report 2012

In 2012, MCC prepared a Section 261A Report on the Registered Area (refer to Appendix 2-3: S261A Report 2012). This Report included maps showing both the area permitted under the original planning permission grant 83/09 and the larger area registered under Section 261, with the latter being marked as

> *"site as approved under Q/2004/3002".*

It also includes an aerial photograph of the Registered Area clearly showing that the area of land excavated exceeds that under the original 1983 permission. The Report states:

> *'Site area as per P/1983/09: approximately 3.3 hectares'*
>
> *'Site area as per Q/2004/3002: approximately 11 hectares.'*

#### 2.2.4.1 Section 261A Appropriate Assessment

The Section 261A Report states that the Site lies within 15km of two Special Areas of Conservation (SAC)s and eight Proposed Natural Heritage Areas:

- Kilroosky Lough SAC
- Lough Oughter SAC
- Drumcor Lough pNHA
- Annagheane Lough pNHA

- Lisabuck Lough pNHA
- Drumgole Lough pNHA
- Dromore Lough pNHA
- Lisarilly Bog pNHA
- Rafinny Lough pNHA
- Drumcor Lough pNHA

With respect to the requirement of an Appropriate Assessment, the S261A Report included the following statement;

> *"Given the distance of the quarry from the SAC (approx. 9km) and the fact that there are no watercourses located within the vicinity of the site, there are not considered to be any pathway connectors linked with this development and any Nature 2000 sites. Consequently the planning authority is of the opinion that an Appropriate Assessment is not required for this quarry development."*

#### 2.2.4.2 Section 261A Environmental Impact Assessment

With regards to the requirement of an EIA, the Section 261A Report identified the following thresholds as '*not applicable*':

*"New quarries in excess of 5 ha";*

*"Extension of a quarry which brought the total quarry to in excess of 5 ha and represented an increase of over 25% of the existing quarry, provided that the extension in itself exceeded 2.5 ha*."

The Report states:

> *'whilst it is noted that development has taken place post 1990, post 1997 and post-2007, it is also noted that no quarrying activity has been undertaken outside of the originally granted site.'*

The Report then quotes Guidelines for Planning Authorities in Section 261A:

> *"If development carried out after 1/2/1990 was authorised by a planning permission granted prior to 1/2/1990, EIA is not required in respect of such development under the Directive because the Directive does not apply in respect of projects authorised before the Directive became operative. Any development which obtained planning permission before the EIA Directive came into effect and is operating in accordance with the terms of its planning permission is not affected by the Directive and does not require EIA under the terms of this Directive."*

The Report goes on to consider sub-threshold EIA requirements with the following conclusion (emphasis in original):

> "*The planning authority is of the opinion that an environmental impact assessment is not required for the quarry development in question. In accordance with Article 103 of the Planning and Development Regulations 2001, it is noted that the site does not lie <u>within</u> any of the following:*
>
> - *A European site*
> - *An area the subject of a notice under section 16(2)(b) of the Wildlife (Amendment) Act 2000*
> - *Land established or recognised as a nature reserve within the meaning of section 15 or 16 of the Wildlife Act 1976 as amended by section 17 of the Wildlife (Amendment) Act 2000 or*

- *Land designated as a refuge for flora or as a refuge for fauna under section 17 of the Wildlife Act 1976 as amended by section 28 of the Wildlife (Amendment) Act 2000.*

"*The planning authority does note that the site lies within 15km of Kilroosky Lough SAC. However, given the distance of the quarry from the SAC (approx. 9kms) and the fact that there are no watercourses located within the vicinity of the site, there are not considered to be any pathway connectors linked with this development and it is therefore considered that the development will have no impact upon the Natura 2000 network.*"

In accordance with Schedule 7, the following points are noted;

*There are no additional quarries within the vicinity of the site.*
*The surrounding area is not considered to be densely populated.*
*The surrounding area is not considered to be environmentally sensitive.*
*It is considered that the conditions imposed under p/83/9 and Q/04/3022 has ensured that the development has been assessed with regard to traffic safety, residential amenity, environmental protection and visual amenity.*

The Report states that attached aerial photographs indicate that quarrying has been contained within the boundary of the original planning permission.

Section 261A(2)(a) states (as quoted by MCC within the Report) that the planning authority must demonstrate whether:

I. *"Development carried out after 1st February 1990 was not authorised by a permission granted under Part IV of the Act of 1963, prior to 1st February 1990, which development would have required either an environment impact assessment or a determination as to whether an environmental impact assessment was required, but that such an assessment or determination was not carried out*
II. *Development was carried out after 26th February 1997 which was not authorised by a permission granted under Part IV of the Act of 1963 prior to 26th February 1997, which development would have required having regard to the Habitats Directive, an appropriate assessment, but that such an assessment was not carried out"*

The Report states that it is the opinion of the planning authority that no development had occurred on the site post-1990 or post-1997 that wasn't covered by the 1983 planning application and that additionally the site was fully registered under Q/2004/3002 (i.e., under Section 261).

The Report concludes that:

*"No further action is required under Section 261A of the Planning and Development Act 2000 and related provisions*."

On the basis of this outturn from Section 261A, the operator continued to reasonably believe that the continued quarrying in the wider site, beyond the limit of P83/09, was authorised, subject to compliance with the Section 261(6)(a)(ii) conditions, to the extent of the Registered Area.

### 2.2.5 Planning Permissions and Consents Since 2012

Further planning permissions applied for following the 2012 Section 261A Report are listed in Table 2-2 below. These applications were accompanied by site maps indicating the boundary of the Registered Area as matching the site ownership boundaries.

**Table 2-2: Planning Application and Consent History Since 2012**

| Reference | Applicant | Details | Notes | Decision | Grant Date |
|---|---|---|---|---|---|
| Planning ref 14/124 | Scotshouse Quarries Ltd | Retention permission for:<br>2 Crushing plants<br>Screening plant<br>Concrete storage facility<br>Conveyors<br>Concrete feeding chute<br>Concrete supporting structure<br>Electrical services control container<br>Mobile concrete batching plant<br>Utilities and associated works | The Planning and Development Report issued by MCC states<br>*'Notably, the site is not located within or within 15km of any Natura 2000 site. In addition, there are no watercourses in proximity to the application site and no pathway connectors with the Natura 2000 network. It is the opinion of the planning authority therefore that given the cumulative effects of both the proposed development and any other plan or project, the development is not of a nature or scale to have any significant effects on the integrity of the Natura 2000 network and therefore a Stage 2 Appropriate Assessment is not required.'* | Granted | 27/02/2015 |
| Planning ref 14/157 | Scotshouse Quarries Ltd | Construction of:<br>Site office<br>Wastewater treatment unit<br>Raised filter percolation area<br>Car park<br>Storm drainage<br>Foul drainage and associated works | The Planning and Development Report issued by MCC states<br>*'Notably, the site is not located within or within 15km of any Natura 2000 site. In addition, there are no watercourses in proximity to the application site and no pathway connectors with the Natura 2000 network. It is the opinion of the planning authority therefore that given the cumulative effects of both the proposed development and any other plan or project, the development is not of a nature or scale to have any significant effects on the integrity of the Natura 2000 network and therefore a Stage 2 Appropriate Assessment is not required.'* | Granted | 25/07/2014 |

| Reference | Applicant | Details | Notes | Decision | Grant Date |
|---|---|---|---|---|---|
| Planning ref 15/113 | Scotshouse Quarries Ltd | Construction of hot-mix tarmacadam plant and associated works | The Planning and Development Report issued by MCC states<br>*'Notably, the site is not located within or within 15km of any Natura 2000 site. In addition, there are no watercourses in proximity to the application site and no pathway connectors with the Natura 2000 network. It is the opinion of the planning authority therefore that given the cumulative effects of both the proposed development and any other plan or project, the development is not of a nature or scale to have any significant effects on the integrity of the Natura 2000 network and therefore a Stage 2 Appropriate Assessment is not required.'* | Granted | 20/08/2015 |
| Discharge consent WP26/15 | Scotshouse Quarries Ltd | Discharge consent sought for trade effluent arising from:<br>Overflow from mineral crushing plant<br>Mineral washing<br>Washing out of vehicles<br>Wheel washing<br>Runoff from yard areas<br>Trade effluent passed through settlement ponds and hydrocarbon interceptor before discharge to surface waters (water body XB_36_east_14) | NOT a planning application. Discharge consents are issued by Environment or Water sections of the County Council.<br>Earth Science Partnership Ire Ltd, in their AA Screening Report for the application for leave to apply for substitute consent stated that Stage 1 Screening for Appropriate Assessment was carried out by MCC on receipt of the discharge licence application and that this determined that a Stage 2 Appropriate Assessment was not required. | Granted | 18/09/2015 |
| Planning Ref 18/485 | Scotshouse Quarries Ltd | Construction of electrical sub-station and switch room | The Planning and Development Report issued by MCC states<br>*'Having regard to cumulative effects of both the proposed development and any other plan or project, it is the opinion of the Planning Authority that the development is not of a nature or scale to have any significant effects on the integrity the above mentioned or any other Natura 2000 sites and therefore a Stage 2 Appropriate Assessment is not required.'* | Granted | 13/12/2018 |

| Reference | Applicant | Details | Notes | Decision | Grant Date |
|---|---|---|---|---|---|
| Planning Ref 19/9011 | Scotshouse Quarries Ltd | Extension of duration of planning permission granted under 14/157 until August 2024 | | Granted | 11/09/2019 |

## 2.3 Planning Enforcement

In 2019, following a letter of complaint to MCC from a third party, a Warning Letter was sent to the Applicant under Section 152 of the Planning and Development Act 2000.

On 2nd June 2020, a letter was issued by MCC which made the following requirements of the Registered Area owners:

*Action A: On or before the day of 2nd October 2020 (extended to 2nd April 2021)*

*(A) To permanently cease all quarrying activity on lands which are outside the site area in respect of which planning permission was granted under Ref. No. 83/9 (the unauthorised lands) (see map attachment 2 to this Notice which shows the approved quarry area under Ref. No. 83/9 within a line edged green).*

*(B) To submit to Monaghan County Council, for its approval a comprehensive site restoration plan in respect of the unauthorised lands prepared by a suitably qualified and competent person and to furnish to Monaghan County Council on request all additional information and documentation required by it to enable it to approve the plan. This plan shall include the following:-*

- *The identification of all items of plant, machinery, scrap metals, stockpiles and waste material to be removed.*
- *The position of all quarry faces, together with details of measures to be used to ensure that all final faces are left in a safe and stable condition.*
- *Details of comprehensive landscape proposals for that re-instatement of the site area to include:*
  - *Details of species, varieties, number and location of trees/shrubs for purposes of forming dense screen planting along all boundaries.*
  - *A timescale for the implementation and completion of the site restoration plan which shall be completed in full within a period not exceeding 24 months from the date of serving the enforcement notice.*

*Action B*

- *To carry out and complete on or before the day of 2nd June 2022 all the works required under the site restoration plan which has been approved by Monaghan County Council."*

### 2.3.1 Leave to Apply for Substitute Consent

The resulting enforcement details and exchange of communication is set out in a legal opinion by Dr M Moran-Long [14] , written for the Applicant on 16th September 2021 (see Appendix 2-4: Legal Opinion of Dr Moran-Long). In brief, Dr Moran-Long's legal opinion was and is that MCC should have served a notice under subsection 261A(3)(a) directing the Site owner at the time (Mr Connolly) to apply to An Bord Pleanála (ABP) for substitute consent under section 177E, to be accompanied by an rEIAR.

Further to Dr Moran-Long's opinion, the Applicant made an application for leave to apply for substitution consent to ABP. ABP carried out a site inspection on 17th February 2022 as part of their assessment, the findings of which are presented in the Inspector's Report ABP-311755-21 [15] (Refer to Appendix 2-5). The Inspector's Report acknowledged that MCC's conclusion at the time of the S261A Review in 2012 that No Further Action was needed indicated that MCC viewed the 83/09 and S261 conditions as providing for extraction within the registered site – i.e., the Registered Area.

ABP considered MCC's 2012 statement that:

> *"This site is authorised by planning permission P/83/09. Whilst it is noted that development has taken place post 1990, post 1997 and post 2008 it is also noted that no quarrying activity has been undertaken outside of the originally granted site."*

ABP found that by "originally granted site", MCC can logically only refer to the area of modified permission. ABP further found that the granting of planning permissions 14/124 (for processing/crushing plant) and 15/113 (for a tarmacadam plant) were permitted on the understanding that they would be dependent on site-produced aggregates, and that therefore the aggregates must have been regarded as authorised.

The ABP report determined that the Applicant reasonably understood that the modified permission was sound; that the need to address the shortfall in site authorisation arises through no fault of the site owner and that due to the circumstances, closure of the quarry would be disproportionate. It also found that had MCC identified the need for an EIA under the S261A process in 2012, the Applicant would have been able to use the Substitute Consent process, the 'sunset clause' provisions of which would have allowed the operator automatic entry to the process then.

Under Section 177D(1)(a)(ii) of the Planning and Development Act 2010 (as amended), the Board may grant leave to apply for substitute consent where 'any error or fact or law or procedural error' has occurred. ABP concluded that the procedural errors outlined above were in their own right sufficient exceptional circumstances to justify leave to apply for substitute consent.

Under Section 177D(2), when considering if exception circumstances exist, the Board must consider matters a-g inclusive, listed below. The ABP report examined each matter in turn and the conclusions reached by APB are summarised below [15].

a) *Whether regularisation of the development concerned would circumvent the purpose and objectives of the Environmental Impact Assessment Directive or the Habitats Directive.*
   The submission of a rEIAR with the substitute consent application will uphold the purpose and objectives of the EIA Directive and therefore regularisation will not circumvent them.
   Multiple Stage 1 Appropriate Assessment Screening exercises have been completed with the collective conclusion that a Stage 2 Natura Impact Assessment is not required. Therefore regularisation will not circumvent the Habitats Directive.
b) *Whether the application had or could reasonably have had a belief that the development was not unauthorised.*
   Following registration under S261, the then-owners submitted a restoration plan for the entire site, which was accepted by the Planning Authority. Multiple planning applications were subsequently made, and the Registered Area was the subject of several enforcement enquiries. The Planning Authority has accepted, in submission to ABP, that it failed to identify that extraction was occurring beyond the boundaries of the 1983 permission and that enforcement reports made in March 2014 and October 2017 understood the site registered under S261 to be authorised for extraction beyond the 1983 boundaries. Therefore, the Applicant had or could reasonably have had a belief that the development was authorised.
c) *Whether the ability to carry out an assessment of the environmental impacts of the development for the purpose of an environmental impact assessment or an appropriate assessment, and to provide for public participation in such an assessment, has been substantially impaired.*
   An rEIAR would allow the environmental impacts of the extraction to be assessed and reported on and would be the subject of public participation. The ABP inspector did not expect there to be substantial impairment of the ability to prepare an rEIAR.

*d) The actual or likely significant effects on the environment or adverse effects on the integrity or European site resulting from the carrying out or continuation of the development.*
An rEIAR would provide the opportunity to assess and report on environmental effects and establish their significance.

*e) The extent to which significant effects on the environment or adverse effects on the integrity of a European site can be remediated.*
Previous conditions have been complied with, establishing regulation of the extraction activities at the Registered Area. It is reasonable to expect any significant effects can be remediated to a satisfactory extent.

*f) Whether the applicant has complied with previous planning permissions granted or has previously carried out an unauthorised development.*
The planning history of the Registered Area indicates that the only unauthorised activities are those affected by the current application.

*g) Such are the matters the board considers relevant.*
No other matters were considered relevant.

The overall conclusion of the Bord's Inspector Report was that exceptional circumstances existed under Section 177D(2). Leave to apply was therefore granted on 11th March 2022.

The Section 177C application was, for completeness, accompanied by a Stage 1 Screening for Appropriate Assessment. The Board found that only an EIA offence existed, so an rNIS is not required with this application.

The initial date for submission of the application was extended by decision of the Board on 24th June 2022. The current final date for receipt of the application for substitute consent is 31st March 2023. This rEIAR forms part of that application.

### 2.3.2 Substitute Consent Appropriate Assessment Screening Report

A Remedial Appropriate Assessment Screening Report (rAASR) was prepared as part of the application for leave to apply for substitute consent [16]. The rAASR has been submitted to and accepted by ABP. In brief, from the assessment it was concluded, that the Site;

- *Is not directly connected with or necessary to the management of a Natura 2000 site.*
- *Has not result in any significant impacts on the integrity or qualifying interests of any of the three identified Natura 2000 sites to date.*
- *Has not significantly impact the Natura 2000 network either on its own, or in combination with other plans/projects to date.*

## 2.4 Policy Context

### 2.4.1 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. Two headline documents were produced:

- The National Planning Framework (NPF) [17]; and
- The National Development Plan 2021-2030 (NDP) [18].

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 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.

#### 2.4.1.1 Industrial Policy

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"* [19]. 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."*

### 2.4.2 Regional Policy

County Monaghan lies within the Border Strategic Planning Area (BSPA), which also includes Counties Cavan, Donegal, Leitrim and Sligo. The total population of the BSPA in 2016 was 394,333 according to the census of that year [20]. 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 768,774 in the 2016 census [20].

The Regional Assembly produced the current Regional Spatial and Economic Strategy (RSES) 2020-2032 [21], 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. Given the applicants experience and modern fleet of road surfacing equipment, the Registered Area could play a significant role in supplying aggregates for these infrastructural improvement works.

### 2.4.3 Local Policy

#### 2.4.3.1 Local Population Policy

The Monaghan County Development Plan 2019-2025 (MCDP) [22] predicts a population growth within Co Monaghan of 1.04% per annum with an estimated 2025 population of 67,253 people. 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 [22]. Although the 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.

### 2.4.3.2 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 the 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 Extractive Industry Policies (EIP) 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.

Appendix 10 of the MCDP sets out quarrying as a development which may require a Traffic and Transport Assessment (TTA).

Appendix 22 of the MCDP is the Noise Action Plan (2018-2023), with section 2.1. setting out suggested noise limits for quarrying and ancillary activities (see Chapter 11 – Noise and Vibration).

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

### 2.4.3.3 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)
- 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 2-3 below.

**Table 2-3: Zoning Matrix Extract (MCDP)**

| Development | TC | ER | PRA/B | 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 2-3 above), extractive industry development is limited to such areas by default.

## 2.5 Need For Development

The NPF2040 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 Development in question.

The Registered Area and associated development has facilitated the economy of the area through direct employment of up to 25 staff. If the Site cannot be regularised, the long-term future of the Registered Area and associated jobs are at risk.

It is considered that the Development is and was aligned with the objectives/polices of the NPF, NDP, RSES, and CDP.

As previously stated, the Development is of greywacke, a high PSV rock resource of regional and potentially national importance, given the shortage of 'friction course' resources across the country. The nearest high PSV source in regular production is in north Longford, with lesser quality materials available elsewhere in the north-east. This particular resource is, therefore, of regional importance for the production of chippings for surface dressing of roads, the main form of road maintenance in Ireland. Industry experts suggest that high PSV sites represent only 4-5% of extractive sites in the country.

# 3 DESCRIPTION OF DEVELOPMENT

## 3.1 Introduction

This Chapter is divided into two sections. The first section describes the operational activities which occur and have occurred within the Permitted Area (83/09). The second section describes the activities which occur and have occurred within the Substitute Consent Site (i.e., the Development where substitute consent is being sought). See Figure 1-1 above for the boundaries of each area. Figure 3-1 below shows the site infrastructure.

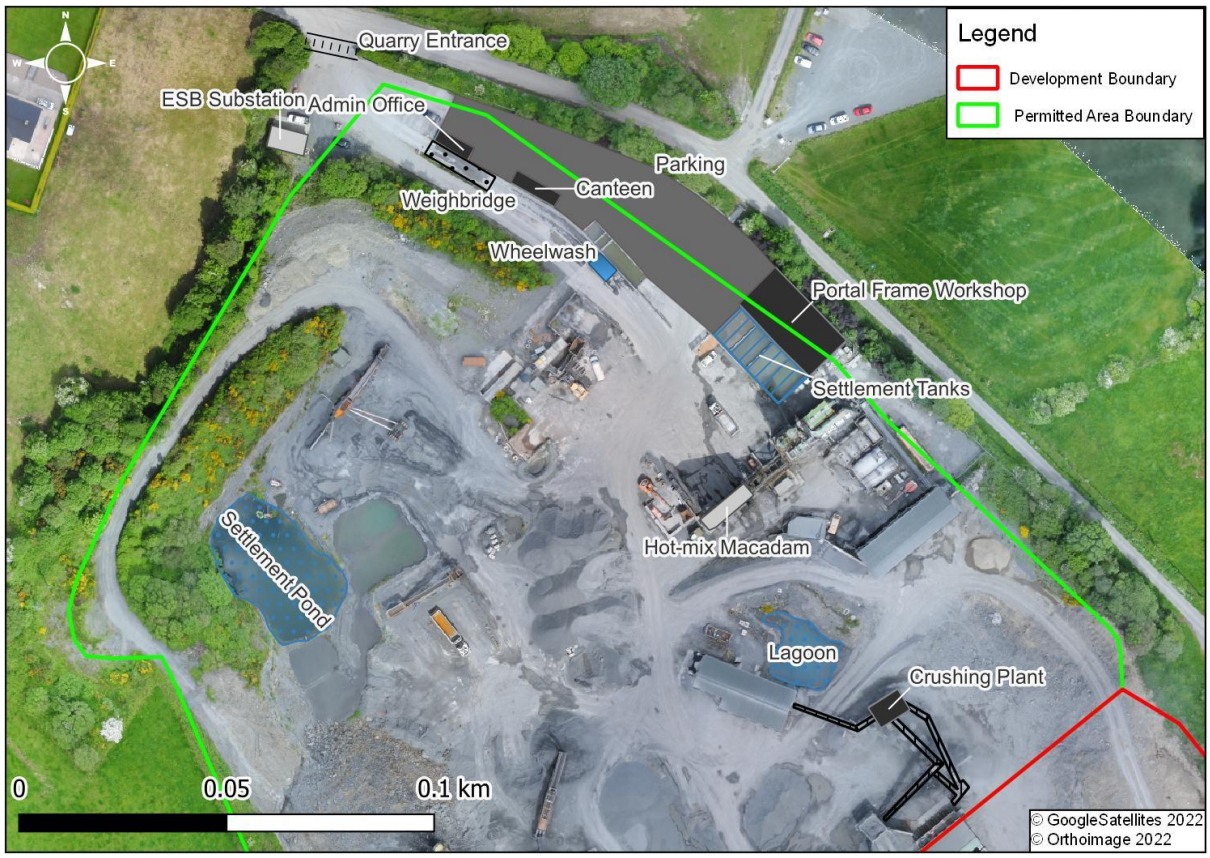
## 3.2 The Permitted Area and Associated Activities

The Permitted Area consists of a quarry covering ca.3.3ha. There has been a long history of quarrying associated with the Permitted Area based principally on permission 83/09, although evidence exists of pre-1963 origins. The Permitted Area along with the overall Registered Area has been in the possession of the Applicant since 2006 and has continued to be in regular use since this purchase.

The contour survey of the Permitted Area (see Appendix 3-1) indicates an average extracted depth to ca.105 m above ordnance datum (maOD[2]). The average ridge height is 130maOD. The Registered Area entrance extends into the north-western portion of the Permitted Area. An access route extends in a south easterly direction by the office, canteen, wheel wash and weighbridge. The workshop and associated settlement tanks are located in the north central portion of the Permitted Area. The crushing and screening plant and hot-mix macadam manufacturing plant are located in the south-eastern portion of the Permitted Area. The settlement ponds are located in the western portion of the Permitted Area. The Permitted Area generally comprises of a quarry floor with haul routes extending to the aforementioned plant and equipment. See Figure 3-1 below.

[2] Unless otherwise stated all elevations are relevant to Malin Head datum.

**Figure 3-1: Site Infrastructure**




### 3.2.1 Historic Activities

The preparation of the Permitted Area involved the removal of topsoil and overburden, the planting of the treeline along the L6280 and the initial opening of the ground. The Permitted Area has been and is excavated by blasting. This requires the working rock face to be intermittently prepared by a drilling rig prior to controlled blasting to break/shatter a given portion of rock face. During and after a blasting event, the area would be 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 consists of the breaking of the blast rock and the repeated crushing and screening of the aggregate to produce the required aggregate sizes. This requires the use of various plant such as tracked excavators, rubber tyred loading shovels and a variety of crushers and screeners. In 2014, the Applicant applied for and was granted planning permission for a crushing facility on the floor of the Permitted Area (planning reference 14/124 – see Chapter 2 for further details) which included:

- Two (2No.) crushers;
- Screening plant;
- Conveyors;
- Feeding chute;
- Mobile stacker;
- Supporting structure;
- Mobile concrete batching plant and
- Storage facility.

Crushed and screened aggregate is stockpiled prior to removal from the quarry or use in the hot-mix manufacturing operation. The Site produces aggregate chippings for use in surface dressing and macadam, four or more different grades of crushed stone (for fill) and aggregates tailored to customer requirements. The crushing plant was powered by a 450 kva diesel generator but is now powered from the grid via an ESB sub-station located close to the entrance gate.

In previous years, the excavated and processed volumes of aggregates from the Registered Area have been up to 350,000 tonnes per annum.

#### 3.2.1.1 Crushing and Screening

Blasted rock must be processed for suitability for either the production of aggregate chip or the production of macadam. This process is carried through a system of crushing and screening as outlined below.

Blasted rock is moved from the quarry floor by use of a 30-ton excavator and loaded into the primary crusher. This includes a screened floor that allows the removal of fines (quarry dust) prior to crushing.

After the primary crushing process, the rock is sent by conveyor to the scalping screen. This consists of a feed hopper and a screen-box. A scalping screen will have at least two screen decks within the box. The box will be mechanically vibrated to convey the material downward. The material is then sorted into sizes by virtue of the internal screen decks.

Two conveyors are used to remove the fines and mid-sized rocks to each side. A mobile stacker can then accept the discharged material and stock-pile it for later use. Out-size rocks are sent forward to the secondary, mobile, crusher or can be stock-piled outside the main crusher for later processing.

All material can be looped back into the system if it is not of a suitable size. The mobile stacker can also be used at the entry or exit points on the secondary crusher.

#### 3.2.1.2 Production of High PSV Aggregate

Polished Stone Value (PSV) is a measure of the resistance of an aggregate to polishing. A high PSV value indicates an increased resistance to the polishing action of vehicles tyres passing over an aggregate road surface, resulting in improved skid resistance. An aggregate's PSV is needed in order to determine its suitability for use in surfacing asphalt or in surface dressing (i.e., the renewing of a road surface with bitumen and aggregate chippings) [23]. Testing the PSV of an aggregate is carried out in accordance with international standards such as NS812 Part 14:1989 [23].

The Client produces high PSV aggregate suitable for surface dressing chips which are assessed annually by the National Standards Authority of Ireland (NSAI) to ensure compliance with the necessary standards.

#### 3.2.1.3 Macadam Plant

As of 2015, the Permitted Area also includes a hot-mix macadam plant (planning ref 15/113 – see Chapter 2 for further details) on the quarry floor. This consists of:

- Bag house filter;
- Hot stone dryer;
- Cold feed aggregate bins;
- Hot mix storage facility;
- Screen and mixing tower;
- Bitumen tanks;
- Control cabin;
- Fan;

- Chimney; and
- Dust reclamation system.

The aggregate used within the hot-mix macadam plant is substantially sourced from the quarry. Bitumen, some stone and small volumes of limestone are imported to the quarry for use in the macadam plant by HGV. Imports also include burner fuel and road fuel (imports require ca. 2 HGVs deliveries per day – see Chapters 9 (Air Quality) and 13 (Traffic and Transport)). The finished product is discharged from the plant directly into delivery vehicles for removal off-site. The Applicant produces five bituminous products:

- Asphaltic concrete/macadam
- Stone mastic asphalt (SMA)
- Hot Rolled Asphalt (HRA)
- Porous Asphalt
- Surface Quickfix

The plant was designed with a capacity of 60 – 80 tonnes/hour. Prior to the installation of the ESB sub-station in 2019, the macadam plant was powered by a 300 kva diesel generator.

### 3.2.2 Current Activities

Following identification and confirmation of planning issues at the Site, work at the Registered Area has been restricted to the Permitted Area until the Site (the subject of this application for substitute consent) is regularised and further authorised for prospective development. The historic activities of blasting, processing and roadstone production have continued, but at a reduced scale.

## 3.3 The Development and Associated Activities

The Development is an extension to the southwest of the Permitted Area. It covers an area of ca. 5.6 ha. Topsoil and overburden have been removed over time as the excavated area has expanded.

The contour survey of the Development (see Appendix 3-1) indicates an average extracted depth to 105 maOD. The average ridge height is 130maOD.

No quarrying activities, such as stripping, blasting crushing or screening has occurred within the Site since the Applicant was informed of the need for regularisation. The last working blast took place in April 2021.

### 3.3.1 Historic Activities

During the operations within the Site, the Development consisted of rock. This is carried out by blasting (see section 3.2.1 above) before the blast rock is removed to the Permitted Area for processing. The following mobile equipment was operational as part of the 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
- One (1) x Volvo L180 Wheel Loader

This plant has all been high-specification, highly efficient and fuel-efficient.

## 3.4 The Registered Area

### 3.4.1 Staffing Numbers

During the years of production within the expanded Registered Area, 15-20 persons were employed for on-site operations and 5-6 persons for the off-site crew.

### 3.4.2 Screening

The north-eastern boundary consists of a high bank, separating the Site from the road. To the south and southeast, the road climbs and the Site is partially visible.

To the west, local road L62801 runs north-south ca. 500m from the Site but the land to the immediate east of the road rises. To the north, the Site boundary includes trees and bushes.

To the east, the land-use is largely agricultural, and natural undulating topography screens the Site. Further details on visual impact assessment are presented in Chapter 11.

### 3.4.3 Drainage

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.

### 3.4.4 Fuel and Oil Storage

Fuel is stored within a purpose-built bunded tank inside a covered garage. All on-site mobile plant and equipment and HGVs 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. Drainage from this area feeds into the settlement tanks situated beside the quarry offices (see Figure 3-1 above and section 3.5 below) which flows into an interceptor prior to discharge.

Oils and other maintenance liquids are stored in the main site garage close to the Registered Area boundary, on hard-standing, in barrels and other bunded/double-skinned/drip-tray containers.

Any oil or lubricant changes or routine servicing of wheeled or tracked plant are undertaken within suitable garage facilitates, within the Registered Area boundary.

### 3.4.5 Wheel wash

The wheel wash comprises a concrete lined depression measuring 9.3m by 3.7m. The intercepted runoff from the extraction floor forms its source of supply. During prolonged periods of dry weather, the wheel wash can be topped up using the mains water supply. The wheel wash is routinely maintained through clearance of silt using an excavator.

### 3.4.6 Safety and Security

The L6280 forms the north-eastern boundary of the Registered Area. This boundary is secured partly by a palisade fence and partly by a high bank with trees and low-growing bushes on the road-ward side of the bank. The remaining boundaries consist of ditches and trees. There is only one entrance, onto the L6280, which is secured by a lockable gate. There is safety signage erected along the site boundary at relevant locations. The Registered Area includes internal lighting and security cameras. See Figures 3-2 to 3-4 below.

**Figure 3-2: Registered Area Entrance Gate from Northern Approach**

**Figure 3-3: Registered Area Security Fence and Hot Macadam Plant**

**Figure 3-4: Roadside Warning Sign on Northern Approach to Quarry**


### 3.4.7 Working Hours

Operational hours associated with the Registered Area are:

- Monday to Friday 08:00 – 18:00
- Saturday 08:00 – 14:00; and
- Sunday & Public Holidays closed.

## 3.5 Utilities

### 3.5.1 Electricity

There is an ESB sub-station adjacent to the Registered Area entrance to provide mains electricity. Prior to the installation of the substation in 2019, the concrete crushing plant and macadam plant were powered by a 450 kva and 300 kva diesel generator respectively.

### 3.5.2 Water Supply

Potable water is supplied via mains water, with sewerage being provided via septic tank (SR6). Process water is supplied by harvested stormwater from lagoons with recycling maximised.

### 3.5.3 Stormwater Drainage

The quarry floor slopes at a shallow gradient towards the northwest, towards the Registered Area entrance [24]. All run-off within this area (including tracks from higher ground) of the Registered Area drains overland via informal channels and large puddles. The run-off is intercepted either by the wheel wash or yard interceptor drain.

The yard interceptor drain comprises 20m by 0.7m wide, ca. 0.1m deep linear drain covered with removable metal grate [24]. The yard interceptor drain discharges to an informal open channel at its eastern end, where run-off flows to settlement tanks (see section 3.5.5 below) via a 150mm pipe [24].

Further details on this discharge are provided in Chapter 8 Water.

### 3.5.4 Receiving Waters

The receiving surface water is a drainage ditch which connects into the Briscarnagh Stream (IE_NW_36G750800, segment code 36_964), flowing in a southeast to northwest direction approximately 450m east-northeast from the Registered Area.

The Briscarnagh feeds into the Killyfargy (IE-NW_36G750800, segment code 36_1304) approximately 500m northeast of the Registered Area. 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 the Lough Erne system before entering Donegal Bay.

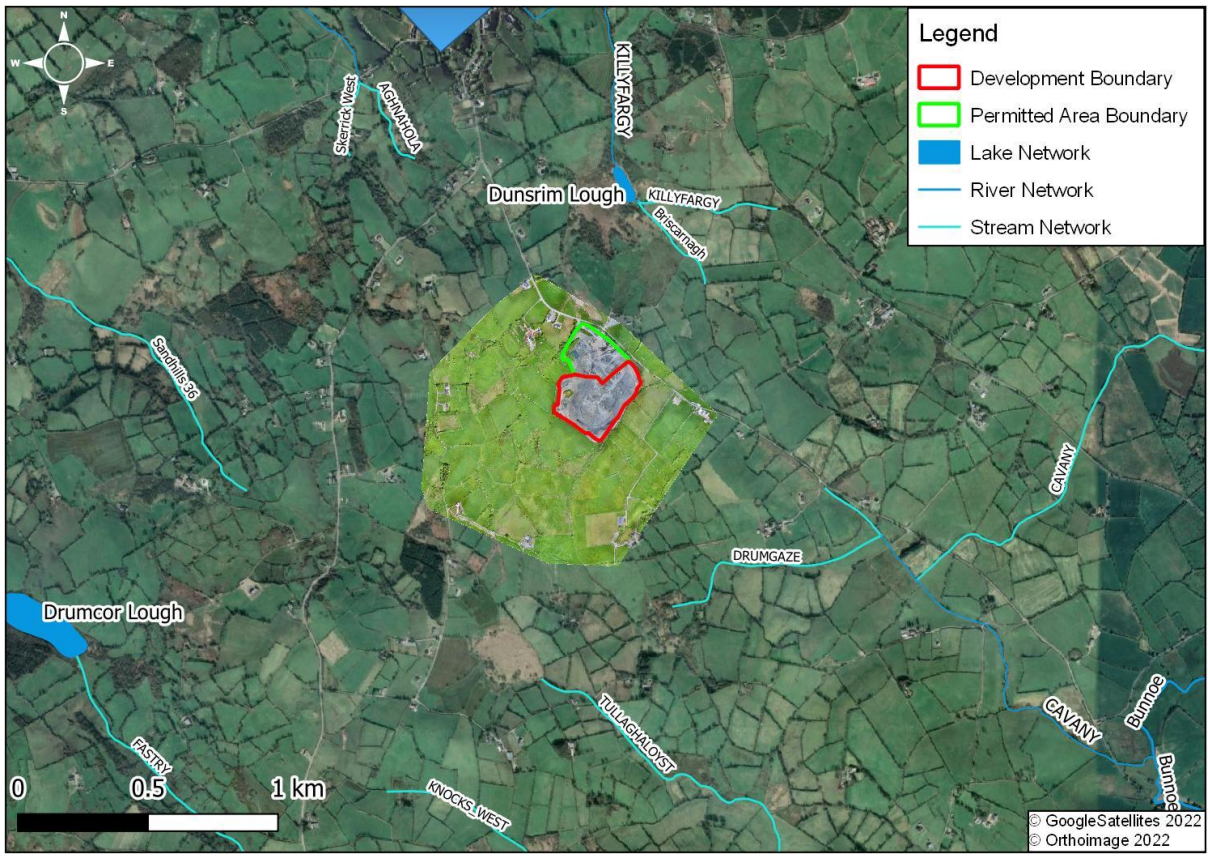
### 3.5.5 Trade Effluent Drainage

There is no sewer connection for trade effluent, but the Site was granted a discharge licence from MCC in respect of trade effluent (WP26/15) following the granting of planning ref 14/124. This licence permits trade effluent comprising overflow from the following processes/sources:

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

The effluent is collected and contained within a series of linked settlement tanks close to the north-eastern boundary of the Permitted Area. These comprise a concrete lined pit with a surface area ca. 230m$^2$ with raised sides, divided into 4No. equal sections by interior walls. Water enters the tanks at the north-west end and discharges to the south-east via a hydrocarbon class interceptor. After passing through the interceptor, discharge from the settlement tanks flows via a buried 150mm pipe to an open roadside drain on the exterior of the boundary fence. The drain flows to the northwest, being culverted beneath the local road, and flows through agricultural land to eventually discharge to a wetland area prior to entering Dunsrim Lough (Refer to Figure 3-5 below).

**Figure 3-5: Hydrogeological Context of Site**




## 3.5.6 Foul Water

There is a portable toilet stationed just inside the entrance gate (within the Permitted Site). There is also a septic tank opposite the site office within the Permitted Site. This is gravity-fed by an underground pipe and takes foul water from the hygiene facilities inside the office and from the canteen. Both are emptied on an as-needed basis by appropriate contractors.

## 3.5.7 Local Potable Water

There are numerous private wells around the Site (see Chapter 8 – Water). Properties to the south of the Registered Area are largely dependent on private wells for water supply. The village of Scotshouse is within a public supply source protection area, with the Outer Protection Area lying ca. 1 km north-northwest from the Registered Area.

## 3.6 Restoration and Aftercare

Following the S261 registration, an after-care plan was created for the whole Registered Area. A further after-care plan has been created for the Substitute Consent area as it stood when work ceased in this area in 2021. Both these plans were submitted to the relevant planning authority.

No part of the Site has undergone any restoration at the time of writing (March 2023), pending this application to regularise the site and any further works including restoration and/or further prospective permission for future quarrying.

Any future restoration will be carried out in accordance with then-current best practice guidelines and in compliance with relevant legislation. For consistency, a restoration plan, incorporating the plans submitted to date, has been supplied in Appendix 3-3. The Applicant will work with MCC to best implement the final site restoration of the Site in line with the agreed plan.

It is envisaged that the restoration phase will take ca. 24 months to complete.

## 3.7 Existing Compliance Measures

The Permitted Area (original consent 83/09) set out conditions which included requirements for the suppression of dust, limits on noise levels, the prohibition of surface water flow onto the public road, the storage of topsoil against future site restoration and the planting of native trees/retention of hedges to act as a screen.

The conditions regarding dust and noise were re-stated when the quarry was registered under S261(6)(a)(ii): -

> *"2.a) Adequate measures shall be taken for the suppression of dust at any point of emission.*
>
> *b) The dust outfall measured at any point at the site boundaries shall not exceed 150mg/m$^2$*
>
> *c) 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 shall not exceed 45 dB(A) rated sound level at any point along the boundaries of the development."*

The area covered by the 1983 planning permission lay within a larger area under the same ownership. The field boundaries of this larger area were delineated by hedges and shrubs. As the excavated area has expanded, it has remained within the same ownership boundary. The field boundaries have therefore functioned as a screen between the quarry and the surrounding fields and the line of trees along the road has screened the quarry from road-users. Moreover, there is a wheel wash within the Permitted Area. All HGVs leaving the Registered Area traverse this to mitigate potential impacts from track-out onto the public road.

# 4 ALTERNATIVES CONSIDERED

## 4.1 Introduction

Schedule 6 of the Planning and Development Regulations, 2001 (S.I. No. 600 of 2001), as amended requires an EIAR to contain:

> "*A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the Proposed Development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the Proposed Development on the environment.*"

This Chapter assesses the alternative options considered by the Applicant when deciding to progress with the Development and outlines the following alternative considerations:

- Location;
- Layout and alternative and Design; and
- Alternative responses to enforcement.

Although this is a rEIAR, which is retrospective in nature, the alternatives considered here are from the perspective of the Applicant when deciding to progress with the Development.

## 4.2 Alternative Location

The Site comprised agricultural land that offered a suitable and appropriate location for the extraction of aggregates derived from greywacke. As previously presented, this type of aggregate is of national importance given the shortage of friction course resources across the country. The nearest high PSV source in regular production is in north Longford, with lesser quality materials available elsewhere in the north-east. In order to maintain future supply, alternative site locations were not readily available.

## 4.3 Alternative Layout

Potential does exist for an alternative layout within the Site. The primary crusher could have been positioned within the Permitted Area adjacent the secondary and tertiary crushers, thereby removing these activities from the Site and concentrating them in the Permitted Area.

However, industry standard is to operate a mobile primary crusher which moves in tandem with the active quarry face. This is the optimal approach and as such, in keeping with Applicants commitment to continuously optimising operations.

## 4.4 Alternative Responses to Enforcement

### 4.4.1 Obtain Substitute Consent

The Client's preferred option is to obtain substitute consent. This regularisation of the Registered Area would be in alignment with the policies and objectives of national, regional or local plans (refer to Section 2.4) and would ensure the future viability of the quarry with its valuable natural resources protected for suitable use.

The granting of Substitute Consent would recognise that the historic development was conducted in a manner that did not significantly impact the environment and is not negatively impacting the natural environment and would mean that the historic works would be deemed to have been permitted. This will therefore enable a coherent approach to either future restoration or to future development, subject to further planning authorisations.

### 4.4.2 Complete Restoration

MCC sent a Warning Letter dated 2nd October 2019 to the Applicant under Section 152 of the Planning and Development Act 2000. An enforcement notice was subsequently issued on the 2nd of June 2020. In brief, this letter instructed the applicant to cease all extraction activities

within the Site, agree a restoration plan with MCC, and complete all restoration works within two years thereafter. Although a plan was progressed, further correspondence between the Applicant and the Council has enabled the current approach towards Substitute Consent to authorise the historic works.

The closure and restoration of the Site would result in the cessation of the operations within the Permitted Area, leading to the loss of local jobs and the supply of aggregate from the quarry. The Site has a proven record as a supplier of nationally important resources of high PSV aggregates. The closure of the Site would remove aggregates from circulation, potentially exacerbating national supply issues. Additionally, the loss of this established quarry could lead to a greenfield site elsewhere being opened to extraction as an alternative source, leading to habitat loss.

### 4.4.3 Do Nothing Option

The 'Do Nothing' option does not exist in this situation, as the planning situation requires regularisation. The closest solution is the restoration of the Site – see Section 4.4.2 above.

# 5 POPULATION AND HUMAN HEALTH

## 5.1 Introduction

This chapter of the rEIAR provides a description and assessment of the likely impacts of the Development in terms of population and human health.

The local or receiving population comprises a significant element of the overall environment. In carrying out development, 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 development.

## 5.2 Methodology

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

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 (IPH): Health Impact Assessment Guidelines 2021 [25]
- Institute of Environmental Management and Assessment (IEMA) Health Impact Assessment in Planning, *Impact Assessment Outlook Journal*, Vol 8: October 2020 [26]
- IEMA: Health in Environmental Impact Assessment, A Primer for Proportionate Approach (2017) [27]
- IEMA: Effective Scoping of Human Health in Environmental Impact Assessment (2022) [28]
- IEMA: Determining Significance for Human Health in Environmental Impact Assessment (2022) [29]
- International Association for Impact Assessment (IAIA) and European Public Health Association (EPHA): Human Health – Ensuring a High Level of Protection (2020) [30]
- EPA: Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022) [7]

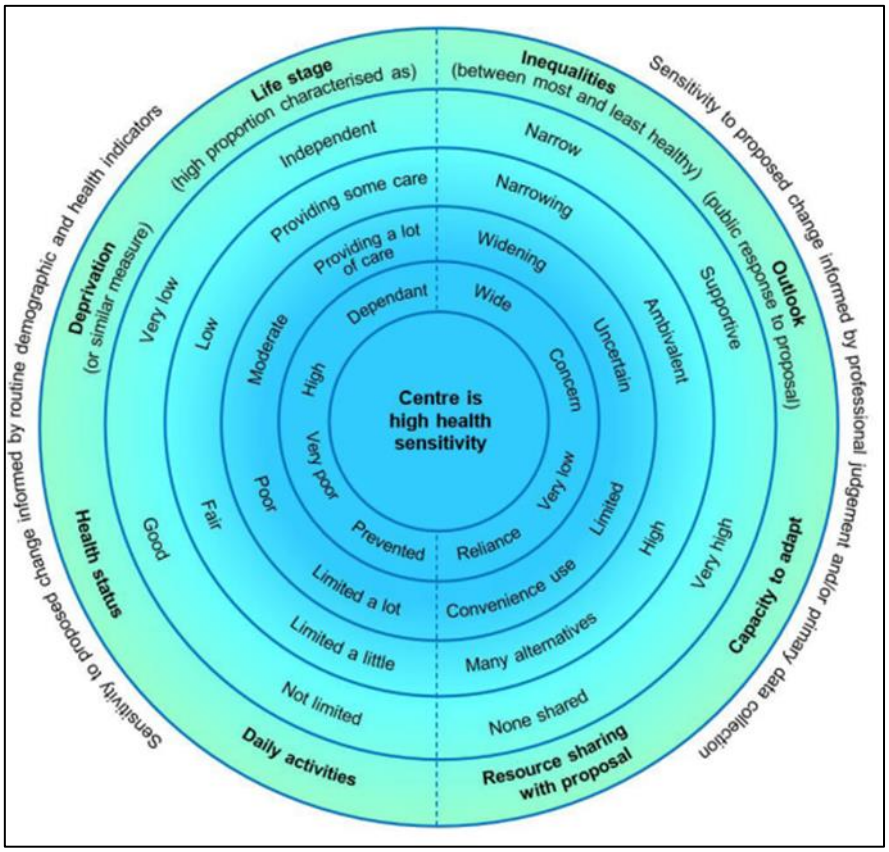
### 5.2.1 Health Sensitivity

In accordance with the IPH guidance, the health sensitivity of the local population was determined following the methodology set out in *Part 4: Analysis tools and resources* of the guidance [25] and summarised in Figure 5-1 below. The sensitivity in each factor was considered 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 the analysis are set out in section 5.3.6 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 2006, 2011 and 2016 [31]
- CSO Census Mapping Small Area Population map [32]

**Figure 5-1: Health Sensitivity Conceptual Model**




## 5.3 The Receiving Environment

### 5.3.1 Population

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 Electoral Districts (ED) within each County.

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

### 5.3.2 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 177031001 Small Area (SA), with the extent of SA 177031001 shown in Figure 5-2 below. The CSO population statistics from the 2006, 2011 and 2016 census data are set out in Table 5-1 below [31] with the figures for the relevant ED, LEA, County and State also shown for context. The population change between each census date and over the period 2006 – 2016 is also shown. The 2021 census was delayed until 2022 due to the COVID pandemic and therefore the 2022 figures are not available at the time of writing (February 2023).

The low population reflects the predominantly rural nature of the locality. The population of the immediate area has declined since 2011 but the population of the wider ED has increased slightly.

**Figure 5-2: SA 177031001**

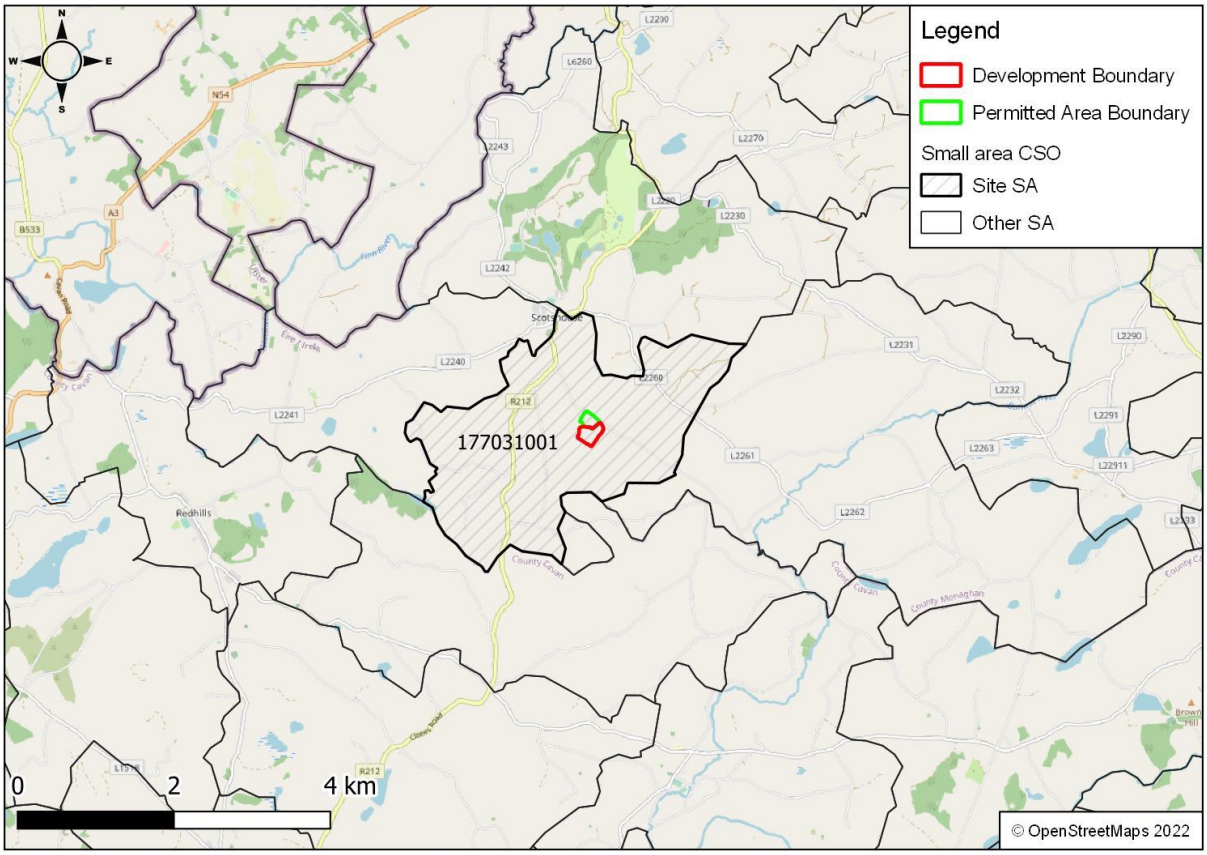



**Table 5-1: Population Statistics (2006-2016) for SA177031001**

| Area | 2006 | 2011 | 2016 | % Change 2011-2016 | % Change 2006-2016 |
|---|---|---|---|---|---|
| **Small Area 177031001** | 206 | 221 | 203 | -8.14% | -1.5% |
| **Currin ED** | 559 | 660 | 676 | +2.42% | +20.9% |
| **Ballybay-Clones LEA** | 10,491 | 11,326 | 18,495 | +63.3% | +76.3% |
| **Monaghan** | 55,997 | 60,483 | 61,386 | +1.5% | +9.6% |
| **Ireland** | 4,239,848 | 4,588,252 | 4,761,865 | +3.8% | +12.3% |

*LEA changed between 2014 and 2019 – the 2014 boundaries have been used for consistency

### 5.3.3 Local Population

The nearest population centre to the Site is Scotshouse village, which lies at the juncture of SA177031001, SA177031002 and SA177031003. Table 5-2 below shows key statistics in relation to the population of SA177031001 and Scotshouse Village, taken from the CSO 2016 Census Mapping Small Area Population map [32]. Please note that the population figures of SA177031001 and Scotshouse Village overlap to an unknown extent. The County Monaghan and Ireland figures are given for comparison.

**Table 5-2: Local Population Statistics for SA177031001 and Scotshouse Village**

| Dataset | Small Area 177031001 | Scotshouse Village | Co. Monaghan | Ireland |
|---|---|---|---|---|
| Registered Permanent Households | 77 | 79 | 21,689 | 1,702,289 |
| Unoccupied Buildings | 21 | 17 | 3,620 | 296,192 |
| Population No (Male/Female) | 203 (98/105) | 220 (110/110) | 61,386 (50.3/49.7) | 4,761,865 (49.4/50.6) |
| Age Breakdown (%) | | | | |
| Aged 0 – 9 | 15.8% | 30.5% | 15.63% | 14.43% |
| Aged 10 – 14 | 4.9% | 5.0% | 7.11% | 6.71% |
| Aged 15 – 19 | 6.9% | 2.3% | 6.54% | 6.36% |
| Aged 20 – 24 | 3.9% | 5.5% | 4.85% | 5.75% |
| Aged 25 – 64 | 47.8% | 48.2% | 51.9% | 53.37% |
| Aged 65 – 80 | 14.8% | 4.1% | 10.52% | 10.27% |
| Aged 80+ | 5.9% | 4.5% | 3.45% | 3.12% |
| % with Irish/UK Nationality | 98.9% | 89.9% | 89.43% | 89.25% |
| % Identifying as White Irish | 97.85% | 88.9% | 85.63% | 82.18% |
| % Identifying as Irish Traveller | 0% | 0% | 0.45% | 0.66% |
| % of: | | | | |
| 1 person households | 28.6% | 26.6% | 23.74% | 23.49% |
| >1 adult households | 59.7% | 54.4% | 60.72% | 58.56% |
| Single-parent households | 7.8% | 13.9% | 11.87% | 11.66% |
| % Owner/Occupiers (population) | 93.6% | 47.5% | 72.96% | 67.6% |
| % Renting (population) | 3.4% | 49.3% | 22.76% | 27.66% |
| (Private Landlord) | (3.4%) | (40.3%) | (14.17%) | (18.24%) |
| (Local Authority/Housing Body) | (0%) | (9%) | (8.59%) | (9.42%) |
| % with Central Heating: | 98.7% | 97.5% | 95.45% | 96.2% |
| (Oil-Fired) | (84.4%) | (94.9%) | (76.26) | (40.41%) |
| (Coal-Fired) | (5.2%) | (1.3%) | (6.98%) | (5.1%) |
| (Wood-Fired) | (6.5%) | (0%) | (2.32%) | (2.0%) |
| (Electric-Fired) | (0%) | (1.3%) | (3.94%) | (8.62%) |
| (Gas-Fired) | (0%) | (0%) | (5.96%) | (33.53%) |
| % with confirmed water supply | 100% | 96.2% | 96.56% | 95.77% |
| (Mains Water Supply) | (32.5%) | (88.6%) | (43.83%) | (76.97%) |
| (Private Water Supply) | (61.0%) | (1.3%) | (14.38%) | (10.13%) |
| (Group Scheme) | (6.5%) | (6.3%) | (38.35%) | (8.67%) |
| % with Stated Sewerage | 97.4% | 97.5% | 95.92% | 95.28% |
| (Mains Sewerage) | (16.9%) | (88.6%) | (40.49%) | (65.88) |
| (Septic Tank) | (74.0%) | (8.9%) | (48.72%) | (25.82%) |

| Dataset | Small Area 177031001 | Scotshouse Village | Co. Monaghan | Ireland |
|---|---|---|---|---|
| Educational Level Reached 15+: | | | | |
| % No Formal Education | 1.4% | 2.4% | 2.5% | 1.69% |
| % Primary School | 26.4% | 13.8% | 14.52% | 10.8% |
| % Lower Secondary | 25.7% | 12.2% | 18.81% | 14.53% |
| % Upper Secondary | 15.7% | 21.9% | 17.97% | 18.53% |
| % Third Level + | 12.8% | 16.3% | 20.57% | 28.46% |
| % With a Disability | 16.7% | 11.4% | 11.75% | 13.51% |
| % Working Age Unable to Work (Illness/Disability) | 1.2% | 2.1% | 4.29% | 4.22% |
| % Caring for Disabled Person | 5.9% | 5.9% | 4.22% | 4.1% |
| Health: | | | | |
| Very Good/Good | 85.2% | 86.8% | 87.62% | 87.02% |
| Fair | 12.3% | 6.4% | 8.57% | 8.04% |
| Bad/Very Bad | 0.9% | 0.9% | 1.36% | 1.61% |

### 5.3.3.1 Pobal Information for SA177031001

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 [33]. Deprivation is categorised into eight bands from 'extremely affluent' to 'extremely disadvantaged'. Small Area 177031001 is categorised as 'marginally below average'. Table 5-3 below sets out the relevant factors drawn from the 2006, 2011 and 2016 census results.

**Table 5-3: Deprivation Indices for SA177031001 (2011 and 2016)**

| Indicator | 2006 Census | 2011 Census | 2016 Census |
|---|---|---|---|
| SA177031001 | | | |
| Pobal HP Index | -2.9 | -7.4 | -5.3 |
| Pobal HP Description | Marginally below average | Marginally below average | Marginally below average |
| Age dependency ratio (%)* | 36.4 | 38.5 | 41.38 |
| Primary Education only (%) | 43.0 | 35.0 | 29.0 |
| Third Level Education (%) | 13.3 | 15.3 | 17.78 |
| Local Authority Rented (%) | 1.4 | 0.00 | 0.00 |
| Unemployment Rate – Male (%) | 1.7 | 21.1 | 5.88 |
| Unemployment Rate – Female (%) | 2.7 | 8.5 | 5.41 |
| County Monaghan | | | |
| Pobal HP Index | -3.06 | -3.97 | -3.23 |

| Indicator | 2006 Census | 2011 Census | 2016 Census |
|---|---|---|---|
| Pobal HP Description | Marginally below average | Marginally below average | Marginally below average |
| Age dependency ratio (%) | 33.25% | 34.64% | 36.41% |
| Primary Education only (%) | 25.11% | 21.37% | 17.96% |
| Third Level Education (%) | 21.6% | 21.53% | 26.07% |
| Local Authority Rented^ (%) | - | - | 7.83% |
| Unemployment Rate – Male (%) | 7.82% | 24.25% | 14.2% |
| Unemployment Rate – Female (%) | 7.63% | 15.85% | 12.93% |

*Ratio of dependents (people aged 0-15 and 65+) to the working-age population. Shown as the proportion of dependents per 100 working-age population. High ratios indicate a higher support burden on the working population. The 2016 figure for Ireland as a whole is 52.7% [31] [20]

^Taken from CSO figures as Pobal does not hold the data at this level

#### 5.3.3.2 Scotshouse Village

Comparable data for Scotshouse Village itself is not available, as the Small Area is the narrowest data sample used by Pobal. However, census data shows that:

- A total of 56% of the village population are working-age adults (15 – 64 years), which is lower than the national average.
- The percentage of single-parent families is slightly above the national average.
- Although the percentage of households in Local Authority/Housing Association accommodation matches the national average, the proportion in private-rented housing is twice the national average.
- Although the percentage of the population with education only to lower secondary-level is close to the national average, the percentage with education no further than primary school is almost 50% higher than the national average, and the percentage with a third-level qualification is nearly 43% lower than the national average.

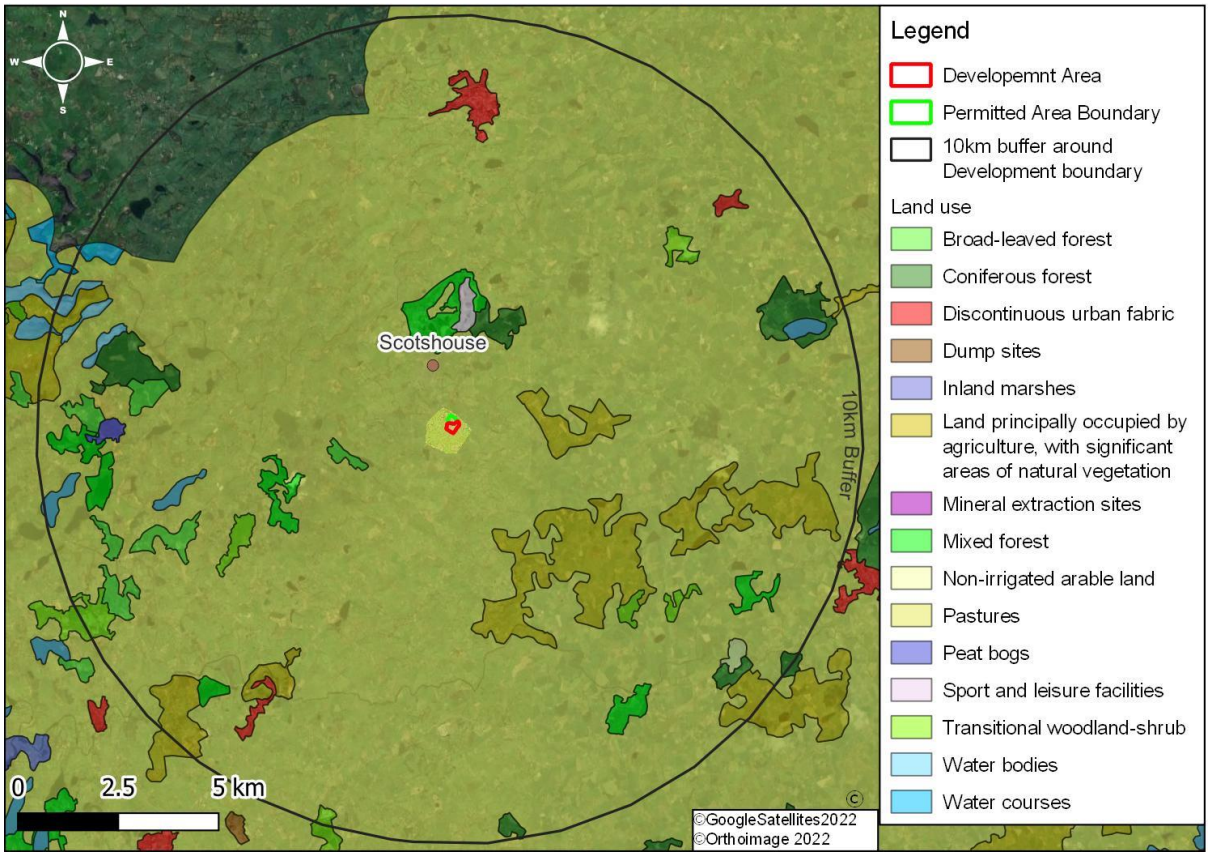
Some additional data is available from the Scotshouse Community Plan, which was produced by MCC, released in draft format in November 2018 [34] and in final form in November 2019 [35]. This indicated that:

- 27% of households had no internet access, against a 2018 national average of 11% [36]
- 21.5% of households had no car, against a national average of 18.1% [20].

### 5.3.4 Surrounding Land Use

The surrounding land use is predominantly agricultural (pasture and crops), with expanses of broad-leaved/coniferous/mixed forest and small water bodies. There are also scattered individual dwellings, agricultural businesses (e.g., poultry and pig farms) and individual rural businesses, such as a golf club and B&Bs as well as more urban land use such as Scotshouse Village and small local towns. Figure 5-3 below shows the land-use map.

**Figure 5-3: Land Use Within 10km Of Registered Area**




The nearest towns are:

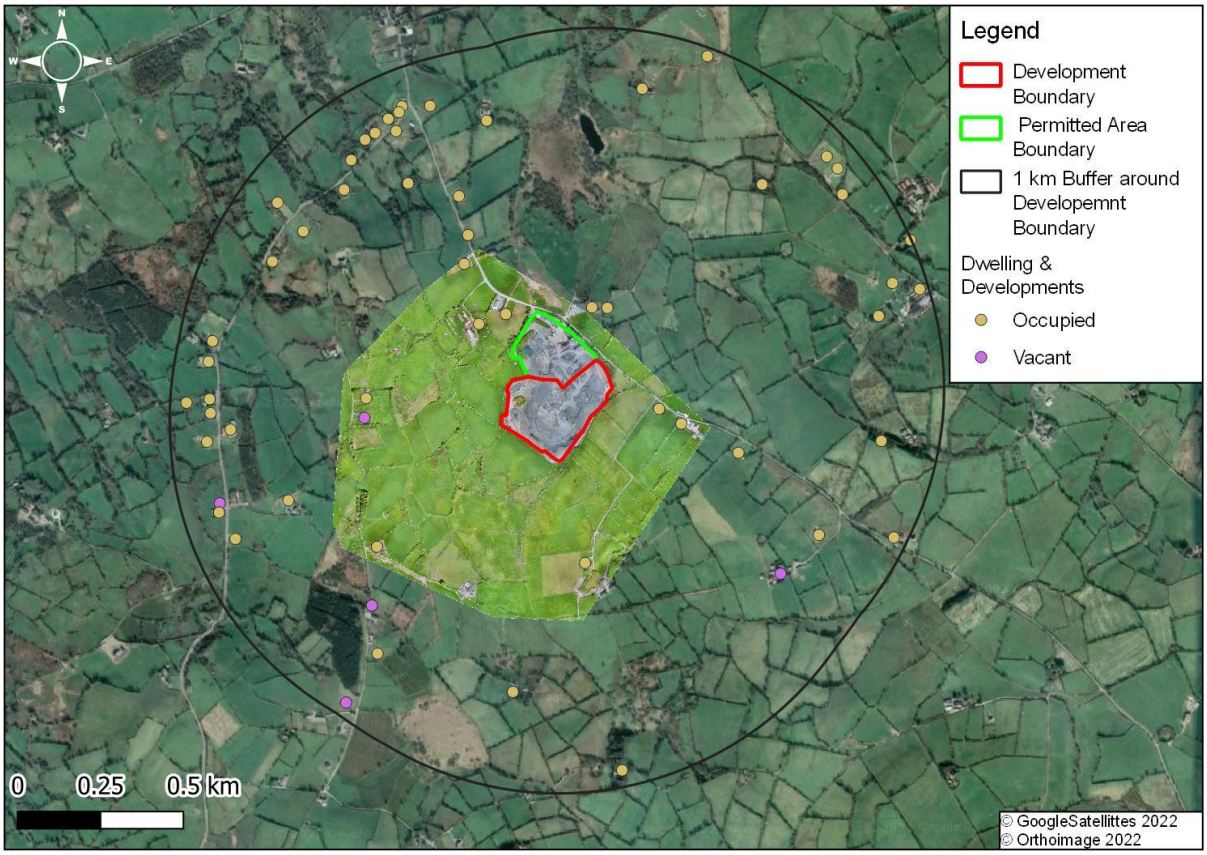
- Clones Town (8km to the North),
- Cootehill Town (10km to the Southwest),
- Belturbet Town (11km to the West),
- Cavan Town (23km to the South)
- Monaghan Town (29km to the Northeast),

The closest settlement is the village of Scotshouse. The village proper is 1.5km away by road, lying to the north-northwest of the Registered Area. The village boundary is 0.7km away. The village includes St Enda's National School (to the north of the village), a playground and community centre. Currin GAA club lies ca. 1.8 km to the northwest of the village on the edge of a wooded area including Coolnacarte Plantation and Mullaghmore Wood, which borders Clones Golf Club. The wooded area includes Hilton Lough and The Garden Lough. These both drain into the Annies Stream (IE_NW-36G750800, segment code 36_1550), which joins the Gortnana downstream of the Site.

In keeping with EIP1 in the MCDP [22] (see section 2.3.3.2 above), an examination of all dwellings and developments within 1km of the Registered Area was undertaken. The area is shown in Figure 5-4 below utilising data provided by Geodirectories in December 2022. The majority of Scotshouse village lies outside this boundary, meaning that within this area there are:

- 193 residential dwellings
- 12 buildings dedicated entirely to non-residential purposes and
- 39 buildings defined as being for "Crop and Animal Production, Hunting And Related Service Activities".

**Figure 5-4: Dwellings and Developments within 1km of Registered Area**




## 5.3.5 Economic Activity and Employment

The economic activity/employment figures from the 2016 census for the immediate SA and Scotshouse village against the wider region are outlined in Table 5-4 below [20]:

**Table 5-4: Principal Economic Status of Working-Age Population**

| Area | In Work | Student | Retired | Caring for home /family | Unemployed | Unable to work |
|---|---|---|---|---|---|---|
| SA177031001 | 52% | 11% | 24% | 10% | 3% | 1% |
| Scotshouse Village | 61% | 6% | 11% | 6% | 14% | 2% |
| Co Monaghan | 54% | 10% | 9% | 14% | 8% | 4% |
| National Average | 54% | 11% | 15% | 8% | 8% | 4% |

**Table 5-5: Occupations of Working-Age Population**

| Occupation | SA177031001 | | Scotshouse Village | | County Monaghan | | Ireland | |
|---|---|---|---|---|---|---|---|---|
| | Number | % | Number | % | Number | % | Number | % |
| Administrative and Secretarial Occupations | 9 | 10.3% | 8 | 7.7% | 2,607 | 9.0% | 230,639 | 10.0% |
| Associate Professional and Technical Occupations | 9 | 10.3% | 7 | 6.7% | 1,855 | 6.4% | 250,268 | 10.9% |
| Caring, Leisure and Service Occupations | 7 | 8.0% | 9 | 8.7% | 2,293 | 7.9% | 168,456 | 7.3% |
| Elementary Occupations | 8 | 9.2% | 14 | 13.5% | 2,896 | 10.0% | 203,183 | 8.8% |
| Manager/Director/Senior Officials | 6 | 6.9% | 4 | 3.8% | 1,902 | 6.6% | 170,934 | 7.4% |
| Process, Plant and Machine Operatives | 16 | 18.4% | 15 | 14.4% | 3,372 | 11.6% | 166,013 | 7.2% |
| Professional Occupations | 7 | 8.0% | 10 | 9.6% | 3,861 | 13.3% | 397,469 | 17.3% |
| Sales and Customer Service Occupations | 5 | 5.7% | 9 | 8.7% | 1,512 | 5.2% | 156,542 | 6.8% |
| Skilled Trade Occupations | 17 | 19.5% | 18 | 17.3% | 5,945 | 20.5% | 322,278 | 14.0% |
| Not Stated | 3 | 3.4% | 10 | 9.6% | 2,787 | 9.6% | 235,871 | 10.3% |
| **TOTAL** | **87** | **N/A** | **104** | **N/A** | **29,030** | **N/A** | **2,301,653** | **N/A** |

Of those of working-age (15-64 years), the breakdown by occupation for SA177031001 and Scotshouse Village is shown in Table 5-5 above against the over-all figures for County Monaghan and Ireland. The high percentage of process/plant/machine operatives and skilled tradespersons, both in the local population and relative to the County and national figures, reflects the importance of the construction and extraction industries in the area.

#### 5.3.5.1 Employment Opportunities in the Surrounding Area

Opportunities for employment exist within the vicinity of the Site in Clones Town (8km to the north), Cootehill Town (10km to the southwest), Belturbet Town (11km to the west), Cavan Town (23km to the south) and Monaghan Town (29km to the northeast), as well as in rural industries and smaller settlements around the area. One difficulty in accessing these employment opportunities is the low level of public transport across the area as a whole (although there is a daily commuter bus which links Scotshouse to Cavan in one direction and to Clones and Monaghan in the other, it runs only five (No5) times per day Monday-Saturday [22]). This increases the relative importance of local employment in rural settings such as these.

#### 5.3.5.2 Site Employment

The Development employed 20-26 people at the Site prior to enforcement proceedings and was therefore a sizeable local employer. This number has been reduced as the Applicant seeks to regularise the Site and this has had a negative impact on the local employment situation.

### 5.3.6 Human Health

#### 5.3.6.1 Sensitivity

The populations of the immediate Small Area (SA177031001) and Scotshouse Village were considered in terms of the categories given in Figure 5-1 above. The results of this consideration are set out in Table 5-6 below. The over-all sensitivity of both populations to any resulting impact was deemed to be ‘low’.

**Table 5-6: Consideration of Health Sensitivities in the Local Population**

| Criteria | Classification | Basis |
|---|---|---|
| **SA177031001** | | |
| Life Stage | Providing some care | Although the age-dependency ratio is below the national average, the % of people listed as carers is 50% above the national average, which increases the over-all care burden. |
| Deprivation | Low/Moderate | Pobal Description is “marginally below average” |
| Health Status | Good | The proportion of people reporting bad or very bad health is well below the national average |
| Daily Activities | Limited a little | 1.2% of people are unable to work due to illness/disability, much lower than national average but 16.7% over all have a disability which is above the national average and 5.9% are carers for someone with a disability. |

| Criteria | Classification | Basis |
|---|---|---|
| Inequalities | Narrowing | The number of people with education only to lower secondary level is much higher than the national average and the % with third-level qualifications is much lower than the national average. However, the % with only primary-level education has reduced across the 2006 to2016 censuses and the number with a third-level qualification has increased The unemployment rate for 2016 is much lower than the national average and the % of home-ownership is much higher than the national average |
| Outlook towards Proposal | Supportive to Ambivalent | The Development has been an important local employer since extractive work began, and no known complaints of nuisances have been lodged with MCC. |
| Capacity of health services to adapt | Very High | The Development was not a health-related project and did not create additional specific demands on the local heath infrastructure. |
| Resource sharing with the proposal | Many alternatives | The Site did/does not have high power or water demands. A high percentage of local residential properties have private water supplies and use oil-fired rather than electric-powered central heating. Traffic impact is outlined in Chapter 13 – Traffic and Transport |
| **Overall Score** | **Low** | |
| **Scotshouse Village** | | |
| Life Stage | Providing some care | Although the proportion of the local population aged 65+ is lower than the national average, meaning the requirement for support of the elderly is lessened, the proportion of the local population that is aged under-15 is higher than the national average, leading to a greater level of support needed for this age group. |
| Deprivation | Low/Moderate | Scotshouse Village lies at the juncture of three Sas, all of which are rated by Pobal as being 'marginally below average' in terms of advantage. |
| Health Status | Good | The proportion of people reporting bad or very bad health is on-par with the national average |
| Daily Activities | Limited a little | The proportion of the local population identifying as having a disability and the proportion of local adults who are unable to work due to a disability or illness is below the national average. However, the proportion of local adults who identify as caring for someone with a disability is higher than the national average. |
| Inequalities | Narrowing | The village has a high proportion of residents in rented accommodation, a low proportion of car-owners and, relative to the national average, a very low level of internet connectivity. The percentage with a low level of education is also higher than average. 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 [34]. |
| Outlook towards Proposal | Supportive to Ambivalent | The Development has been an important local employer since extractive work began, and no complaints have been lodged with the owner or with MCC. |

| Criteria | Classification | Basis |
|---|---|---|
| Capacity of health services to adapt | Very High | The Development is not a health-related project and will not create additional specific demands on the local heath infrastructure. |
| Resource sharing with the proposal | Many alternatives | The Site will not have high power or water demands. Traffic impact is outlined in Chapter 13 – Traffic and Transport |
| **Overall Score** | **Low** | |

## 5.4 Characteristics and Potential Impact of the Development

### 5.4.1 Population

The Development has enabled the Client to provide valuable local employment in a rural environment.

### 5.4.2 Human Health

There have been no complaints lodged to either MCC or the Applicant in respect of nuisance associated with the Development.

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 impacts arising from groundwater contamination due to the Development.
Chapter 9: Air Quality - An assessment of potential air pollution arising from both the Development and the entire Registered Area was carried out in this Chapter, with the conclusion of negligible effect from dust.
Chapter 10: Climate. An assessment of the impact of the Site on greenhouse gas emissions was carried out with the conclusion that emissions associated with the historic operations of the Development had no overall impact 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 impacts arising from the Site was carried out in this Chapter. No significant impacts were determined.
Chapter 12: Landscape and Visual. An assessment of the noise and vibration impacts arising from the Site was carried out in this Chapter. No significant impacts were determined.
Chapter 14: Material Assets – Traffic and Transport. An assessment of the noise and vibration impacts arising from the Site was carried out in this Chapter. No significant impacts were determined.

#### 5.4.2.1 Safety

The Health and Safety Authority (HSA) views the quarrying industry as a high-risk sector [37].

The use of on-site explosives to break quarry faces for processing has been carried out in a carefully controlled manner by expert specialist companies. No explosives have been stored on-site.

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)* [38] and this is the guidance document utilised by the HSA to determine safe working practices. Extraction activities associated with the Development have taken cognisance of this guidance document.

The Applicant has confirmed there have been no accidents or incidents associated with the Development.

#### 5.4.2.2 Unplanned Events

As with all similar developments, there is some risk that accidents at the Site or disasters outside the operator's control could result in a risk to the environment. There is no history of any unplanned event at the Site.

## 5.5 Proposed Mitigation Measures and/or Factors

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

- Chapter 3: Description of the Development
- Chapter 6: Biodiversity
- Chapter 7: Land, Soils and Geology
- Chapter 8: Water
- Chapter 9: Air
- Chapter 10 Climate
- Chapter 11: Acoustics (Noise and Vibration)
- Chapter 12: Landscape and Visual
- Chapter 13: Cultural Heritage
- Chapter 14: Material A–sets - Traffic and Transport

## 5.6 Cumulative and In-combination Effects

In combination with other businesses/enterprises in the area, the Registered Area 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. The impact on the population in terms of employment and the local economy, and the impact on the aggregate supply, can be considered as long-term, positive and moderate.

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 means that there are no cumulative impacts on the population or human health arising from the extractive industry – see Chapters 9 (Air Quality) and 11 (Noise & Vibration).

## 5.7 Interactions with other Environmental Attributes

Population and human health have the potential to be impacted positively or negatively by environmental issues. The relevant interactions with other key environmental factors are set out in section 5.4.3 above.

## 5.8 Indirect Impacts

The Development has a positive indirect impact in regard to continued local employment.

## 5.9 Residual Effect

The residual effect with regard to human health has been long-term and "imperceptible" to "not significant".

## 5.10 Monitoring

Certain environmental emissions with the potential to impact human health and wellbeing will be monitored. These are outlined in the relevant chapters.

## 5.11 Reinstatement

Following on from S261 registration, an after-care plan was created for the whole Site. A further after-care plan has been created for the Substitute Consent area as it stood when work ceased in this area in 2021. Both these plans were submitted to the relevant planning authority. See section 3.6 above and Appendix 3-3 for further details.

## 5.12 Difficulties Encountered

A common difficulty encountered throughout the rEIAR was the issue of attempting to identify potential historic impacts which may have once existed, but which are now absent or which may have reduced over time. Similar difficulties arose regarding the establishment of any historic periods when certain impacts may have become apparent only to subsequently abate.

The rEIAR has been limited by the availability, completeness and accessibility of publicly available data from the period of time applicable to the Development subject to the substitute consent.

# 6 BIODIVERSITY

## 6.1 Introduction

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

A remedial Appropriate Assessment Screening Report (rAASR) was prepared to accompany application for Leave to apply for Substitute Consent under Section 177C, which was processed and the findings of which accepted by the Board.

Please refer to Chapter 1 for a comprehensive overview of the Site location.

## 6.2 Study Assessment and 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 Guidance and Legislation

In addition to the EIA guidelines listed in Chapter 1 of this rEIAR, other reference documents used in this Chapter included the following:

- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (2018 and revisions) [39];
- Best Practice Guidance for Habitat Survey & Mapping (2011) [40];
- Interpretation Manual of European Union Habitats (2013) [41];
- Guidelines for the Protection of Biodiversity within the Extractive Industry [42]
- Flora species were assessed in accordance with their occurrence on the following:
- Flora (Protection) Order 2022 (S.I. No. 235/2022)
- Ireland Red List No. 10: Vascular Plants [43]
- Faunal species were assessed in accordance with their occurrence in the following:
- Wildlife Act 1976, (as amended)
- EU Habitats Directive (92/43/EEC) and the EU Birds Directive 2009/147/EC as transposed by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) as amended
- Article 17 Species Conservation Assessments [Volume 3] [44]
- Irish Red Data Lists [45]
- Birds of Conservation Concern in Ireland List [46] [47]
- Guidance Document on the strict protection of animal species of Community interest under the Habitats Directive. Commission Notice (2021) [48]
- Guidelines for the Treatment of Badgers Prior To the Construction of National Roads (National Roads Authority (NRA)) [49]

#### 6.2.1.1 Zone of Influence

The Chartered Institute of Ecology and Environmental Management [39] 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 [39] - 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. However, a wider Zone of Influence

was identified for designated sites aided by the EPA's Appropriate Assessment tool [50] to determine potential pathways e.g., hydrological.

#### 6.2.1.2 Study Area

In order to evaluate likely significant effects of historic operations on ecological receptors in the receiving environment, a number of survey area extents were required. These comprised the Registered Area(see Figure 1-1 above) 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. Refer to Table 6-1 below for ecological receptors and Study Areas.

### 6.2.2 Desk Study

#### 6.2.2.1 Review of Available Information

A review of available information, datasets and documentation sources pertaining to the ecology of the Development and the surrounding area was carried out to collate the available data on the receiving environment, including species and habitats of conservation importance in the study areas.

Information for the desktop study was also accessed from the following sources:

- Monaghan County Development Plan 2019-2025 [22]
- National Biodiversity Action Plan 2017-2021 [51]
- Monaghan Biodiversity & Heritage Strategic Plan 2020 – 2025 [52]
- Monaghan County Council Planning Enquiry System [53]
- National Parks and Wildlife Service (NPWS) website, maps and metadata [54]
- National Parks and Wildlife Service (NPWS) website Flora Protection Order Map Viewer – Bryophytes [55]
- National Biodiversity Data Centre (NBDC) website and 10 km grid square records for H41 and H51 [56]
- Environmental Protection Agency's (EPA) Mapping Information System [57]
- Teagasc Soil area maps [58]
- Inland Fisheries Ireland (IFI) [59] Inland Fisheries Ireland (IFI) [59]
- Geological Survey Ireland (GSI) area maps [60]Geological Survey Ireland (GSI) area maps [60]
- River Basin Management Plan for Ireland 2018 – 2021 [61]River Basin Management Plan for Ireland 2018 – 2021 [61]
- River Basin Management Plan for Ireland 2022 – 2027 (Draft) [62]River Basin Management Plan for Ireland 2022 – 2027 (Draft) [62]
- EIAR Biodiversity chapters for nearby development via the EIA Portal [63] EIAR Biodiversity chapters for nearby development via the EIA Portal [63]
- BirdWatch Ireland website [64]

**Table 6-1: Study Area Extents**

| Ecological Receptor | Study Area | Guidance/Literature |
|---|---|---|
| Designated –sites - European and National | European Sites appraised in rAASR. | A buffer of 15km (DoEHLG, 2009) was first examined using Geographic Information System (GIS) 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 [39]. |
| Habitats | The Site plus surrounding land parcels to 50m | Professional judgement and as per Best Practice [39]<br>Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes [65] |
| Watercourse | Discharge point to Dunsrim Lough and Briscarnagh Stream (where accessible) | Professional judgement and as per Best Practice [39] |
| Non-volent mammals | The Site plus surrounding land parcels up to 100m | NRA [49].<br>Scottish National Heritage: Surveying for Badgers: Good Practice Guidelines [66].<br>Guidelines for the treatment of otters prior to the construction of national road schemes (NRA) [67].<br>NPWS National Otter Survey of Ireland 2010/12 [68] |
| Bats | The Site plus surrounding land parcels | Bat mitigation guidelines for Ireland [69]<br>Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition) [70]<br>Bat Tree Habitat Key (BTHK) [71] |
| Avifauna | The Site plus surrounding land parcels | Countryside Bird Survey [72]<br>English Farm Woodland Bird Survey [73] |
| Amphibians / Reptiles | The Site plus surrounding land parcels | Surveying for amphibians. Tips, techniques and skills to help you survey for amphibians [74]<br>National Frog Survey of Ireland [75]<br>Irish Wildlife Trust National Reptile Survey [76]<br>National Reptile survey (ARC) [77] |

Furthermore, a comprehensive examination and comparison of historic aerial imagery, which is publicly available on GeoHive [78] and Google Earth was undertaken as a means of evaluating the expansion of the Site and the habitats which previously occurred within that area. The following base information mapping was evaluated:

Geohive:

- MapGenie Imagery 1995
- MapGenie Imagery 1999-2003
- MapGenie Imagery 2004-2006
- MapGenie Imagery 2005-2012
- MapGenie Imagery 2013-2018
- Digital Globe

Google Earth:

- 2009
- 2014
- 2015
- 2017
- 2020
- 2022

#### 6.2.2.2 Bat Landscapes

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. An analysis of the habitat and landscape associations of all bat species deemed resident in Ireland was undertaken and reported [79].

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 and it is that the model 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.

### 6.2.3 Field Survey

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

#### 6.2.3.1 Habitats and Flora

A Preliminary Ecological Appraisal (PEA) 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 22 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[3] with good visibility and gentle breeze[4].

Habitats were surveyed and classified according to Fossitt [80] and following best practice [40]. The dominant plant species present in each habitat type were recorded during the field

[3] https://www.metoffice.gov.uk/weather/guides/

[4] Force 1 on the Beaufort Scale. https://www.met.ie/forecasts/marine-inland-lakes/beaufort-scale

surveys and this is considered sufficient to allow accurate classification of the habitats present. Non-native invasive species were also noted and mapped within the study area in accordance with Property Care Association (2018). In addition to habitat identification, each habitat was assessed for its ecological significance, based on guidance provided in CIEEM [39].

### 6.2.3.2 Non-Volant Mammals

Mammal surveys were carried out as part of the PEA on 22 September 2022. 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 handheld GPS units subsequently digitised using GIS.

Surveys were undertaken in accordance with the following best practice guidance:

- Surveying for Badgers: Good Practice Guidelines. Version 1 [66].
- NRA (2009) 'Ecological Surveying Techniques for Protected Flora and Fauna During the Planning of National Road Schemes' [81]
- NRA, (2006). Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes. [49]
- NRA, (2008). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes. [67]
- JNCC (2004) 'Common Standards Monitoring Guidance for Mammals'. [82]
- NPWS (2013) National Otter Survey of Ireland 2010/12. [68]
- All-Ireland Squirrel and Pine Marten Survey 2019. [83]
- National pine marten population assessment 2016. [84].

Mammal identification and their field signs were undertaken with reference to a number of sources:

- Mammals of Britain: Their tracks, trails and signs [85];
- Badgers [86]
- The Badger and Habitat Survey of Ireland [87] and,
- How to find and identify mammals [88].

### 6.2.3.3 Bats

A preliminary roost assessment (ground level) for bats was carried out for the site as part of the PEA on 22 September 2022. During this survey, habitats and structures (trees, buildings etc.) within the study area (refer to Table 6-1) were assessed for their potential suitability for bats, for foraging, commuting or roosting. Any evidence of activity or potential roost features observed within the study area were recorded using field notes and/or handheld GPS units subsequently digitised using GIS.

Trees

Inspections of the exterior of trees to look for features bats could use as Potential Roost Features (PRFs) from ground level. The aim of the survey was to determine the actual or potential presence of bats and the need for further survey and/or mitigation.

Inspections of each potential tree roost within the study area were undertaken. The inspections were carried out in daylight hours from ground level, and information was compiled on each tree, PRFs and evidence of bats. All trees surveyed were numbered and marked on a map and a description of each PRF observed was recorded.

Structures

Structures within the Site were subject to a visual inspection for evidence of, and potential for bats. The exterior of the structures was visually assessed for potential bat access points and evidence of bat activity using binoculars and a high-powered torch. All buildings surveyed were numbered and marked on a map and a description of each PRF observed was recorded.

Trees/ structures were categorised according to the highest suitability PRF present in line with relevant guidance [70], detailed in Table 6-2 below.

Surveys were undertaken in accordance with the following best practice guidance:

- Bat mitigation guidelines for Ireland v2. [89]
- Bat Surveys for Professional Ecologists: Good Practice Guidelines [70]
- Bat Roosts in Trees. A Guide to Identification and Assessment for Tree-Care and Ecology Professionals [71]
- Landscape Conservation for Irish Bats and Species-Specific Roosting Characteristics [79].

An overview of definitions of potential suitability of habitats for bats is provided in Table 6-2.

**Table 6-2: Potential Suitability of Habitats for Bats**

| Suitability | Description of Roosting Habitats | Commuting and Foraging Habitats |
|---|---|---|
| Negligible | Negligible habitat features on site likely to be used by roosting bats. | Negligible habitat features on site likely to be used by commuting or foraging bats. |
| Low | A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).<br>A tree of sufficient size and age to contain potential roosting features (PRFs) but with none seen from the ground or features seen with only very limited roosting potential. | Habitat that could be used by small numbers of commuting bats such as gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.<br>Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub. |
| Moderate | A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only- the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed). | Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.<br>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water. |

| Suitability | Description of Roosting Habitats | Commuting and Foraging Habitats |
|---|---|---|
| High | A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat. | Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge.<br>High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.<br>Site is close to and connected to known roosts. |

#### 6.2.3.4 Avifauna

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

#### 6.2.3.5 Amphibians/Reptiles

Incidental sightings or evidence of amphibians and reptiles were noted as part of the PEA on 22nd of September 2022 and the watercourse walkover on 20th of January 2023 and the habitats within the study areas were evaluated for the potential to support amphibians or reptiles in accordance with Irish Wildlife Manuals, No. 58 and Irish Wildlife Trust (IWT) National Smooth Newt Survey.

#### 6.2.3.6 Other Terrestrial Fauna

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

#### 6.2.3.7 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.

### 6.2.4 Assessment Approach

The ecological assessment was carried out in accordance with the standard guidance for EIA [39] [7].

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 Development may result in a significant impact.

The importance of an ecological feature should be considered within a defined geographical context [39]. 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, adapted to local circumstances as per the guidance [39] :

- International (European).

- National (Ireland).
- Regional (Monaghan ).
- County (Scotshouse ).
- Townland (Aghnaskew)
- Local (Intermediate between the Site and Townland).
- 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. Examples of relevant lists and criteria include:

- Species of European conservation importance (as listed on Annexes II, IV and V of the Habitats Directive or Annex 1 of the Birds Directive)
- Species protected under the Wildlife Acts–1976 - 2021
- Birds of Conservation Concern in Ireland (BoCCI)[5]
- Red List of Terrestrial Mammals

The approach to impact assessment in the guidance [39] only requires that ecological features (habitats, species, ecosystems and their functions/processes) that are considered to be important and potentially affected by the 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 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.

#### 6.2.4.1 Impact Assessment

The impact assessment was carried out with regard to the criteria outlined in the guidance [39] [7]. Refer to Chapter 1 of this rEIAR for details.

## 6.3 Receiving Environment

### 6.3.1 European Designated Sites

There are three European Sites within the 15km search radius of the Site:

- Lough Oughter and Associated Loughs SAC,
- Kilroosky Lough Cluster SAC and
- Lough Oughter SPA

Of the three European sites, one is hydrologically connected to the Site. A connection exists between the Site and Lough Oughter and Associated Loughs SAC as the discharge from the quarry enters the drainage ditch which flows through a wetland that enters the Dunsrim Lough which is connected to the Briscarnagh Stream and Gortnana_010 river which eventually flows into the SAC. Figure 6.1 shows the location of the European designated sites in relation to the Site and potential connectivity.

[5] 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.

A remedial Appropriate Assessment Screening (rAAS), which evaluates the likely significant effects the historical development may have had on the above listed European sites, is included in the application.

### 6.3.2 Natural Heritage Areas and proposed Natural Heritage Area

In Ireland, sites of national importance are termed Natural Heritage Areas (NHA) and proposed Natural Heritage Areas (pNHA). 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 11 pNHAs located within the initial 15km search radius of the Site.

- Drumcor Lough (001841)
- Dromore Lakes (000001)
- Annagheane Lough (001836)
- Cootehill Church (000003)
- Lisabuck Lough (001835)
- Lisarilly Bog (001781)
- Lough Oughter And Associated Loughs (000007)
- Drumkeen House Woodland (000980)
- Lough Garrow And Lough Gubdoo (000984)
- Rafinny Lough (001606)
- Kilroosky Lough Cluster (001786)

NPWS sites synopses and available information on proposed and designated Natural Heritage Areas can be viewed on www.npws.ie [54].

Figure 6-2 below shows the location of the pNHA sites in relation to the Site and potential connectivity.

### 6.3.3 Other Designated Sites

There are no nature reserves or other designated sites within the initial 15km search radius of the Site.

### 6.3.4 Pre-Operational Habitats

The current habitat within the Site is an operational quarry. Using aerial imagery (refer to Section 6.2.3.1), previous habitats are identified as agricultural grassland (GA1) with fields intersected by hedgerow (WL1) and a small patch of mature trees (refer to Figures 6-2 and 6-3 below).

#### 6.3.4.1 Agricultural grassland GA1

As illustrated in Figure 6-3 the dominant habitat within the Site prior to the expansion of the quarry works was improved agricultural grassland (GA1). It is not known if this land was used for growing arable crops or as grazing pasture for livestock, although, the imagery identifies more with grazing pasture for livestock. Nonetheless, the monoculture of this agricultural land was of low ecological value.

[6] Proposed Natural Heritage Areas were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. pNHA 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.

Habitat Evaluation: Due to the low ecological value of the habitat and the prevalence of the habitat type within the greater surroundings, it is deemed to be of *Site Ecological Importance.*

**Figure 6-1: Natura 2000 Sites**

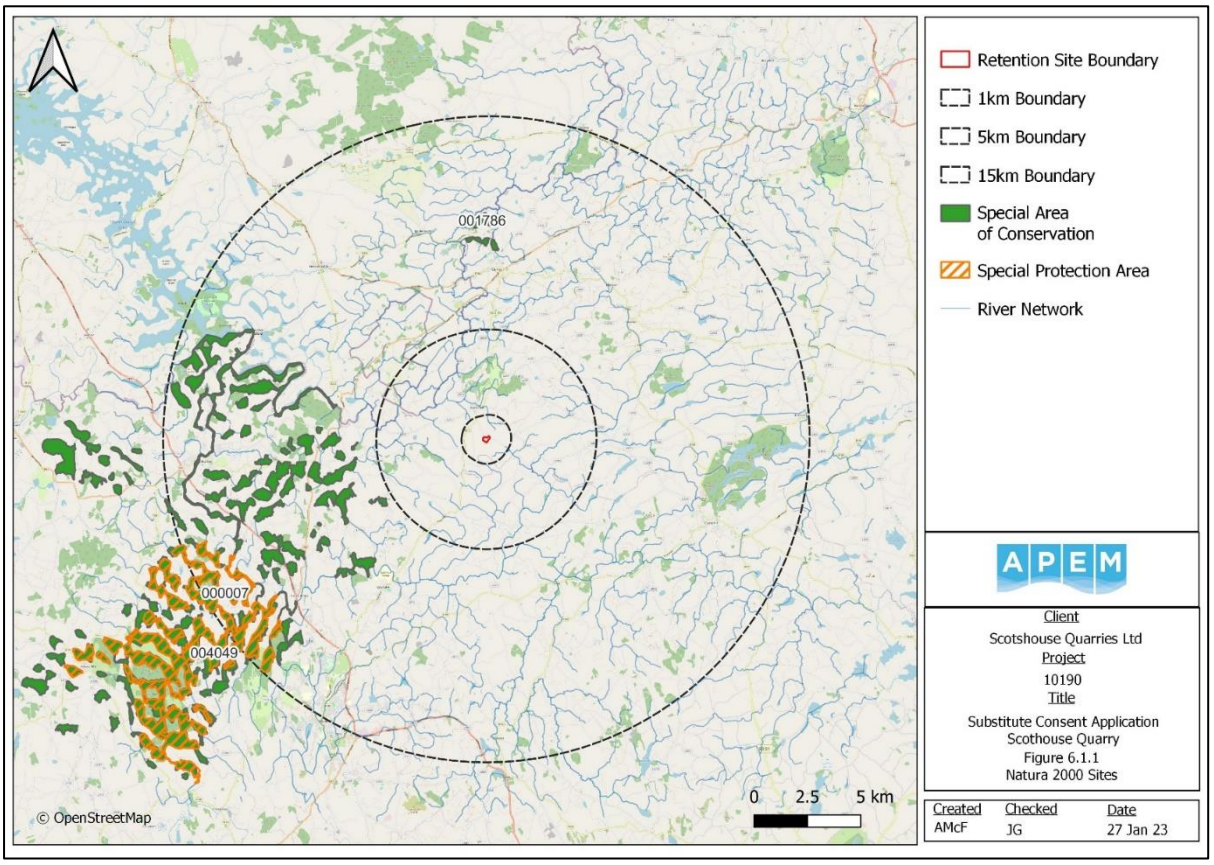


**Figure 6-2: National Designated Sites**

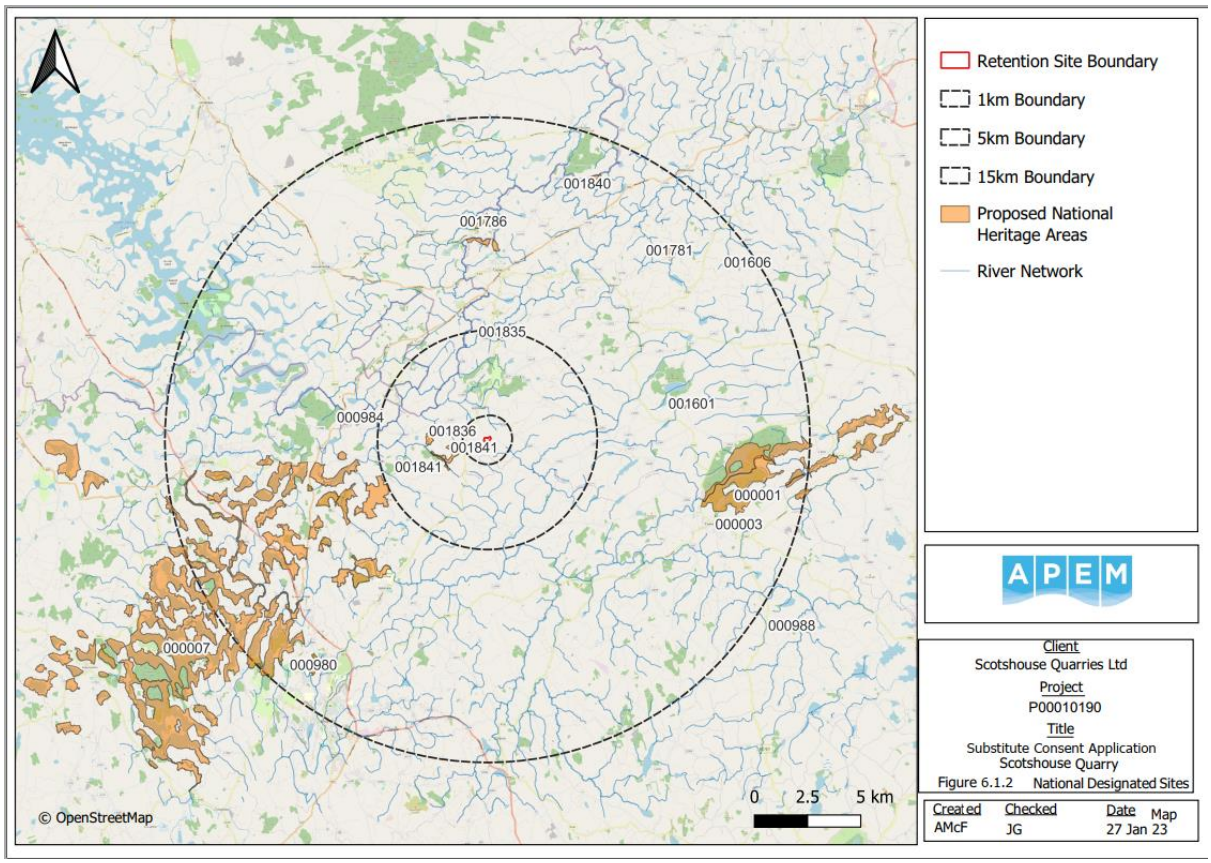
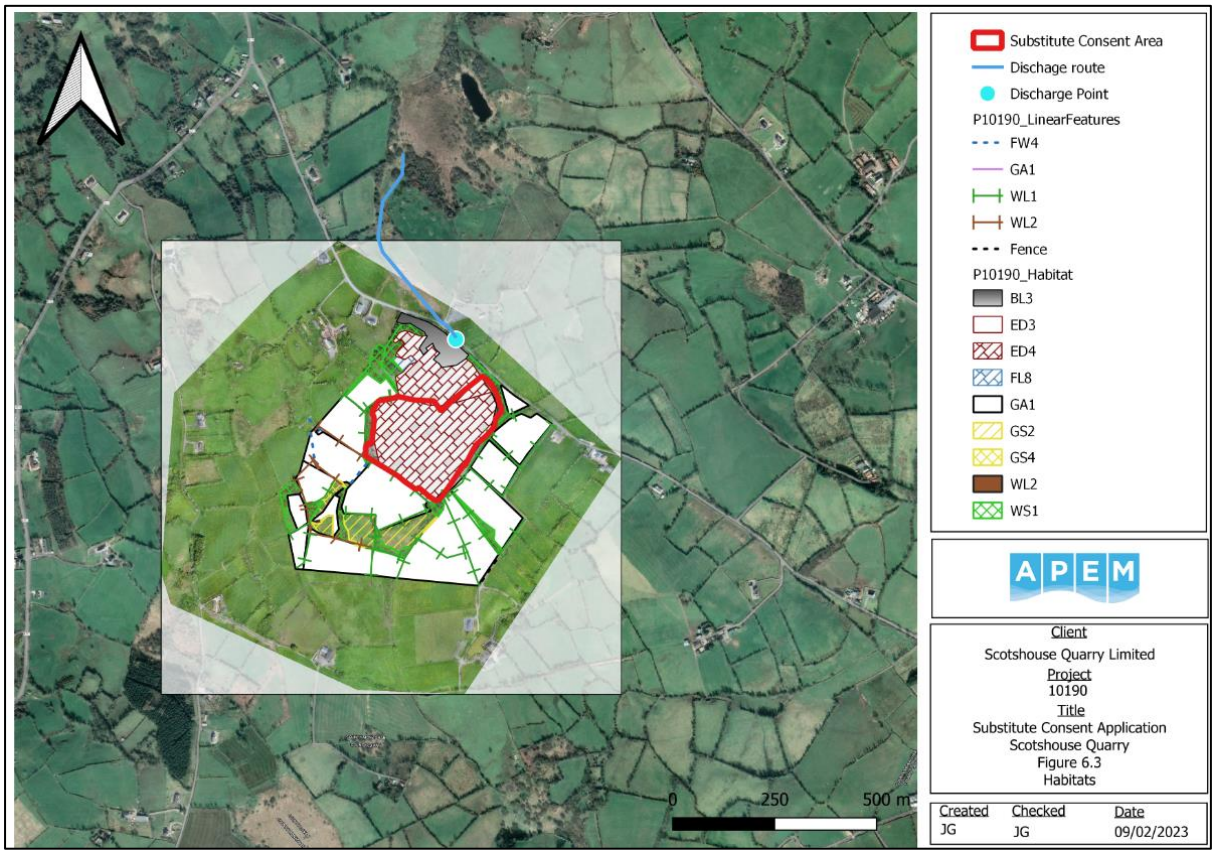


**Figure 6-3: Aerial Image Showing Historical Grassland**


**Figure 6-4: Historical and Current Habitats**



### 6.3.4.2 Hedgerow (WL1)

As illustrated in Figure 6-4 above, the agricultural fields are bounded with two gappy hedgerows going northeast-southwest and a more intact hedgerow with trees going southeast-northwest. In accordance with The Heritage Council's publication *Conserving Hedgerows* [90], a gappy hedge is bad both for wildlife and for farming, therefore, of *Site Ecological Importance.* The intact hedgerows along the southern boundaries are of *Local Ecological Importance*, as they act as a corridor connecting the trees (see below) with the surrounding hedgerow network. The species composition of the hedgerow is unknown, however, due to the protection status for hedgerows within the Monaghan County Development Plan 2019-2025 (MCDP), the hedgerows within the Site would be considered as ecological corridors or steppingstones in the context of Article 10 of the Habitats Directive.

Habitat Evaluation: Due to the ecological value of the habitat in accordance with the CDP, the habitat type is deemed to be of *Local Ecological Importance*.

### 6.3.4.3 (Mixed) broadleaved woodland (WD1)

As illustrated in Figure 6-4 there is a small patch (c. >0.04ha) of broadleaved woodland located on the northern boundary of the Site. The species composition is unknown, however, due to the protection status for treelines/ small woodlands within the County Development Plan 2019-2025, the small woodland would be considered a steppingstone in the context of Article 10 of the Habitats Directive.

Habitat Evaluation: Due to the ecological value of the habitat in accordance with the CDP, the habitat type is deemed to be of *Local Ecological Importance.*

### 6.3.4.4 Drainage Ditch (FW4)

The receiving surface water is a drainage ditch which flows through a wetland that enters the Dunsrim Lough which is connected to the Briscarnagh Stream (IE_NW_36G750800, segment code 36_964), flowing in a southeast to northwest direction approximately 450m east-northeast from the Registered Area. The ditch is slow flowing. It flows along the road neighbouring the Registered Area, then goes underneath the road across from the Rehostered Area and into the neighbouring field, from here the stream flowed underground partially and resurfaced approx. 150m northwest. The watercourse then flows into a wetland/bog area where it becomes open saturated ground. On the north-eastern side of the wetland/bog area is the Gortnana_010.

Habitat Evaluation: Due to the low flowing nature of the ditch and the underground section, it is deemed to be of *Site Ecological Importance.*

## 6.3.5 Pre-Operational Fauna

Fauna that may have used the Site prior to operations according to the habitats present at the time and best judgement using existing species data are described below.

### 6.3.5.1 Non-volant Mammals

Table 6-3 below presents the findings of the desktop study for non-volant mammals within the 10km grid squares H41 and H51 [56] .

The conservation categories are based on the checklist of protected and threatened species in Ireland [91].

**Table 6-3: Mammal Desktop Study Results**

| Mammal Name | Year of Last Record | EU HD* | WA** | Conservation Status |
|---|---|---|---|---|
| Badger *(Meles meles)* | 2016 | | ✓ | LC |
| Hedgehog *(Erinaceus europaeus)* | 2021 | | ✓ | LC |
| Otter *(Lutra lutra)* | 2010 | II IV | ✓ | LC |
| Pine marten *(Martes martes)* | 2021 | V | ✓ | LC |
| Red squirrel *(Sciurus vulgaris)* | 2015 | | ✓ | LC |
| Irish Hare *(Lepus timidus subsp. hibernicus)* | 2007 | | | |
| Irish Stoat *(Mustela erminea subsp. lernica)* | 2012 | | | |
| Red Fox *(Vulpes vulpes)* | 1996 | | | |

*European Council, Habitats Directive 92/43/EEC

**Wildlife Act 1976, as amended

The open nature of the improved agricultural grassland habitat within the Site prior to the Site works would have had limited potential to support non-volant mammal species. Small common mammals such as pygmy shrew *(Sorex minutus)* and European hedgehog would have used this habitat for foraging. Larger mammals such as European rabbit *(Oryctolagus cuniculus)*, Irish hare and red fox may have also used the area for commuting and foraging, however the lack of vegetative cover within the available habitats would not have been conducive to breeding sites.

Furthermore, it is unlikely that protected species like Otter *(Lutra lutra)* and Badger *(Meles meles)* would have used the Site for anything other than commuting due to the excavation works (blasting) of the Permitted Area.

Habitat Evaluation: Given the open nature of the habitats within the Site prior to operations onsite, the site would have been of *Site Ecological Importance* to non-volant mammals.

### 6.3.5.2 Invasive Mammal Species

Table 6-4 below presents the findings of the desktop study for invasive mammals within the 10km grid squares H41 and H51 [56] The conservation categories are based on the checklist of Protected and Threatened Species in Ireland [91], the 'Impact Level' [92] and status with regard to European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011), as amended.

**Table 6-4: Invasive Mammal Species Desktop Study Results**

| Mammal Name | Impact Level | Status | Year of Last Record | Conservation Station in Ireland |
|---|---|---|---|---|
| American Mink (*Mustela vison*) | High | Invasive Species under Regulation S.I. 477/2011 (as amended) (Ireland) | 2017 | Not Assessed |
| Eastern Grey Squirrel (*Sciurus carolinensis*) | High | Invasive Species under Regulation S.I. 477/2011 (as amended) (Ireland) | 2007 | N/A |
| European Rabbit (*Oryctolagus cuniculus*) | Medium | None | 2013 | Least Concern |
| Fallow Deer (*Dama dama*) | High | Invasive Species under Regulation S.I. 477/2011 (as amended) (Ireland) | 2008 | Least Concern |
| Sika Deer (*Cervus nippon*) | High | Invasive Species under Regulation S.I. 477/2011 (as amended) (Ireland) | 2014 | Not Assessed |

These species are all invasive mammal species and as such they negatively impact biodiversity.

### 6.3.5.3 Bats

Table 6-5 presents the findings of the desktop study for bats within the 10km grid squares H41 and H51 [56].

**Table 6-5: Bat Species Desktop Study Results**

| Bat Name | Legal Protection | Year of Last Record | Conservation Status |
|---|---|---|---|
| Lesser Noctule (Nyctalus leisleri) | EU Habitats Directive (92/43/EEC)<br>Annex IV, Wildlife Act 1976 (as amended) | 2009 | Least Concern |
| Brown Long-eared Bat (Pleuritus) | | 2003 | |
| Daubenton's Bat (Mladntonii) | | 2010 | |
| Common Pipistrelle (Pipistrellus sensu lato) | | 2013 | |
| Soprano Pipistrelle (Pipistrellus pygmaeus) | | 2009 | |
| Nathusius's Pipistrelle (Pipistrellus nathusii) | | 2003 | |
| Natterer's Bat (Myotis nattereri) | | 2003 | |

Bat species would have potentially used the hedgerows and treelines along the boundaries of the Site area as foraging and commuting habitat. They may also have used the mature trees for roosting. The hedgerow boundaries have remained intact throughout the operations at the Site, however the small area of mature trees has been removed.

There would not have been any habitat present to support the Annex I Lesser Horseshoe Bat *(Rhinolophus hipposideros)* and there were no SACs designated for this species within the known CSZ of the species of 2km radius of the Site.

Habitat Evaluation: Given the habitats present prior to extraction works at the Site, it is considered that the site would have been of *Local Ecological Importance* in relation to bats.

### 6.3.5.4 Avifauna

A total of 35 Red and Amber listed species bird species have been recorded as per [47]. Table 6-6 below presents the findings of the desktop study for avifauna within the 10km grid squares H41 and H51 [56].

**Table 6-6: Avifauna Desktop Study Results**

| Species Name | Year of Last Record | BoCCI Status | Annex I Status |
|---|---|---|---|
| Barn Owl (*Tyto alba*) | 2019 | Red | No |
| Barn Swallow (*Hirundo rustica*) | 2011 | Green | No |
| Black-headed Gull (*Larus ridibundus*) | 1991 | Amber | No |
| Common Coot (*Fulica atra*) | 2011 | Amber | No |
| Common Goldeneye (*Bucephala clangula*) | 2011 | Red | No |
| Common Grasshopper Warbler (*Locustella naevia*) | 2011 | Green | No |
| Common Kestrel (*Falco tinnunculus*) | 2011 | Red | No |
| Common Kingfisher (*Alcedo atthis*) | 2011 | Amber | Yes |
| Common Linnet (*Carduelis cannabina*) | 2011 | Amber | No |
| Common Pheasant (*Phasianus colchicus*) | 2011 | Green | No |
| Common Pochard (Aythya ferina) | 31/12/2011 | Red | No |
| Common Redshank (Tringa totanus) | 2001 | Red | No |
| Common Snipe (*Gallinago gallinago*) | 2018 | Red | No |
| Common Starling (*Sturnus vulgaris*) | 2011 | Amber | No |
| Common Swift (*Apus apus*) | 2011 | Red | No |
| Common Tern (*Sterna hirundo*) | 1972 | Amber | Yes |
| Common Wood Pigeon (*Columba palumbus*) | 2011 | Green | No |
| European Golden Plover (*Pluvialis apricaria*) | 2001 | Red | Yes |
| Great Cormorant (*Phalacrocorax carbo*) | 2011 | Amber | No |
| Great Crested Grebe (*Podiceps cristatus*) | 2018 | Amber | No |
| Herring Gull (*Larus argentatus*) | 1991 | Amber | No |
| House Martin (*Delichon urbicum*) | 2011 | Amber | No |
| House Sparrow (*Passer domesticus*) | 2011 | Amber | No |
| Little Grebe (*Tachybaptus ruficollis*) | 2011 | Green | No |
| Mallard (*Anas platyrhynchos*) | 2018 | Amber | No |

| Species Name | Year of Last Record | BoCCI Status | Annex I Status |
|---|---|---|---|
| Mew Gull (*Larus canus*) | 2011 | Amber | No |
| Mute Swan (*Cygnus olor*) | 2018 | Amber | No |
| Northern Lapwing (*Vanellus vanellus*) | 2011 | Red | No |
| Northern Wheatear *(Oenanthe oenanthe)* | 2017 | Amber | No |
| Red Grouse (*Lagopus lagopus*) | 1972 | Red | No |
| Rock Pigeon (*Columba livia*) | 2011 | Green | No |
| Sand Martin (*Riparia riparia*) | 2011 | Amber | No |
| Sky Lark (*Alauda arvensis*) | 2011 | Amber | No |
| Spotted Flycatcher (*Muscicapa striata*) | 2011 | Amber | No |

The Canada Goose (*Branta canadensis*) and Greylag (*Anser anser*)are invasive species under Regulation S.I. 477/2011, (as amended) (Ireland) that have also been recorded within the 10km grid squares H41 and H51 [56].

Given the habitats present onsite prior to the works taking place, avifauna within the Site would have been limited primarily to general passerine and corvid species using the hedgerows surrounding the site and agricultural land for nesting and foraging.

Evaluation: Given its foraging and nesting potential for general breeding bird species, the pre-operational habitats onsite would have been of *Local Ecological Importance*.

### 6.3.5.5 Amphibians / Reptiles

Common Frog (*Rana temporaria*) and the Smooth Newt (*Lissotriton vulgaris*) have both been recorded within the 10km grid squares H41 and H51 [56]. Both species are afforded protection under the EU Habitats Directive (92/43/EEC) Annex V and Wildlife Acts. No reptiles have been recorded within the 10km grid squares H41 and H51 [56].

There is no evidence of waterbodies within the agricultural grassland of the Site and surrounding landscape prior to operations that may have supported the two amphibian species, and as such, the limited size and diversity of the habitat would have limited its capacity to support amphibian/ reptile species.

Evaluation: Given the limited nature of the agricultural grassland habitat available prior to works as well as the absence of waterbodies for potential breeding purposes, it is considered that the Site would have been of *Site Ecological Importance* in relation to amphibians and reptiles.

### 6.3.5.6 Other Terrestrial Fauna

Table 6-7 presents the findings of the desktop study for other terrestrial fauna within the 10km grid squares H41 and H51 [56]

The conservation categories in Table 7 are based on the checklist of protected and threatened species in Ireland [91].

**Table 6-7: Other Faunal Species Desktop Study Results**

| Species Name | Conservation Status and Legal Protection | Year of Last Record |
|---|---|---|
| Marsh Fritillary (*Euphydryas aurinia*) | EU Habitats Directive (92/43/EEC)<br>Annex IV, Wildlife Act 1976 (as amended) | 2020 |
| *Hydroporus glabriusculus* (water beetle) | Endangered | 2006 |
| *Hydroporus scalesianus* (water beetle) | Near Threatened | 2006 |
| *Laccornis oblongus* (water beetle) | Near Threatened | 2006 |

Improved agricultural grassland would have been of limited ecological value to invertebrates.

Evaluation: Due to the limited floral diversity of the grassland habitat present prior to works, it is considered that the Site would have been of *Site Ecological Importance* in relation to invertebrates.

### 6.3.5.7 Aquatic Ecology

Although there are eight bony fish and five crustaceans recorded within the 10km grid squares H41 and H51 [56], there are no records of species within the 1km grid square H4918 that encompasses the outfall, drainage ditch and Briscarnagh Stream.

Evaluation: Due to the limited flow of the drainage ditch it is considered that habitat would have been of *Site Ecological Importance* in relation to aquatic species.

### 6.3.6 Current Habitats

The dominant habitat is active quarry bounded by hedgerow, scrub and recolonising bare ground. See Figure 6-4 above.

### 6.3.6.1 Active quarry (ED4)

This category is used for all active rock or sediment quarries (including gravel pits) and mines, or parts of these, where levels of disturbance are so high that colonisation by plants and animals is almost entirely prevented.

The current Site is dominated by active quarry that has undergone extensive activity throughout the operational period.

Habitat Evaluation: Given its lack of recolonization this area of the Site is considered to be of *Site Ecological Importance*.

### 6.3.6.2 Recolonised bare ground (ED3)

The western boundary of the Site is bounded by this habitat type where the exposed quarry faces have been left to recolonise. Species found to be present include knapweed (*Centaurea nigra*), ribwort plantain (*Plantago lanceolata*), bramble (*Rubus fructicosus*), soft rush (*Juncus effusus*), cocksfoot (*Dactylis glomerata)*, broom (*Cytisus scoparius*), coltsfoot (*Tussilago farfara*), oxeye daisy (*Leucanthemum vulgare*) and red clover (*Trifolium pratense*).

Habitat Evaluation: Due to the low species diversity, it is deemed to be of Site Ecological Importance.

### 6.3.6.3 Hedgerow (WL1)

The southern boundaries are hedgerow. The south-eastern hedgerow is c. 2m high bordering the quarry access road and the adjacent agricultural field. The hedgerow comprises gorse

(*Ulex europaeus*). The south-western hedgerow is c. 1.5m high and comprises of gorse, immature rowan (*Sorbus aucuparia*), ivy (*Hedera Helix*) and bramble.

Habitat Evaluation: Due to the ecological value of the habitat in accordance with the CDP, the habitat type is deemed to be of *Local Ecological Importance*.

### 6.3.6.4 Scrub (WS1)

The north-eastern boundary comprises scrub at the top of the quarry face. Species comprise willowherb (*Epilobium sp.*), coltsfoot, dock (*Rumex sp.*) and semi-mature ash (*Fraxinus excelsior*).

Habitat Evaluation: Due to the low species diversity, it is deemed to be of *Site Ecological Importance*.

### 6.3.6.5 Drainage Ditch (FW4)

Algae were observed growing in outflow pipe and the water being discharged from the outflow was of 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.

Habitat Evaluation: Due to the low flowing nature of the ditch and the abundance of algae, it is deemed to be of *Site Ecological Importance.*

### 6.3.6.6 Protected Flora

No rare or protected plant species were found during the Phase I habitat survey. There are no Flora Protection Order records within the 10km grid squares H41 and H51 within which the Site is situated [56].

Overall, the Site is assessed as being of *Site Ecological Value* only for flora species.

### 6.3.6.7 Non-Native Invasive Flora Species

Ten non-native invasive flora species have been recorded within the 10 km grid squares H41 and H51 [56]). These species are listed as both high and moderate impact non-native invasive species [92] [93]. Table 6-8 below sets out the species and their level of impact.

**Table 6-8: Invasive Flora Species Recorded within 10km grid squares H41 and H51**

| Name | Date of Last Record | Impact Level | Invasive Species under Regulation S.I. 477 (Ireland) |
|---|---|---|---|
| Black Currant (*Ribes nigrum*) | 29/08/2015 | Medium | No |
| Canadian Waterweed (*Elodea canadensis*) | 29/09/2015 | High | Invasive Species under Regulation S.I. 477 (Ireland);<br>'Third Schedule' species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations–2011 - 2021 |
| Cherry Laurel (*Prunus laurocerasus*) | 18/05/2017 | High | No |
| Giant Hogweed (*Heracleum mantegazzianum*) | 31/07/2013 | High | Invasive Species under Regulation S.I. 477 (Ireland);<br>'Third Schedule' species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations–2011 - 2021 |

| Name | Date of Last Record | Impact Level | Invasive Species under Regulation S.I. 477 (Ireland) |
|---|---|---|---|
| Himalayan Knotweed (*Persicaria wallichii*) | 13/07/2016 | Medium | Invasive Species under Regulation S.I. 477 (Ireland);<br>'Third Schedule' species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations–2011 - 2021 |
| Japanese Knotweed (*Fallopia japonica*) | 18/05/2017 | High | Invasive Species under Regulation S.I. 477 (Ireland);<br>'Third Schedule' species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations–2011 - 2021 |
| N'ttall's Waterweed (*Elodea nuttallii*) | 29/08/2015 | High | Invasive Species under Regulation S.I. 477 (Ireland);<br>'Third Schedule' species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations–2011 - 2021 |
| *Rhododendron ponticum* | 29/08/2015 | High | Invasive Species under Regulation S.I. 477 (Ireland);<br>'Third Schedule' species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations–2011 - 2021 |
| Salmonberry (*Rubus spectabilis*) | 18/05/2017 | Medium | Invasive Species under Regulation S.I. 477 (Ireland);<br>'Third Schedule' species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations–2011 - 2021 |
| Sycamore (*Acer pseudoplatanus*) | 29/09/2015 | Medium | No |

Schedule III invasive flora species pose a risk to economic, agricultural and/or natural environments.

None of the species identified in the desk study, and no other invasive flora species, were identified within the study area during the surveys undertaken on the 22nd of September 2022 and 20th January 2023.

### 6.3.7 Current Fauna

This section details the findings of the field survey for the Site and the surrounding study area.

#### 6.3.7.1 Non-volant Mammals

Table 6-9 lists the non-volant mammal species presented in the 10km grid squares H41 and H51 [56] that were recorded during the field survey. Also listed is an indication of whether suitable habitat for species is found within the Study area.

**Table 6-9: Non-Volant Mammal Species With Suitable Habitat in Surrounding Area**

| Mammal Name | Recorded during survey | Suitable Habitat |
|---|---|---|
| Badger (*Meles meles*) | No | In surrounding habitat |
| Hedgehog (*Erinaceus europaeus*) | Faeces observed within hedgerow north of Site | In surrounding habitat |
| Otter (*Lutra lutra*) | No | In surrounding habitat > 400m |
| Pine marten (*Martes martes*) | No | In surrounding habitat > 700m |
| Red squirrel (*Sciurus vulgaris*) | No | In surrounding habitat > 700m |

| Mammal Name | Recorded during survey | Suitable Habitat |
|---|---|---|
| Irish Hare (*Lepus timidus subsp. hibernicus*) | No | In surrounding habitat |
| Irish Stoat (*Mustela erminea subsp. hibernica*) | No | In surrounding habitat |
| Red Fox (*Vulpes vulpes*) | Tracks observed in surrounding land parcels | In surrounding habitat |
| American Mink (*Mustela vison*) | No | In surrounding habitat |
| Eastern Grey Squirrel (*Sciurus carolinensis*) | No | In surrounding habitat |
| European Rabbit (*Oryctolagus cuniculus*) | No | In surrounding habitat |
| Fallow Deer (*Dama dama*) | No | In surrounding habitat |
| Sika Deer (*Cervus nippon*) | No | In surrounding habitat |

The hedgerows and the scrub have limited suitability for hedgehog, pygmy shrew, badger, stoat and fox.

During site surveys invasive species identified within the desk study were not observed within or nearby the study area. However, they are likely to be in the general area. These species are all invasive mammal species and as such they negatively impact biodiversity.

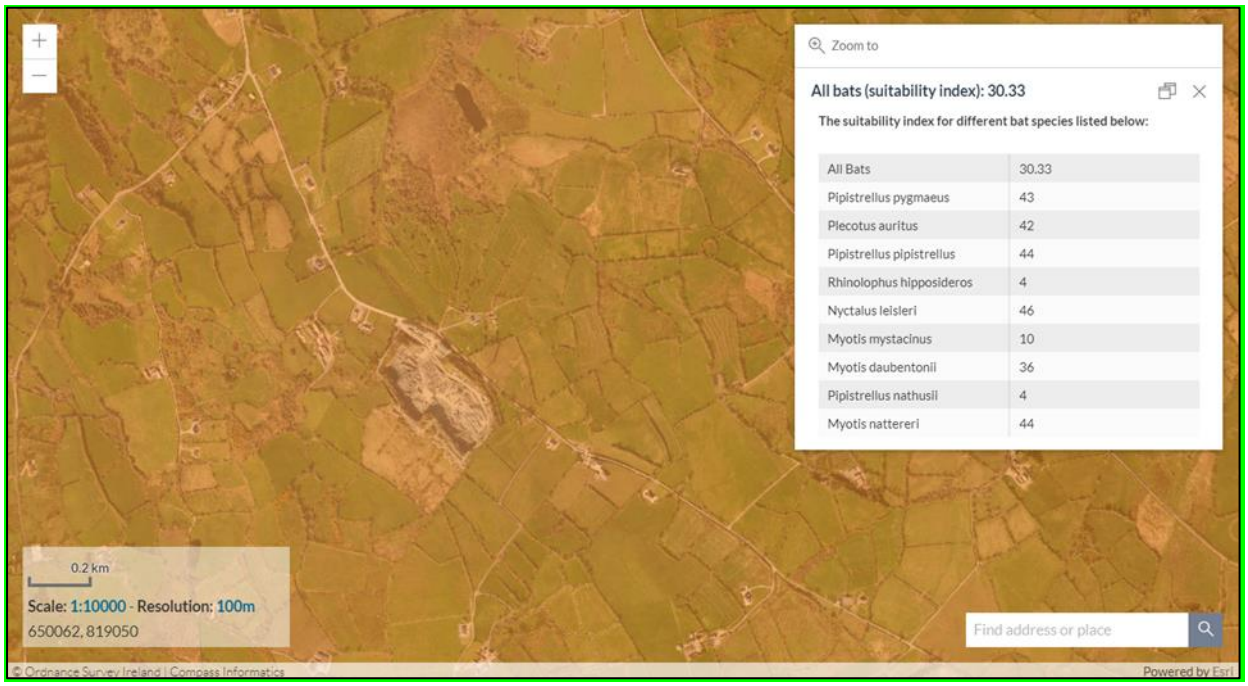
Evaluation: The Site is considered to be of *Site Ecological Importance* in relation to non-volant mammals.

### 6.3.7.2 Bats

Bat landscape

The landscape suitability index as generated for bat species at the Site [79] is detailed in Figure 6-5. The model suggests that the Site is of moderate landscape suitability for bat species on an average basis. The model identifies the landscape to be of high suitability for Soprano and Common Pipistrelle, Brown Long-eared Bat, Leisler's Bat and Natterers Bat.

**Figure 6-5: Landscape Suitability Index for Bats**



Field survey results

The structures within the Site did not comprise suitable roosting features for bats. No evidence of bat presence was found / observed during the survey undertaken on 22nd September 2022. Therefore, all structures within the Site were assessed as being of negligible suitability for roosting bats. There are no trees within the Site boundary. There are no structures within the surrounding study area or trees that have been identified as comprising of suitable potential roost features for bats. Therefore, all trees were assessed as being of negligible suitability for roosting bats.

The hedgerow on the boundary of the Site have potential to support commuting and foraging bat species identified as being present within the area (refer to Table 6-7).

Evaluation: The Site is considered to be of *Site Ecological Importance* in relation to bats.

### 6.3.7.3 Avifauna

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 nesting on the top of the northern boundary.

None of the species identified as being present within the 10km squares H41 and H51 (refer to Table 8) were identified using the Site or the surrounding land parcels during the survey undertaken on 22nd September 2022.

Evaluation: Due to the assemblage of common species identified using the boundary habitats, surrounding land parcels and the presence of the nesting rooks, the Site is considered to be of *Local Ecological Importance* in relation to birds.

### 6.3.7.4 Amphibians / Reptiles

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 survey undertaken on 22nd September 2022. The attenuation ponds within the existing quarry do not comprise suitable habitat for amphibians.

The surrounding fields comprise potential commuting habitat for reptiles, however, there is no suitable basking, hibernation or habitat mosaic for reptile species.

Evaluation: Although there is suitable habitat for amphibians in terrestrial phase and commuting reptiles within the surrounding landscape, the Site comprises unsuitable habitat, therefore, the Site is considered to be of *Site Ecological Importance* in relation to amphibians and reptiles.

### 6.3.7.5 Other Terrestrial Fauna

The site comprises bare ground and active quarry with constant plant machinery movement adjacent in the Permitted Area. There is therefore no suitable habitat for flora to establish. The recolonised bare ground comprises common flora species. No suitable food plant for marsh fritillary nor habitat for the water beetle species were identified during the survey undertaken on 22nd September 2022.

Evaluation: The Site is considered to be of *Site Ecological Importance* in relation to other terrestrial fauna.

### 6.3.7.6 Aquatic Ecology

The drainage ditch comprises no suitable habitat for aquatic species. The bank flora species are common and widespread. The ditch comprise a grey colour and the cobble/gravel substrate is covered in a fine sediment and algal layer.

Evaluation: The drainage ditch is considered to be of *Site Ecological Importance* in relation to aquatic ecology.

## 6.3.8 Summary of Evaluations

Table 6-10 outlines the ecological resources in the form of habitat types and fauna found within the Site, their evaluation and the key ecological receptors are identified. Table 6-11 outlines the avifauna evaluation, and the key ecological receptors are identified.

**Table 6-10: Summary of Evaluations and Selection as Key Ecological Receptors**

| Habitat / Species Name | Conservation Status | Evaluation | Rationale | Key Ecological Receptor |
|---|---|---|---|---|
| Pre-Operational Habitats | | | | |
| Agricultural Grassland GA1 | None | Site | Common and widespread flora species. Habitat ubiquitous in the wider surroundings. | No |
| Hedgerow WL1 | None | Local | Contained within the County Development Plan 2019-2025 | Yes |
| (Mixed) Broadleaved Woodland WD1 | None | Local | Contained within the County Development Plan 2019-2025 | Yes |
| Current Habitats | | | | |
| Active Quarry ED4 | None | Site | No habitats | No |
| Recolonised Bare Ground ED3 | None | Site | Common and widespread flora species. | No |
| Hedgerow WL1 | None | Local | Contained within the County Development Plan 2019-2025 | Yes |
| Scrub WS1 | None | Site | Common and widespread flora species. Habitat ubiquitous in the wider surroundings. | No |
| Drainage Ditch FW4 | None | Site | Low flowing, depositing, however, provides hydrological connectivity to wider river network | Yes |
| Non-native invasive flora | | | | |
| Black Currant (*Ribes nigrum*) | None | None | Invasive Species of Medium Impact. Not found within Site. | No |
| Canadian Waterweed (*Elodea canadensis*) | None | None | Invasive Species of High Impact. Not found within Site. | No |
| Cherry Laurel (*Prunus laurocerasus*) | None | None | Invasive Species of High Impact. Not found within Site. | No |
| Giant Hogweed (*Heracleum mantegazzianum*) | None | None | Invasive Species of High Impact. Not found within Site. | No |
| Himalayan Knotweed (*Persicaria wallichii*) | None | None | Invasive Species of Medium Impact. Not found within Site. | No |
| Japanese Knotweed (*Fallopia japonica*) | None | None | Invasive Species of High Impact. Not found within Site. | No |

| Habitat / Species Name | Conservation Status | Evaluation | Rationale | Key Ecological Receptor |
|---|---|---|---|---|
| N'ttall's Waterweed (*Elodea nuttallii*) | None | None | Invasive Species of High Impact. Not found within Site. | No |
| *Rhododendron ponticum* | None | None | Invasive Species of High Impact. Not found within Site. | No |
| Salmonberry (*Rubus spectabilis*) | None | None | Invasive Species of Medium Impact. Not found within Site. | No |
| Sycamore (*Acer pseudoplatanus*) | None | None | Invasive Species of Medium Impact. Not found within Site. | No |
| **Fauna** | | | | |
| Terrestrial Mammals | | | | |
| Badger (*Meles meles*) | Wildlife Act 1976 (as amended),<br>Least Concern | Site | Likely present in habitats surrounding the Site. | No |
| Hedgehog (*Erinaceus europaeus*) | Wildlife Act 1976 (as amended),<br>Least Concern | Local | Confirmed evidence found in habitats surrounding the Site. | Yes |
| Otter (*Lutra lutra*) | Wildlife Act 1976 (as amended),<br>Annex II & IV EU Habitats Directive,<br>Near Threatened | National Importance | No suitable habitat within the Site or present in habitats surrounding the Site. | No |
| Pine marten (*Martes martes*) | Wildlife Act 1976 (as amended),<br>Annex V EU Habitats Directive, Least Concern | National Importance | Likely present in habitats surrounding the Site. | No |
| Red squirrel (*Sciurus vulgaris*) | Wildlife Act 1976 (as amended),<br>Near Threatened | National Importance | Likely present in habitats surrounding the Site. | No |
| Irish Hare (*Lepus timidus subsp. hibernicus*) | None | Site | Likely present in habitats surrounding the Site. | No |

| Habitat / Species Name | Conservation Status | Evaluation | Rationale | Key Ecological Receptor |
|---|---|---|---|---|
| Irish Stoat *(Mustela erminea subsp. hibernica)* | None | Site | Likely present in habitats surrounding the Site. | No |
| Red Fox (*Vulpes vulpes*) | None | Site | Likely present in habitats surrounding the Site. | No |
| Invasive Mammals | | | | |
| American Mink (*Mustela vison*) | | None | Invasive Species of High Impact. Not found within Site. | No |
| Eastern Grey Squirrel (*Sciurus carolinensis*) | | None | Invasive Species of High Impact. Not found within Site. | No |
| European Rabbit (*Oryctolagus cuniculus*) | Least Concern | None | Invasive Species of Medium Impact. Not found within Site. | No |
| Fallow Deer (*Dama dama*) | Least Concern<br>Wildlife Act 1976, (as amended); | None | Invasive Species of High Impact. Not found within Site. | No |
| Sika Deer (*Cervus nippon*) | | None | Invasive Species of High Impact. Not found within Site. | No |
| Bats | | | | |
| Lesser Noctule (Nyctalus leisleri) | Wildlife Act 1976 (as amended),<br>Annex IV EU Habitats Directive, Least Concern | National Importance | Not recorded within the site and no suitable roosting habitat present. Likely to be using surrounding linear features for commuting | Yes |
| Brown Long-eared Bat (Plecotus auritus) | Wildlife Act 1976 (as amended),<br>Annex IV EU Habitats Directive, Least Concern | National Importance | Not recorded within the site and no suitable roosting habitat present. Likely to be using surrounding linear features for commuting | Yes |
| Dau'enton's Bat (Myotis daubentonii) | Wildlife Act 1976 (as amended),<br>Annex IV EU Habitats Directive, Least Concern | National Importance | Not recorded within the site and no suitable roosting habitat present. Likely to be using surrounding linear features for commuting | Yes |
| Common Pipistrelle (Pipistrellus sensu lato) | Wildlife Act 1976 (as amended), | National Importance | Not recorded within the site and no suitable roosting habitat present. Likely to be using surrounding linear features for commuting | Yes |

| Habitat / Species Name | Conservation Status | Evaluation | Rationale | Key Ecological Receptor |
|---|---|---|---|---|
| | Annex IV EU Habitats Directive, Least Concern | | | |
| Soprano Pipistrelle (Pipistrellus pygmaeus) | Wildlife Act 1976 (as amended),<br>Annex IV EU Habitats Directive, Least Concern | National Importance | Not recorded within the site and no suitable roosting habitat present. Likely to be using surrounding linear features for commuting | Yes |
| Nat'usius's Pipistrelle (Pipistrellus nathusii) | Wildlife Act 1976 (as amended),<br>Annex IV EU Habitats Directive, Least Concern | National Importance | Not recorded within the site and no suitable roosting habitat present. Likely to be using surrounding linear features for commuting | Yes |
| Na'terer's Bat (Myotis nattereri) | Wildlife Act 1976 (as amended),<br>Annex IV EU Habitats Directive, Least Concern | National Importance | Not recorded within the site and no suitable roosting habitat present. Likely to be using surrounding linear features for commuting | Yes |
| Common Frog (Rana temporaria) | Wildlife Act 1976 (as amended),<br>Annex V EU Habitats Directive, Least Concern | National Importance | Species recorded in historical records. Potentially present in surrounding habitats including the wet grassland | Yes |
| Smooth Newt (Lissotriton vulgaris) | Wildlife Act 1976 (as amended),<br>Annex V EU Habitats Directive, Least Concern | National Importance | Species recorded in historical records. Potentially present in surrounding habitats including the wet grassland | Yes |
| Marsh Fritillary (*Euphydryas aurinia*) | Wildlife Act 1976 (as amended),<br>Annex V EU Habitats Directive, Least Concern | National Importance | Not recorded within the Site and no suitable habitat present | No |
| *Hydroporus glabriusculus* (water beetle) | Wildlife Act 1976 (as amended),<br>Endangered | Site | Not recorded within the Site and no suitable habitat present | No |

| Habitat / Species Name | Conservation Status | Evaluation | Rationale | Key Ecological Receptor |
|---|---|---|---|---|
| *Hydroporus scalesianus* (water beetle) | Wildlife Act 1976 (as amended),<br>Near threatened | Site | Not recorded within the Site and no suitable habitat present | No |
| *Laccornis oblongus* (water beetle) | Wildlife Act 1976 (as amended),<br>Near threatened | Site | Not recorded within the Site and no suitable habitat present | No |
| Aquatic Ecology | | | | |
| | | Site | No suitable habitat present | No |

**Table 6-11: Summary of Avifauna Evaluations and Selection as Key Ecological Receptors**

| Name | BOCCI Status | Evaluation | Rationale | Key Ecological Receptor |
|---|---|---|---|---|
| Barn Owl (*Tyto alba*) | Red | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Barn Swallow (*Hirundo rustica*) | Green | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Black-headed Gull (*Larus ridibundus*) | Amber | Site | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Buzzard (Buteo buteo) | Green | Site | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site.<br>Observed flying over the surrounding land parcels. | Yes |
| Common Coot (*Fulica atra*) | Amber | County | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |

| Name | BOCCI Status | Evaluation | Rationale | Key Ecological Receptor |
|---|---|---|---|---|
| Common Goldeneye (*Bucephala clangula*) | Red | County | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Common Grasshopper Warbler (*Locustella naevia*) | Green | Site | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Common Kestrel (*Falco tinnunculus*) | Red | County | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Common Kingfisher (*Alcedo atthis*) | Amber | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Common Linnet (*Carduelis cannabina*) | Amber | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Common Pheasant (*Phasianus colchicus*) | Green | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Common Pochard (Aythya *ferina*) | Red | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Common Redshank (Tringa t*otanus*) | Red | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Common Snipe (*Gallinago gallinago*) | Red | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Common Starling (*Sturnus vulgaris*) | Amber | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |

| Name | BOCCI Status | Evaluation | Rationale | Key Ecological Receptor |
|---|---|---|---|---|
| Common Swift (*Apus apus*) | Red | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Common Tern (*Sterna hirundo*) | Amber | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Common Wood Pigeon (*Columba palumbus*) | Green | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Corn Crake (*Crex crex*) | Red | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Eurasian Curlew (*Numenius arquata*) | Red | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Eurasian Teal (*Anas crecca*) | Amber | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Eurasian Wigeon (*Anas penelope*) | Amber | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Eurasian Woodcock (*Scolopax rusticola*) | Red | County | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| European Golden Plover (*Pluvialis apricaria*) | Red | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Goldcrest (*Regulus regulus*) | Amber | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site.<br>Observed within the surrounding land parcels and boundary hedgerow | Yes |

| Name | BOCCI Status | Evaluation | Rationale | Key Ecological Receptor |
|---|---|---|---|---|
| Great Cormorant (*Phalacrocorax carbo*) | Amber | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Great Crested Grebe (*Podiceps cristatus*) | Amber | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Herring Gull (*Larus argentatus*) | Amber | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| House Martin (*Delichon urbicum*) | Amber | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| House Sparrow (*Passer domesticus*) | Amber | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Jackdaw (*Corvus monedula*) | Green | Site | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site.<br>Observed within the surrounding land parcels and boundary hedgerow | Yes |
| Little Grebe (*Tachybaptus ruficollis*) | Green | Site | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Mallard (*Anas platyrhynchos*) | Amber | Site | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Mew Gull (*Larus canus*) | Amber | Site | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Mute Swan (*Cygnus olor*) | Amber | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |

| Name | BOCCI Status | Evaluation | Rationale | Key Ecological Receptor |
|---|---|---|---|---|
| Northern Lapwing (*Vanellus vanellus*) | Red | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Northern Wheatear (*Oenanthe oenanthe)* | Amber | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Pied wagtail (*Motacilla alba yarrellii)* | Green | Site | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site.<br>Observed within the surrounding land parcels and boundary hedgerow | Yes |
| Red Grouse (*Lagopus lagopus*) | Red | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Robin (Erithacus rubecula) | Green | Site | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site.<br>Observed within the surrounding land parcels and boundary hedgerow | Yes |
| Rock Pigeon (*Columba livia*) | Green | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Rook (Corvus frugilegus) | Green | Site | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site.<br>Observed within the surrounding land parcels and nesting on boundary of the Site | Yes |
| Sand Martin (*Riparia riparia*) | Amber | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Sky Lark (*Alauda arvensis*) | Amber | County | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Spotted Flycatcher (*Muscicapa striata*) | Amber | Yes | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |

| Name | BOCCI Status | Evaluation | Rationale | Key Ecological Receptor |
|---|---|---|---|---|
| Stock Dove (*Columba oenas*) | Red | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Tufted Duck (*Aythya fuligula*) | Amber | Local | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Water Rail (*Rallus aquaticus*) | Green | Site | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| White throat (Sylvia communis) | Green | Site | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site.<br>Observed within the surrounding land parcels and boundary hedgerow | Yes |
| Whooper Swan (*Cygnus cygnus*) | Amber | National | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Wren (Troglodytes troglodytes) | Green | Site | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site.<br>Observed within the surrounding land parcels and boundary hedgerow | Yes |
| Wood pigeon (Columba palumbus) | Green | Site | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site.<br>Observed within the surrounding land parcels and boundary hedgerow | Yes |
| Yellowhammer (*Emberiza citrinella)* | Red | County | Historical records within the 10km grid encompassing the Site, potential feeding habitat surrounding the Site. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the Site. | No |
| Invasive Avifauna | | | | |
| Canada Goose (*Branta canadensis*) | Green | None | Invasive Species not found within Site. | No |
| Greylag Goose (*Anser anser*)) | Amber | None | Invasive Species not found within Site. | No |

## 6.4 Characteristics and Potential Impacts of the Development

### 6.4.1 Potential Impacts on Designated Sites

#### 6.4.1.1 European Designated Sites

A retrospective Appropriate Assessment Screening Report was submitted to An Bord Pleanála (as part of the Application for Leave to Apply under S177C) (Earth Science Partnership 2022) to provide the Competent Authority with the information necessary to complete an Appropriate Assessment for the Development in compliance with Article 6(3) of the Habitats Directive.

From the assessment, it is concluded that the Site:

- Is not directly connected with or necessary to the management of a Natura 2000 site.
- Has not resulted in any significant impacts on the integrity or qualifying interests of any of the three identified Natura 2000 sites to date.
- Has not significantly impact the Natura 2000 network either on its own, or in combination with other plans/projects to date.

#### 6.4.1.2 Proposed Natural Heritage Areas

One pNHA, Lough Oughter And Associated Loughs (000007), lies within the boundary of a European Site and is therefore considered as part of the accompanying rAASR.

A hydrological connection exists between the Site and all pNHAs stated in Section 6.3.2 (except Cootehill Church pNHA) via the discharge outfall which flows into a road drain that is connected to the Briscarnagh Stream and Gortnana_010 river which flow in the Finn [Monaghan], however, the pNHAs are all upstream of the confluent points that connect with the Finn [Monaghan] and associated connections. There is no other ecological connectivity (e.g., noise, dust) between the Site and the pNHAs (refer to Chapter 8: Water). Therefore, there are no impacts from the Site that will affect the features of interest of the pNHAs.

There is no hydrological or ecological connectivity between the Site and the Cootehill Church pNHA. The pNHA is designated for a colony of Natterer's Bat (Myotis nattereri). Although the species is transient, the Core Sustenance Zone (CSZ) according to BCT 2016, is identified as 4km. The distance between the Site and the pNHA is c. 11km, which is beyond the identified CSZ, therefore impacts are not expected on the pNHA bat population.

Therefore, there are no impacts from the Site that will affect the features of interest of the pNHAs.

#### 6.4.1.3 Potential Impacts on Habitats

Commencing top-soil and aggregate extraction within the Site led to additional land-take and the irreversible loss of habitats existing within that area. The maximum ecological value of the habitats present within the application area is evaluated as being of *Local Ecological Importance*, with the dominant habitat of the Site being improved agricultural grassland (GA1), which is evaluated as being of *Site Ecological Importance*.

Considering the generally low ecological value of the habitats removed through historical land-take resulting from the Development, and the large availability of alternative habitats of these types in the wider landscape, the potential retrospective direct effect on habitats within the Site would have been negative, irreversible, permanent and not significant in a local context.

Fugitive dust arising from the excavation activities, the bare ground and the stockpiles/ overburden would have had the potential to become deposited on habitats adjacent to the Site. The Institute of Air Quality Management Guidance [13] states that:

> *"Dust can have two types of effect on vegetation: physical and chemical. Direct physical effects include reduced photosynthesis, respiration and transpiration through smothering. Chemical changes to soils or watercourses may lead to a loss of plants or*

> *animals for example via changes in acidity. Indirect effects can include increased susceptibility to stresses such as pathogens and air pollution."*

The guidance prescribes potential dust emission risk classes to ecological receptors. As the habitats within the Site have been identified as being of Site/Local Ecological Importance, they are classified as being negligible sensitivity receptors in accordance with IAQM 2014 and 2016. There were no potentially sensitive ecological receptors identified within 400m of the Site. Therefore, no assessment was carried out for fugitive dust on ecological receptors (refer to Chapter 9: Air Quality) .

The potential for retrospective indirect effects on the adjacent habitats as a result of fugitive dust arising from the Site activities would have been *negligible in a local context*.

Refer to Chapter 8: Water for the potential hydrological impacts of the Site on the drainage ditch and connecting watercourse.

Potential impacts on water quality and, by consequence, aquatic ecology which may have arisen from historical activities are:

- increased silt-laden runoff,
- increased surface water runoff and
- runoff containing hydrocarbons.

Sedimentation of the watercourse has the potential to temporarily degrade the quality of the watercourse and as such reduce the carrying capacity of the watercourse for amphibians and aquatic species. Hydrocarbons are toxic to flora and fauna, including fish, and these chemicals tend to be persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

Runoff within the Site drains overland to the Permitted Area, the settlement lagoons, the wheel wash or the yard interceptor drain. Water from the wheel wash drains into a concrete-lined settlement lagoon and from here into the linked settlement tanks located close to the northeast boundary of the Permitted Area. The yard interceptor drain feeds into the same linked settlement tank. This tank then passes through a hydrocarbon interceptor before being discharged via an underground pipe into a surface drain.

The Quarry Site was granted a discharge licence from MCC in respect of trade effluent (WP26/15), following the granting of planning ref 14/124. The drainage consent permits the stormwater drainage as outlined above, requiring the use of a hydrocarbon interceptor before the discharge to surface waters.

As such, the potential for retrospective indirect effects on the watercourse habitat as a result of hydrological impacts arising from the Site activities would have *Not-Significant in a local context.*

### 6.4.2 Potential Impacts on Fauna

#### 6.4.2.1 Non-volant Mammals

Given the limited suitable habitat for protected mammal species within the Site prior to operations and the Site's limited ecological value, the potential for retrospective indirect effects on non-volant mammal species utilizing the Site by virtue of direct loss of breeding and/or foraging habitat, in addition to noise and vibration from operational excavation activities resulting in disturbance/displacement would have been *Negligible in a local context.*

#### 6.4.2.2 Bats

Given the potential for low availability of suitable roosting habitat within the small woodland adjacent to the Site prior to commencing the Development extension works and the connectivity of the surrounding hedgerow network, the potential for retrospective direct effects

on bat species utilizing the Site by virtue of direct loss of roosting habitat would have been *Negative, Irreversible, Permanent and Significant in a local context.*

However, the Permitted Area was in use for numerous years prior to the Development taking place, including blasting and use of the quarry plant machinery. It is therefore assumed that due to the proximity of the trees to the Permitted Area and the potential suitable roosting habitats within the surrounding landscape, bat species would have utilised roosts further afield. The direct impacts would have therefore been *imperceptible in a local context*.

The potential for retrospective indirect effects on bat species utilizing the Site by virtue of direct loss of foraging habitat, in addition to noise, vibration and lighting from operational activities resulting in disturbance/displacement would have been *Negative, Reversible, Permanent and Significant impact in a local context.* However, due to the replacement of treelines and hedgerow as part of the permitted development and the existing boundary hedgerows being retained, the indirect effects would have been *Imperceptible in a local context*.

#### 6.4.2.3 Avifauna

Given the potential for low availability of suitable roosting habitat within the Site prior to the extension works and the retention of the boundary hedgerows, along with the availability of similar habitats in the surrounding landscape, retrospective direct and indirect effects by virtue of disturbance/displacement on general breeding bird species using these habitats would have been *Imperceptible in a local context*.

#### 6.4.2.4 Amphibians / Reptiles

Given the limited availability of suitable habitat available prior to works as well as the absence of waterbodies for potential breeding purposes, it is considered that the potential for significant retrospective direct and indirect effects of operations in the Site would have been *Imperceptible in a local context* for amphibians and reptiles.

### 6.5 Characteristics and Potential Impacts of the Site during Restoration

### 6.5.1 Potential Impacts on Habitats

The proposed restoration plan includes the seeding of c. 4 ha of grassland and planting of c. 11000m2 of hedgerow and treelines to provide thickening of the existing hedgerows and woodland screening. It also includes the seeding of native flora species in accordance with the national pollinator plan. Although the area will not be infilled to match the pre-existing ground level, the Site will be graded to bring to a uniform and even grade to remove all minor hollows and ridges, allowing for a similar state (grazing grassland) to that prior to works being undertaken.

As such, the impacts from the restoration plan will be *Neutral in a local context* with regards to pre-operational land use and *Significant Positive in a local context* with regards to the Site in its current status.

### 6.5.2 Potential Impacts on Fauna

The proposed restoration plan includes the seeding of grassland, and planting of hedgerow and treelines. This will increase the potential for roosting, nesting, foraging and commuting potential for species present within the area.

As such, the impacts from the restoration plan will be *Neutral in a local context* with regards to pre-operational use by fauna and *Significant Positive in a local context* with regards to the Site in its current status.

## 6.6 Mitigation Measures

### 6.6.1 Previous/Existing Mitigation

The following design and best practice measures have been implemented as part of previous applications within the Quarry Site to prevent the occurrence of impacts to the surrounding area (refer to Chapters 8, 9 and 11 for further measures relating to water quality, dust and noise respectively):

- The raised boundaries (high banks) and treeline/hedgerows/shrubs which were put in place around the border of the Site would have assisted in filtering and containing air borne emissions as this further ensured that operational activity was kept below the surrounding ground level.
- The wheel wash is located at the Site entrance to reduce Site traffic fouling public roads. All outgoing vehicles are required to utilise the wheel wash when exiting the site.
- Fuel is stored within a 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 stored in the main site garage, on hard-standing, in barrels and other containers.
- No disturbance to habitats or flora outside the development footprint have occurred.
- The treeline and hedgerow around the boundary of the site has been replaced and/or enhanced to reduce the visual impact of the quarry. This has increased potential roosting/ foraging for mammal and bird species.
- Runoff passes through the settlement lagoon, wheel wash or the yard interceptor drain which have been shown to clarify the water prior to it leaving the Site.
- The discharge licence from MCC in respect of trade effluent (WP26/15) requires the permitted trade effluent to pass through the hydrocarbon interceptor before the discharge to surface waters.
- 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.

### 6.6.2 Proposed Mitigation

Refer to Chapters 8, 9 and 11 for further measures relating to water quality, dust and noise respectively.

The settlement pond, lagoon, wheel wash and hydrocarbon interceptor will be serviced and maintained, including the removal of sediment offsite periodically by a permitted contractor to a licensed facility, to prevent the release of finer sediment into the drainage ditch.

## 6.7 Cumulative and In-Combination Impacts

### 6.7.1 Projects

All planning permissions in the surrounding area relate to one-off dwellings, garages, extensions and effluent treatment facilities. These planning applications are unlikely to have resulted in significant cumulative effects on biodiversity, given their small scale, lack of effects on ecological receptors and there being no connectivity to the Site or adjoining watercourse. Therefore, it is determined that the planning permissions in the surrounding area did not result in significant in-combination effects.

### 6.7.2 Existing practices

The Site is predominantly located within an area dominated by agricultural land. Cumulative effects could occur if the Site works (mainly blasting/ excavations) are undertaken in parallel

with off-site agricultural activities (particularly manure spreading) within the same catchment, ultimately adding to potential nutrient/ sediment runoff impacts to the drainage ditch and connecting watercourse. However, the drainage ditch goes to ground and is deposited through wetland/bog area that enters the Dunsrim Lough before reaching the Briscarnagh Stream . Therefore, it is determined that the surrounding land management did not result in significant in-combination effects.

### 6.7.3 Plans

The relevant Plans described below set out the most up to date guidance that is used for this assessment. These plans accumulate the retrospective objectives of previous plans and therefore included in this report.

#### 6.7.3.1 The National Biodiversity Action Plan 2017-2021

Ireland's National Biodiversity Action Plan [51] sets out actions through which a range of government, civil and private sectors will undertake to achieve Ireland's 'Vision for Biodiversity' and follows on from the work of the first and second National Biodiversity Action Plans.

There are 119 targeted actions contained within the Plan, underpinned by seven strategic objectives. The objectives lay out a clear framework for Ireland's national approach to biodiversity, ensuring that efforts and achievements of the past are built upon, while looking ahead to what can be achieved over the next five years and beyond.

The objectives are:

- mainstreaming biodiversity across the decision-making process in the State;
- strengthening the knowledge base underpinning work on biodiversity issues;
- increasing public awareness and participation;
- ensuring conservation of biodiversity in the wider countryside;
- ensuring conservation of biodiversity in the marine environment;
- expanding and improving on the management of protected areas and protected species;
- enhancing the contribution to international biodiversity issues.

The National Biodiversity Action Plan 2017-2021 will be superseded in 2023 by Irela$^{nd}$'s 4th National Biodiversity Action Plan.

#### 6.7.3.2 Monaghan County Development Plan 2019-2025

Monaghan County Development Plan 2019-2025 is the existing plan for the county. The policies and objectives in Chapter 6 Heritage, Conservation and landscape of the Monaghan County Development Plan 2019-2025 are relevant to this Assessment.

There are no planned development strategies/ objectives within the plans that will contribute to cumulative impacts with the proposed scheme, therefore, there is no potential for significant effects in-combination with the plans.

The risk of cumulative impacts is deemed to have been *not significant.*

## 6.8 Difficulties Encountered

A common difficulty encountered throughout the rEIAR was the issue of attempting to identify potential historic impacts which may have once existed, but which are now absent, or which may have reduced over time. Similar difficulties arose regarding the establishment of any historic periods when certain impacts may have become apparent only to subsequently abate. The rEIAR has been limited by the availability, completeness and accessibility of publicly available data from the period of time applicable to the Development subject to the substitute consent.

## 6.9 Interactions with other Environmental Attributes

- Chapter 7: Land Soils & Geology
- Chapter 8: Water (Hydrology & Hydrology)
- Chapter 9: Air Quality
- Chapter 10: Climate
- Chapter 11: Noise & Vibration

## 6.10 Residual Impact

The mitigation measures set out above have proven to work and that the surrounding environment has not been significantly affected by the Site. Therefore, the residual impacts on biodiversity are deemed to be Imperceptible from the Site.

With the implementation of the restoration plan as detailed in Appendix 3-3 there will be a neutral to positive effect at the Site post development. This is due to the proposed increased treeline length and hedgerow length/depth providing commuting and foraging benefits for the future species within the area of the Site. The residual impacts on biodiversity are therefore considered to be likely Significant Positive at the local level in the long-term.

## 6.11 Monitoring

Not applicable. As the Development has ceased, the surveys undertaken as part of this assessment reflect the current site condition. No future monitoring is proposed.

## 6.12 Reinstatement

Following on from S261 registration, an after-care plan was created for the whole Site. A further after-care plan has been created for the Substitute Consent area as it stood when work ceased in this area in 2021. Both these plans were submitted to the relevant planning authority. See section 3.6 above and Appendix 3-3 for further details.

# 7 LAND, SOILS & GEOLOGY

## 7.1 Introduction

This chapter provides a description and assessment of the potential likely and significant impacts (if any) on the geological and soil environment which have occurred, which are occurring, or which can reasonably be expected to occur, because of the Development and subsequent restoration.

## 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 [7].

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 [94];
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes [95];
- Department of Environment, Heritage and Local Government: Quarries and Ancillary Activities - Guidance for Planning Authorities [96];
- EPA Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [97], and,
- Institute of Environmental Management & Assessment (IEMA) Guide: A New Perspective on Land and Soil in Environmental Impact Assessment [98]

### 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 [60]
- Environmental Protection Agency (EPA) Online Mapping [57], 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. Two groundwater monitoring wells (GW1 and GW2) were completed within the Registered Area. GW1 was installed in the Permitted Area and GW2 was installed in the Site. The monitoring wells were installed at depth ranging from 50mbgl (GW1) to 51mbgl (GW2). 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. These records provide insight into the condition of the bedrock and geology resulting from historic extraction. An observation of the quarry faces was undertaken by the MOR specialist to record and log the visible water seepages.

A topographical site survey was undertaken in June 2022. Following the installation of the boreholes, a follow up survey linking all borehole locations to Ordnance Datum was supplied on 16th December 2022 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 [95], 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.<br>Degree or extent of soil contamination is significant on a national or regional scale.<br>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).<br>• Large existing quarry or pit.<br>• Proven economically extractable mineral resource. |

| Importance | Criteria | Typical Example |
|---|---|---|
| **High** | Attribute has a high quality, significance or value on a local scale.<br>Degree or extent of soil contamination is significant on a local scale.<br>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.<br>• Large recent landfill site for mixed wastes.<br>• Geologically feature of high value on a local scale (County Geological Site).<br>• Well drained and / or high fertility soils.<br>• Moderately sized existing quarry or pit.<br>• Marginally economic extractable mineral resource. |
| **Medium** | Attribute has a medium quality, significance or value on a local scale.<br>Degree or extent of soil contamination is moderate on a local scale.<br>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.<br>• Small recent landfill site for mixed wastes.<br>• Moderately drained and / or moderate fertility soils.<br>• Small existing quarry or pit.<br>• Sub-economic extractable mineral resource. |
| **Low** | Attribute has a low quality, significance or value on a local scale.<br>Degree or extent of soil contamination is minor on a local scale.<br>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.<br>• Small historical and / or recent site for construction and demolition wastes.<br>• Poorly drained and / or low fertility soils.<br>• Uneconomically extractable mineral resource. |

## 7.3 Receiving Environment

### 7.3.1 Current Land Use and Site Description

The current land use of the Site is best described as extraction of greywacke stone, though such works have ceased following receipt of the Enforcement Notice from MCC. Prior to excavation expanding from the Permitted Area into the Site (see section 1.2), historical records show the land use was agricultural. A description of the historic activities on the Site is provided in Section 3.3 of this EIAR.

### 7.3.2 Topography

Based on the topographic survey, the Site has been extracted to a depth of approximately 105mAOD. The average ridge height is estimated at 130m OD.

Observations on the adjoining land would support an historic landform higher within the southern portion of the Site and falling towards the north and northwest.

### 7.3.3 Bedrock Geology

According to GSI mapping [60], 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 GW1 and GW2. 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. No signs of contamination

were observed on the arisings during the installation of the wells. However, some evidence of water present within the wells was observed during the drilling. There was no evidence of water seepage from the quarry walls. The locations of the newly installed groundwater wells GW1 and GW2 are shown in Figure 7-2 below.

**Figure 7-1: Bedrock Geology**

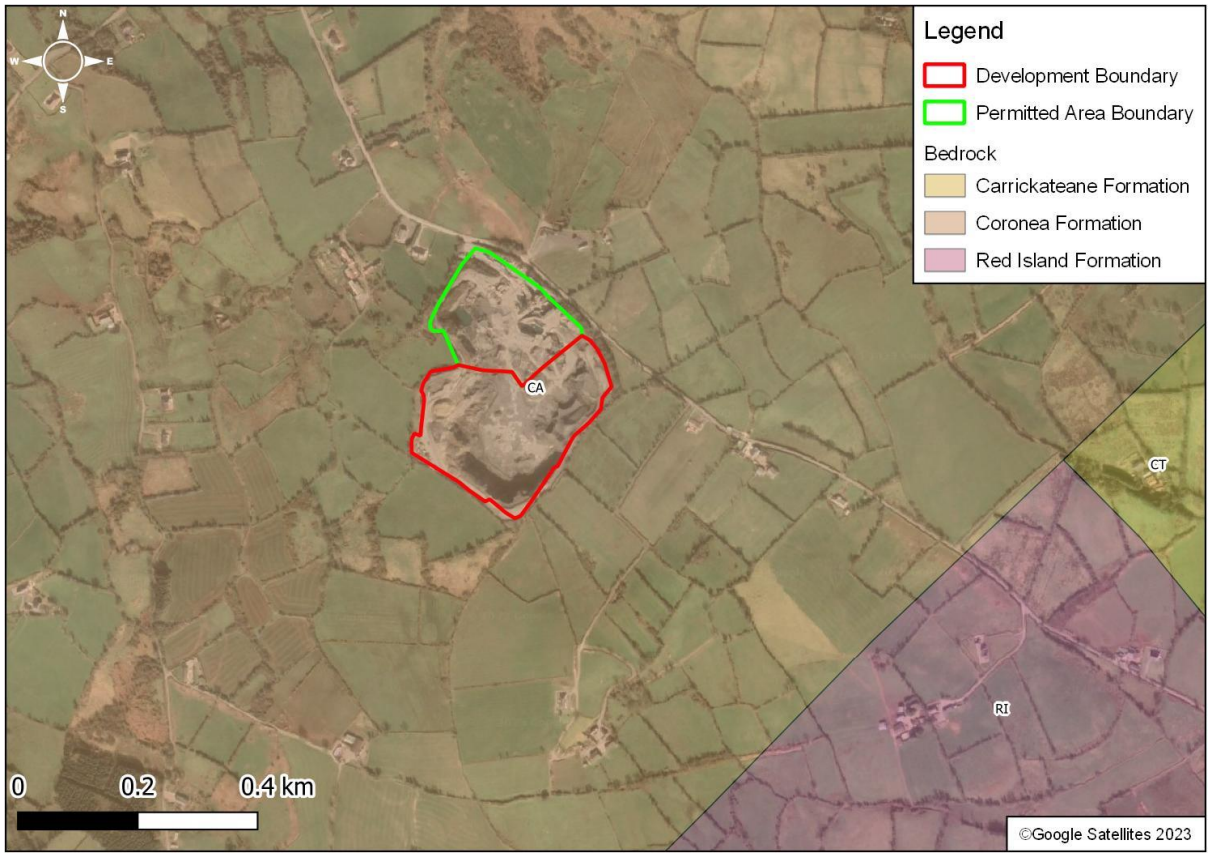
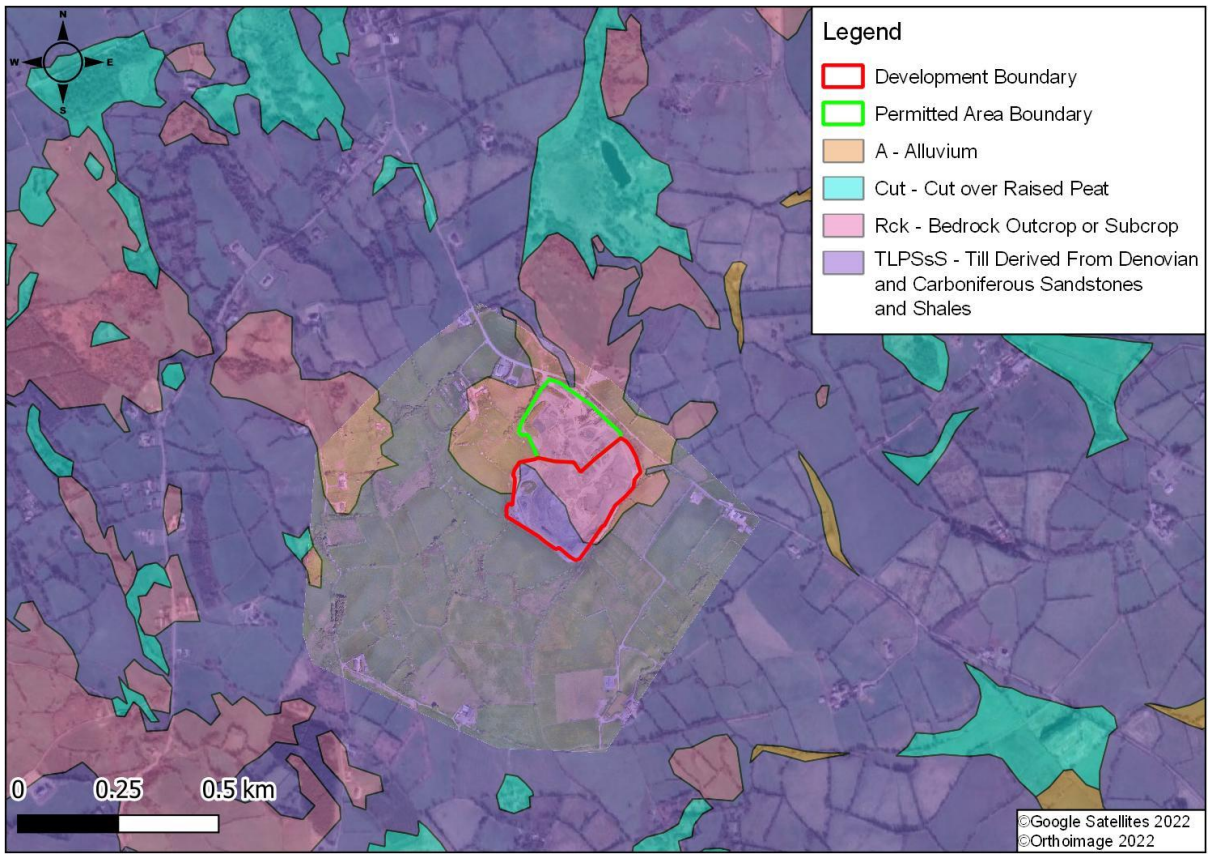


**Figure 7-2: Groundwater Monitoring Wells**


## 7.3.4 Quaternary Geology

According to the GSI database [60], there was a region of near surface bedrock outcrop/subcrop located in the north-eastern section of the Site and with a smaller region along its north-western edge. Till derived from Palaeozoic sandstones and shales comprise the remaining southwestern region of the Site. See Figure 7-3 below. Extraction within the Site has removed this till and the Site is likely now a near complete region of exposed bedrock.

**Figure 7-3: Quaternary Geology**

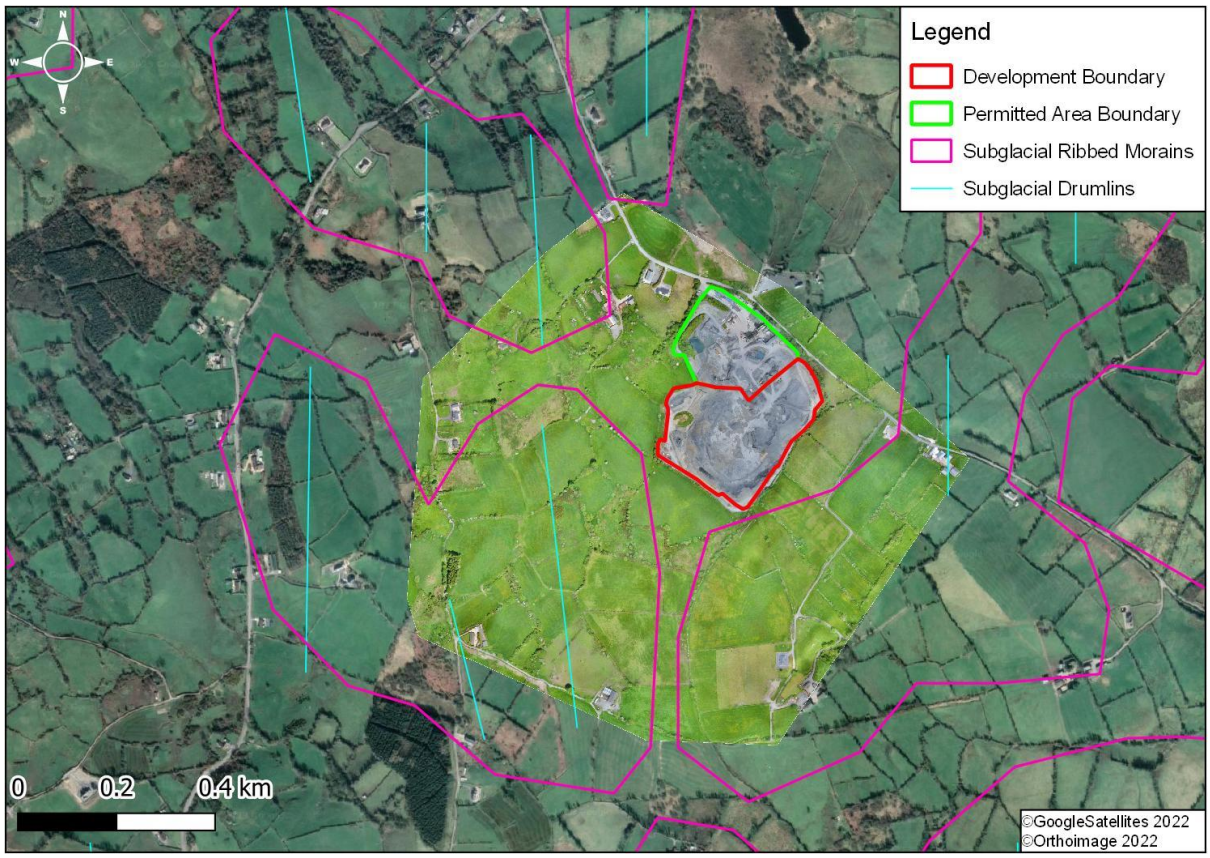



## 7.3.5 Glacial Landforms

The Site is located within a region of glacial landforms and is surrounded by multiple mapped ribbed moraines, with the nearest located to the south of the Site. Drumlins with a north-south trend lie within some surrounding moraines, with the closest ca. 0.21km 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 [99] [100]. 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 Registered Area itself lies close to the north-eastern edge of the CGS.

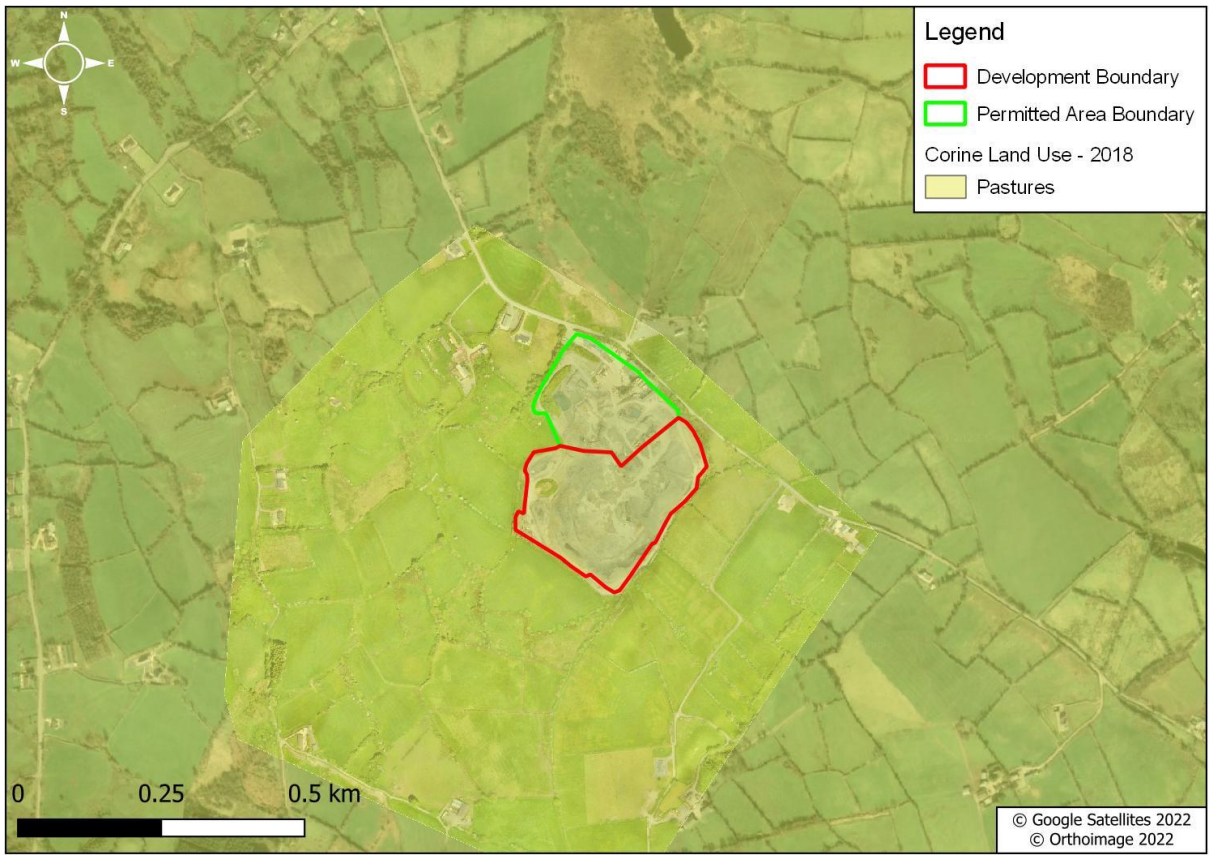
According to *"The Geological Heritage of Monaghan, 2013"* [101], this forms part of the larger Rockcorry-Cootehill ribbed moraine field – the largest field of ribbed moraines in the world. The Scotshouse-Redhills moraines are unique in that they are the only moraine field in the world to record two 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 [101].. The report states [101]:

> *"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 Land use and 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, though the Corine Land Cover inventory [102] has not yet changed to reflect this.

**Figure 7-5: Corine–2018 - Land use**




This change in usage allowed for the extraction of aggregates onsite, which is within an area of Very High Potential for granular aggregate, as identified in GSI database [60].

### 7.3.8 Soils

According to the GSI database [60] soil map, the Site is was characterised by AminSW soil (shallow well drained mineral (mainly acidic)) present in the north eastern region, with as small area of AminSRPT (shallow, rocky, peaty/non-peaty mineral complexes (mainly acidic)) present in the northeast. These soils were also found within the Permitted Area. AminPD soil (Mineral poorly drained (mainly acidic)) comprises the remaining, south-western region of the Site. Refer to Figure 7-6 below.

**Figure 7-6: Soils**


Based on, Table 2 of the 2022 IEMA guidance [98], these soils have a "low" receptor sensitivity, based on the predominantly mineral nature of the soils, and the fact that the Soils were agricultural in nature and would have supported limited community, recreational/educational access to land. Utilising Table 3 of the same guidance, the magnitude of impact associated with the removal of these soils is "Slight" as the Site is between 5-20ha, but there is potential for improvement once restored. Therefore, under this guidance, the impact of the soil removal was negative and moderate, which "*are not material in the decision-making process"* by the guidance.

During the Site preparation phase of works associated with the Development, soils and associated overburden were stripped and used to construct berms around the periphery of the Site. These soils will be re-used as part of the Restoration Plan, where they will be respread and seeded (Refer to Appendix 3-3).

## 7.4 Characteristics and Potential Impact of the Development

The characteristics and potential impacts of the Development have been identified as follows:

- The impact on land use resulting from a change in use facilitating the Development;
- The impact on soils within the Site from the Development;
- The impact on geology from the Development
- The impact of extraction of bedrock aggregates on the geological heritage of Monaghan; and
- The release of pollutants from plant and equipment onto the land soils (and subsequent risks posed to human health and the environment).

### 7.4.1 Historic Impacts of the Development

The Site, which previously formed pastoral agricultural land, underwent extraction and consequently a change in land use (agricultural to industrial). As identified in Chapter 11, "*the wider study area can still be classed as predominantly rolling patchwork farmland containing occasional variant rural land uses.*" This is further evidenced in the Corine Land Cover inventory, where pasture is still the dominant land use in the vicinity of the Site. Moreover, the most recent assessment identifies that agriculture is the primary land use in Ireland, enveloping 67.7% of land cover in Ireland. As such, it is considered that the impact from the Development was "not significant", given the minor extent of land which underwent change of use.

As part of the site preparation phase, soils and overburden were stripped and used to construct berms along the periphery of the Registered Area. These berms have provided screening (noise, dust, visual impacts) and mitigation to the wider environment. The berms have become vegetated which will aid condition preservation. It should be noted that no visual evidence of contamination was observed in the monitoring well logs, or in the wider Site. Moreover, no environmental incidents were identified by the Applicant during this assessment. Nevertheless, the soils and their condition would have been subjected to a slight adverse impact from being excavated and constructed into berms. This impact is considered to be reversible though as part of the restoration works, where the soils will be reinstated and planted with grass seed.

The Site is within a CGS, which, based on NRA Guidance [35], is of high importance as a geological attribute. The historic extraction likely had a slight long term negative impact on the geology and geomorphology within the CGS. However, the extracted area within the Site constitutes <1% of the total area of the CGS (see Section 7.6).

## 7.5 Mitigation Measures

The Applicant has indicated that mitigation measures completed at the Registered Area (and the Site where applicable) were generally in accordance with the EPA (2006) Environmental Management Guidelines: Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [103], whereby;

- All plant and HGVs used were refuelled onsite, on a concrete plinth which flows into settlement tanks before reaching the interceptor;
- Items of plant unsuitable for travelling to the refuelling area (dry screening plant), were refuelled utilising adequately sized and positioned drip trays;
- Fuel (diesel) was stored in a double skinned tank and was appropriately bunded;
- Spill kits were available adjacent to all refuelling and fuel storage operations;
- Unauthorised access was prevented in so far as possible; and
- Waste oils and hydraulic fluids were collected in leak-proof containers and removed from the Registered Area for disposal or recycling.

For the Restoration works, the following mitigation measures should be implemented;

- All plant and HGVs used will be refuelled at the Permitted Area in accordance with existing procedures by trained personnel;
- Items of plant unsuitable for travelling to the refuelling area (dry screening plant), will be refuelled utilising adequately sized and positioned drip trays;
- Fuel (diesel) will be stored in a double skinned tank in the Permitted Area in accordance with existing procedures;
- Spill kits will available adjacent to all refuelling and fuel storage operations;
- Unauthorised access will be prevented in so far as possible; and

- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the Registered Area for disposal or recycling.
    - Soils stored in berms onsite will be re-used as part of the Restoration Plan, respread and seeded.

## 7.6 Cumulative and In-Combination Effects

The potential cumulative impact 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 the Registered Area. The total area covered by the Registered Area as per the S261 registration is ca. 11.5ha, which represents ca.<0.25% of the Scotshouse-Redhills moraine area. Given the extensive nature of Scotshouse-Redhills moraines, the wider Rockcorry-Cootehill moraines and the scale of the Registered Area it is considered that the impact is adverse and long term in nature, but "not significant".

## 7.7 Interactions with other Environmental Attributes

Land, soils and geology interact with other environmental attributes as follows:

- Chapter 6 - Biodiversity: the change in land use and removal of soils could potentially give rise to significant and likely effects on biodiversity primarily through habitat loss. These potential effects are assessed in Chapter 6;
- Chapter 8 - Water: Soil contamination can act as a contamination source that negatively impacts underlying aquifer (groundwater) and surface water quality. However, no soil contamination is known to have occurred onsite. Surface water quality may still be impacted through the mobilisation of suspended soils and release of dissolution of mineral/nutrients from rock and soil into surface water. These impacts on water quality are discussed in Chapter 8;
- Chapter 9 - Air Quality: the mobilisation of dust through extraction processes such as blasting and crushing can impact air quality. The impacts on air quality are addressed in Chapter 9.

## 7.8 Indirect Impact

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

## 7.9 Residual Impact

Given the widespread nature of pasture farmland across Ireland and after the restoration plan has been implemented, the site will be restored to grassland, it is considered that the residual impact on land use was not significant.

Given that no evidence of contamination was observed, no pollution incidents reported, soil materials stripped during the site preparation phase have been stored onsite and will be re-used as part of the restoration plan it is considered that the residual impact on soils was "not significant".

Given the previous extraction activities have resulted in removal of bedrock geology, the extensive nature of Scotshouse-Redhills moraines, the wider Rockcorry-Cootehill moraines and the scale of the Site was "not significant".

## 7.10 Monitoring

Not applicable.

## 7.11 Reinstatement

Following the S261 registration, an after-care plan was created for the whole site as it stood at the time. A further after-care plan has been created for the Substitute Consent area as it stood when work ceased in this area in 2021. Both these plans were submitted to the relevant planning authority. See section 3.6 above and Appendix 3-3 for further details.

## 7.12 Difficulties Encountered

A common difficulty encountered throughout the rEIAR was the issue of attempting to identify potential historic impacts which may have once existed, but which are now absent or which may have reduced over time. Similar difficulties arose regarding the establishment of any historic periods when certain impacts may have become apparent only to subsequently abate. The rEIAR has been limited by the availability, completeness and accessibility of publicly available data from the period of time applicable to the Development subject to the substitute consent.

Where relevant, this rEIAR therefore utilises best practice in risk assessment and prediction to characterise likely impacts, based on the information known regarding the Development.

# 8 WATER

## 8.1 Introduction

This chapter provides a description and assessment of the potential likely and significant impacts if any on the hydrological (surface water) and hydrogeological (groundwater) environment, which have occurred, which are occurring, or which can reasonably be expected to occur because of the Development.

## 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 [61].

Public consultation on the draft of the 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 [62].

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 [94];
- National Roads Authority (NRA) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes [95];
- CIRIA–C532 - Control of Water Pollution from Construction sites - Guidance for Consultants and Contractors [104];
- Department of Environment, Heritage and Local Government Quarries and Ancillary Activities - Guidance for Authorities [96];
- EPA Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [97];
- Groundwater Regulations 2010 (S.I. No. 9 of 2010) as amended (S.I. No. 149 of 2012 and S.I. No. 366 of 2016) [105];
- Surface Water Regulations 2009 (S.I. No. 272 of 2009) as amended (S.I. No.327 of 2012 and S.I. No.386 of 2015 and S.I. No. 77 of 2019) [106]; and
- European Union (Drinking Water) Regulations 2014 (S.I. No. 122 of 2014) as amended (S.I. No. 464 of 2017 and S.I. No. 286 of 2022) [107].

### 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 substitute consent area within the applicant's landholding, using the following data sources:

- Geological Survey of Ireland (GSI) [60];
- Environmental Protection Agency (EPA) Maps database [108];
- Environmental Protection Agency (EPA) Catchments [109]: and,
- Office of Public Works (OPW) 'Flood Maps' [110].

### 8.2.3 Impact Assessment Methodology

The importance / sensitivity of the hydrogeological and hydrological receptors was assessed on completion of the desk study. Using the NRA Guidance [95], 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**

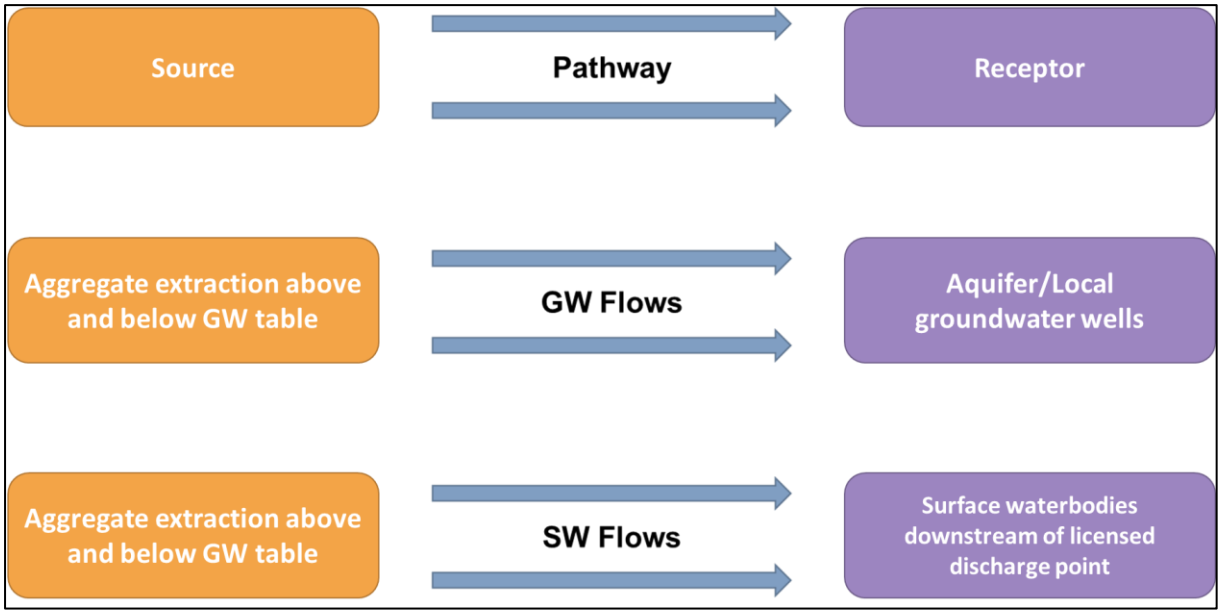
| Importance | Criteria | Typical Example |
|---|---|---|
| **Extremely High** | Attribute has a high quality or value on an international scale | • River, wetland or surface water body ecosystem protected by EU legislation, e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid 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.<br>• Regionally important potable water source supplying >2500 homes.<br>• Quality Class A (Biotic Index Q4, Q5).<br>• Flood plain protecting more than 50 residential or commercial properties from flooding.<br>• 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.<br>• Quality Class B (Biotic Index Q3-4).<br>• Flood plain protecting between 5 and 50 residential or commercial properties from flooding. |
| **Medium** | Attribute has a medium quality or value on a local scale | • Coarse fishery.<br>• Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2-3).<br>• 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.<br>• Local potable water source supplying <50 homes.<br>• Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1 residential or commercial property from flooding.<br>• 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.<br>• Groundwater supports river, wetland or surface water body ecosystem protected by national legislation - NHA status.<br>• 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.<br>• Locally important potable water source supplying >1000 homes.<br>• Outer source protection area for regionally important water source.<br>• Inner source protection area for locally important water source. |
| **Medium** | Attribute has a medium quality or value on a local scale | • Locally Important Aquifer.<br>• Potable water source supplying >50 homes.<br>• 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 (see Figure 8-1) 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.

**Figure 8-1: Source-Pathway-Receptor Model**



Where impacts are identified, the classification of impacts in the assessment follows the descriptors provided in the Glossary of Impacts contained in the following guidance documents produced by the Environmental Protection Agency (EPA):

- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003); and,
- Environmental Protection Agency (May 2022) – Guidelines on the Information to be contained in Environmental Impact Assessment Reports.

The description process clearly and consistently identifies the key aspects of any potential impact source, namely its character, magnitude, duration, likelihood and whether it is of a direct or indirect nature.

To provide an understanding of the stepwise impact assessment process applied below, we have firstly presented below a summary guide that defines the steps 1 to 7 (Table 8-3) taken in each element of the impact assessment process in below. The guide also provides definitions and descriptions of the assessment process and shows how the source-pathway-target model and the EPA impact descriptors are combined.

**Table 8-3: Assessment Methodology**

| Attribute | Status / Occurrence | Importance |
|---|---|---|
| **Step 1** | Identification and Description of Potential Impact Source<br>This section presents and describes the activity that brings about the potential impact or the potential source of pollution. The significance of effects is briefly described. | |
| **Step 2** | Pathway / Mechanism: | The route by which a potential source of impact can transfer or migrate to an identified receptor. In terms of sand and gravel extraction, surface water and groundwater flows are the primary pathways. |
| **Step 3** | Receptor: | A receptor is a part of the natural environment which could potentially be impacted upon, e.g. human health, plant / animal species, aquatic habitats, soils/geology, water resources, water sources. The potential impact can only arise as a result of a source and pathway being present. |
| **Step 4** | Pre-mitigation Impact: | Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impact before mitigation is put in place. |
| **Step 5** | Proposed Mitigation Measures: | Control measures that will be put in place to prevent or reduce all identified significant adverse impacts. These measures are generally provided in two types:<br>(1) mitigation by avoidance, and<br>(2) mitigation by best practice engineering design. |
| **Step 6** | Post Mitigation Residual Impact: | Impact descriptors which describe the magnitude, likelihood, duration and direct or indirect nature of the potential impacts after mitigation is put in place. |
| **Step 7** | Significance of Effects: | Describes the likely significant post mitigation effects of the identified potential impact source on the receiving environment. |

Using this defined approach as a basis, the impact assessment process can be applied to the historic and existing impacts of the Site rather than potential impacts of mitigated proposed activities. When applied to historic extraction activities, which have the potential to generate a source of significant adverse impact on the hydrological/hydrogeological (including wells,

streams, and water quality) environments, the source-pathway-receptor (SPR) linkage below is produced.

Sources

In the case of the Site the primary potential sources of impact are to groundwater and surface water quality and availability, whereby the primary potential hazards are the infiltration of contaminants such as hydrocarbons and nutrients such as ammonia into the bedrock aquifer and nearby surface waters, through the potential spillages from machinery or explosives used in extracting the bedrock aggregates.

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 unnamed stream which subsequently acts as a pathway to Dunsrim Lough, north of the Registered Area.

Receptor

The primary receptors are the underlying bedrock aquifer, local wells in the vicinity of the site, the groundwater source protection areas (Clones Scotshouse PWS) and local surface water receptors downstream of the discharge point (Dunsrim Lough, River GORTNANA_010).

### 8.2.4 Site Investigations

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

- Installation of two (2 No) groundwater wells (GW1 & GW2) at the Registered Area.
- A topographical site survey was undertaken in order to survey the area to Ordnance Datum;
- Groundwater monitoring was carried out at the Site at GW2 in December 2022, GW1 and GW2 in January 2023. A well from a private dwelling north of the Registered Area was sampled in February 2023.

Each groundwater monitoring event included the following:

- The monitoring wells were installed at depth ranging from 50mbgl (GW1) to 51mbgl (GW2). During the installation works the MOR consultant 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 GW1 and GW2 on 25$^{th}$ January 2023 to assess the permeability of the greywacke bedrock.

Surface water monitoring was carried out at the Site historically between May 2016 and November 2019, with more recent monitoring occurring between October 2022 and February 2023. This included the following:

- Field hydrochemistry measurements for surface water, (electrical conductivity, pH and temperature);
- 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.

## 8.3 Receiving Environment

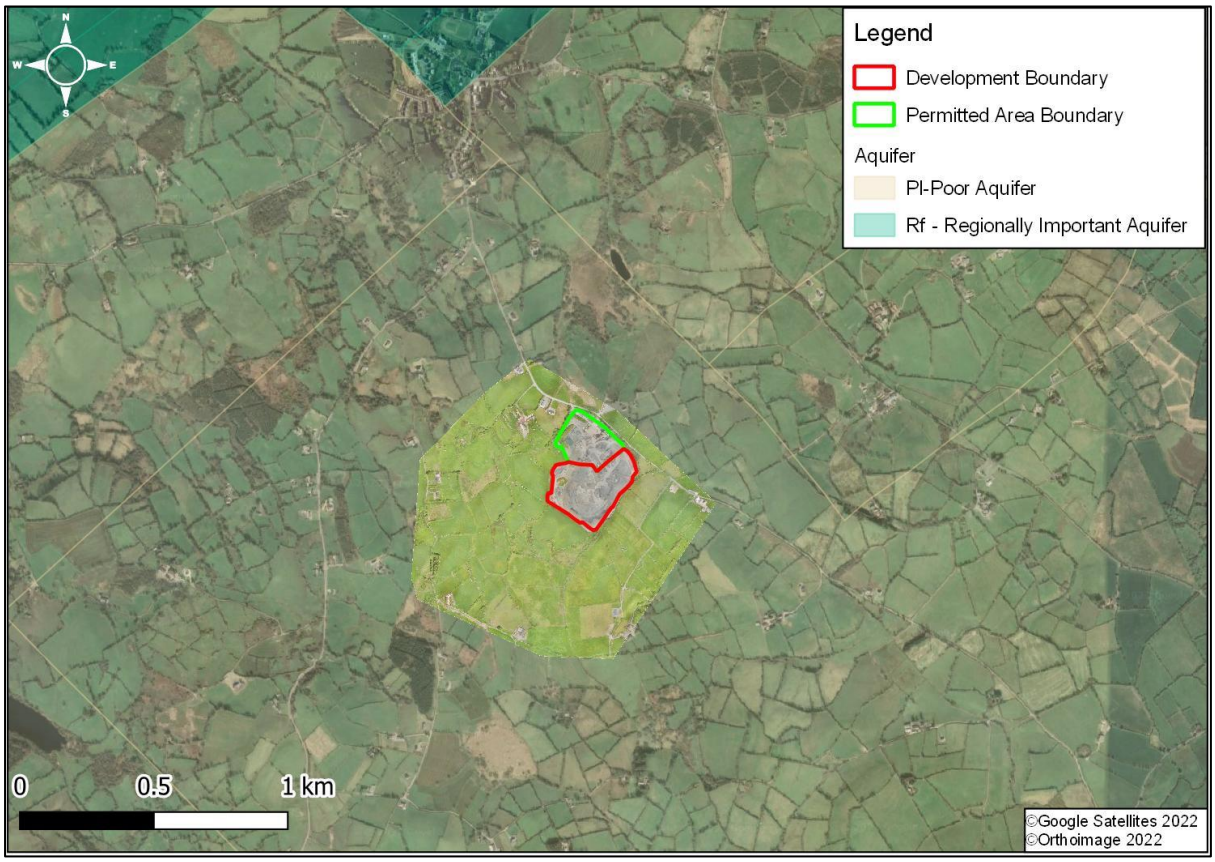
### 8.3.1 Hydrogeology

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 Registered Area is underlain by a Poor Aquifer–(Pl) - Bedrock which is Generally Unproductive except for Local Zones. 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. Based on Figure 8-2, given the poor productivity of the importance of this feature is Low.

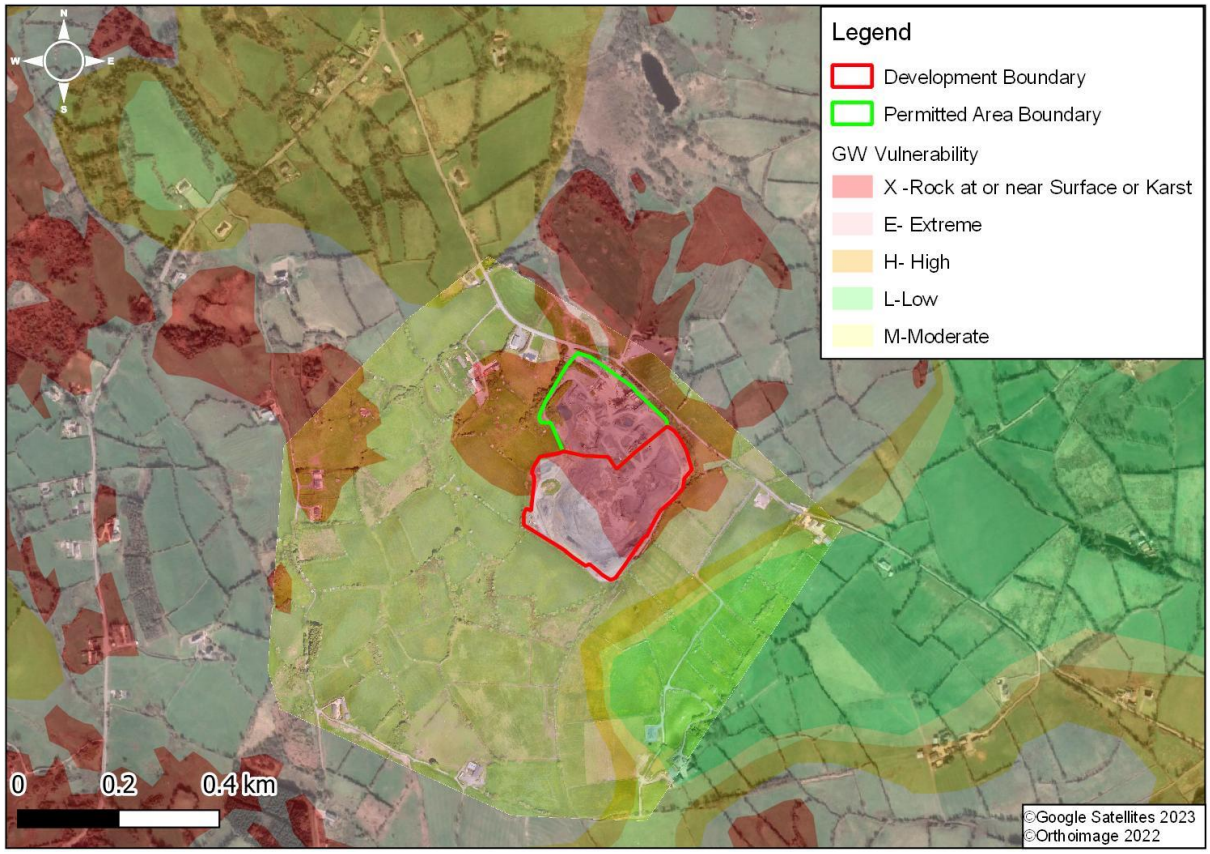
**Figure 8-2: Bedrock Aquifer**




#### 8.3.1.2 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 [111]. The south-western part of the Site is classified as having Extreme (E) vulnerability, whereas the north-eastern section, along with a small section in the north-western corner of the Site, is classified as having Rock at or near Surface or Karst (X). See Figure 8-3 below. Due to the extraction activities at the Site, the rock is now exposed (i.e., rock at surface vulnerability) throughout the Site.

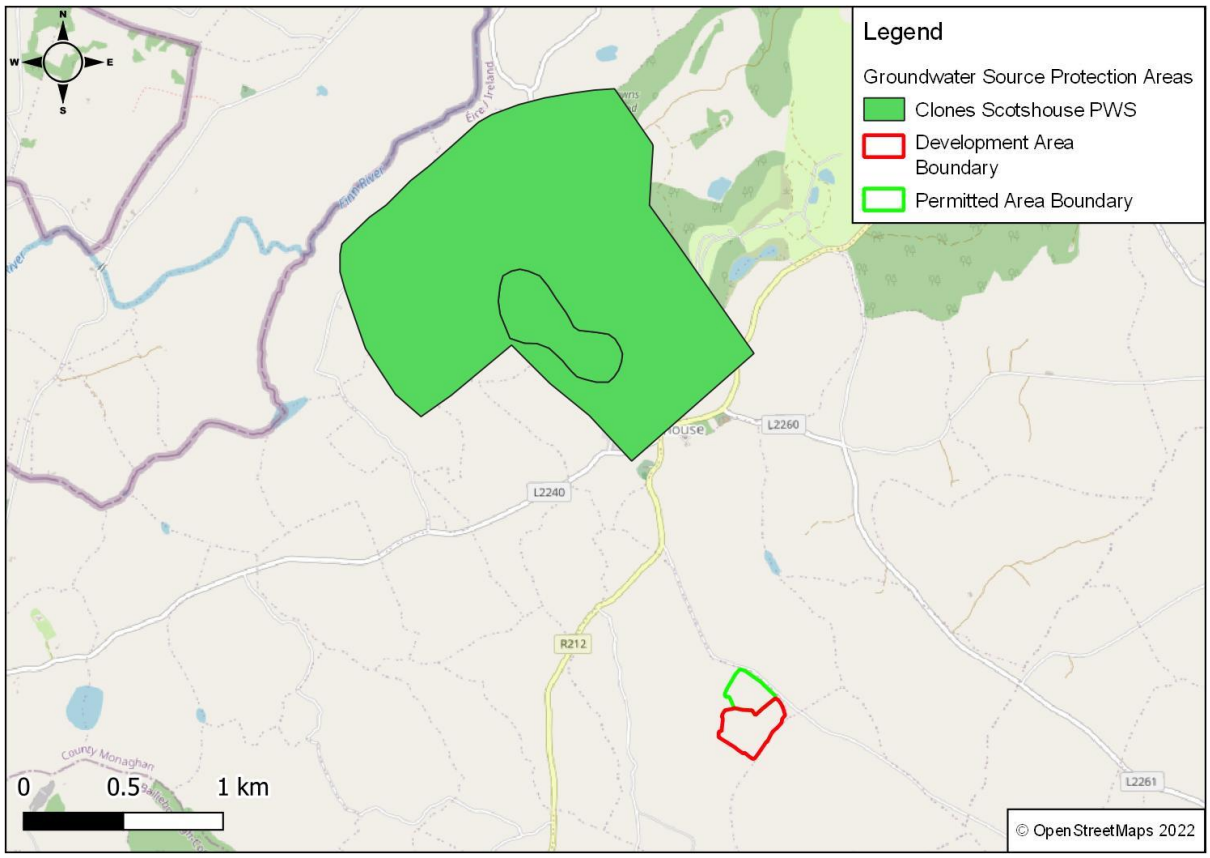
**Figure 8-3: GW Vulnerability**




### 8.3.1.3 Groundwater Protection and Use

Groundwater Protection Schemes provide a framework for the protection of groundwater source zones (i.e., areas of contribution to water supply bores). The Clones Scotshouse Public Water Supply Source Protection Areas are shown in Figure 8-4 below. The Source Inner (SI) and Source Outer (SO) areas are respectively ca.1.7km and 1.3km to the northwest of the Site.

**Figure 8-4: Source of Protection Areas Public Water Supply**




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)* [112]. 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)* [113] 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 8-4 below for details.

**Table 8-4: Available Groundwater Well Information**

| Borehole ID | Centre Distance from Site | Grid Reference (Irish Grid) | Well Type | Total Depth (m) | Townland | Yield ($m^3d$) |
|---|---|---|---|---|---|---|
| 2331SEW001 | 1.68km 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 | 1.46km N | 249310 319550 | Borehole | 20 | Killyfargy | - |
| 2331SEW012 | 1.12km NE | 250650 318800 | Dug well | 5 | Cavan | 17.3 |
| 2331SEW013 | 1.00km NE | 250680 318520 | Dug well | 6 | Cavaney | 8.6 |
| 2331SEW014 | 1.86km N | 249660 319960 | Spring | - | Killyfargy | 25.9 |
| 2331SEW015 | 1.56km N | 249520 319670 | Dug well | 4 | Killyfargy | 25.9 |
| 2331SEW019 | 1.04km SW | 248570 317400 | Unknown | 18 | Skerrick West | 25.9 |

| Borehole ID | Centre Distance from Site | Grid Reference (Irish Grid) | Well Type | Total Depth (m) | Townland | Yield ($m^3d$) |
|---|---|---|---|---|---|---|
| 2331SEW030 | 0.65km N | 249440 318800 | Dug well | 3.7 | Dunsrim | 21.8 |
| 2331SEW034 | 0.74km W | 248530 318100 | Dug well | 3.7 | Corrackan | 38.2 |
| 2331SEW039 | 1.92km NW | 247840 319140 | Borehole | 91.4 | Drumaveale | 218 |
| 2331SEW040 | 1.87km NW | 248890 319880 | Borehole | 3.2 | Cavanreagh | - |
| 2331SEW041 | 1.90km 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 | Cavan | 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 |

These boreholes and any other abstraction points downflow of the Site are the secondary receptors for contamination under any SPR linkages in relation to groundwater, with groundwater flow in the bedrock aquifer acting as a pathway to these receptors.

### 8.3.1.4 Groundwater Levels and Flow Direction

Groundwater levels measured in the newly installed groundwater monitoring wells are shown in Table 8-5 below. Groundwater levels across the Site during the monitoring period, between December 2022 and February 2023, typically varied between approximately 99.826mAOD at GW1 and 104.89mAOD at GW2. Monitoring well locations are shown in Figure 7-2 above.

The Registered Area slopes towards the Dunsrim Lough (to the north) and the groundwater table is likely to follow general topography. The groundwater level measurements would indicate that the local groundwater flow direction across the Registered Area is from GW2 to GW1, also. The water levels measured at GW1 and GW2 also demonstrated that the activities associated with the Development have likely resulted in the quarry floor being below the water table. The original landform has changed from its original state as it has been excavated into the bedrock (i.e., changes in topography) creating a void within the original topography levels and as a result a change in the hydraulic gradient (refer to section 8.3.1.6).

**Table 8-5: 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 |
| GW1 | 105.28 | 50 | 1 | 104.28 | 1.3 | 103.98 | 5.46 | 99.82 | 1.16 | 104.13 |
| GW2 | 104.89 | 51 | 0.1 | 104.79 | 0 | 104.89 | 0 | 104.89 | 0 | 104.89 |

### 8.3.1.5 Groundwater Monitoring

No historic groundwater monitoring data was available for the Site. Groundwater sampling for GW2 occurred on 5th December 2022 and sampling for GW1 and GW2 occurred on January 11th 2023. The groundwater from each well was purged a minimum of three well volumes to allow for a representative sample of the aquifer beneath the Site to be collected. In addition to the sampling, hydrochemistry monitoring was taken during the sampling of the wells. 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) [105]. There were no detections of pesticides or hydrocarbons above laboratory detection limits.

One (No. 1) exceedance of GAC limits was detected during the December monitoring event - sulphate (187.5mg/l) at GW2 (219.2mg/l) and two (No. 2) exceedances of Interim Guideline Values (IGVs) set out by the EPA – sulphate (187.5mg/l) at GW2 (219.2mg/l) and in hardness (as $CaCO_3$) (200mg/l) at GW2 (279mg/l). The exceedance in hardness is an indication that naturally occurring hard water underlies the Site.

A groundwater sample was taken from a private well located north of the site on 25th January 2023 to ascertain the water quality of the bedrock aquifer and to ensure that past activities at the Site have not impacted the private wells in the vicinity of the site. The laboratory results showed one (No.1) exceedance of the IGV (200mg/l) in hardness (as $CaCO_3$) (315mg/l). There were no other exceedances reported at the private well which exhibited similar chemical concentrations to the groundwater beneath the Site (i.e. GW1 and GW2).

When comparing these exceedances to the standards set out in European Union (Drinking Water) Regulations 2014 (S.I. No. 122 of 2014) as amended [107], sulphate is below the drinking water standard (250mg/L) and hardness lacks an associated standard. As such, the levels of hardness and sulphate detected do not present a risk to human health. Moreover, the elevated concentrations of sulphate detected are likely associated with the evaporitic lenses found in the Cooldaragh Limestones (Refer to Section 8.3.1.3 above). As such, it does not appear that past activities at the site have posed a risk to the bedrock aquifer beneath the site.

### 8.3.1.6 Slug Tests

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

- GW1 – This well was installed in the Permitted Area of the quarry floor to assess potential impacts on water quality/availability from the Registered Area.
- GW2 – This well was installed in the quarry floor at the Site, to assess potential impacts on water quality/availability from the Registered Area.

Water level measurements at GW1 and 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).

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 = hydraulic conductivity (m/min)

A = cross-sectional area of borehole casing or standpipe where water level is changing (m2)

t1 = Initial time at H1

t2 = Time at some point during the test at H2

H1 = Initial displacement at time t1

H2 = Displacement at time t2

F = intake factor

Due to the slow recovery expected at GW1 and GW2 only one slug test was performed at these wells. The calculated hydraulic conductivity is presented in Table 8-6 below and Appendix 8-2 for the slug test data and calculations:

**Table 8-6: Calculated hydraulic conductivity – slug test**

| Well ID | Test – K (m/day) |
|---|---|
| GW1 | 2.02E-04 |
| GW2 | 9.98E-04 |

The results show that GW1 and GW2 have a very low hydraulic conductivity (< 0.001m/d) and indicate that the bedrock is unlikely to be conveying significant quantities of groundwater. Prior to quarrying operations, the hydraulic gradient is unlikely to have exceeded topographic gradient 0.074 ([135 mAOD - 101mAOD]/460m). Using Darcy's Law, groundwater flow rate through what is now the southern face of the quarry would have been no greater than 0.42m$^3$/d (0.001 m.d x 0.074 x 190m [width of quarry in south] x 30m [approximate height of quarry face in south], i.e. <420 litres per day, which is minor.

The quarrying operations would therefore have resulted in an average of no more than 0.42m$^3$/d groundwater discharging to the site drainage system which is negligible relative to average incident rainfall on the quarry 147m$^3$/d (approximately 90,000m$^2$ area x 0.0016m/d average daily rainfall. Thus, the quarrying operations will have had imperceptible impact on surface water flow rates. The low permeability of the bedrock will also mean that the quarrying operations are unlikely to have resulted in any significant impacts to the off-site hydrogeologic regime or off-site groundwater abstractions.

#### 8.3.1.7 Groundwater Body (GWB) Status

2022 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 [114]. The groundwater body risk is currently considered “not at risk” of meeting its environmental objectives.

### 8.3.2 Hydrology

This section describes the surface water features in the area and those which are potentially 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 [114]. A subcatchment divide is located ca.134m to the south of the site. The River GORTNANA_010 is located ca.453m north-east of the Site within the Finn[Monaghan]_SC_020 catchment.

There is 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 [114] 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 8-5 below) for the Registered Area and is connected via drainage ditches feeding into unnamed streams that connect to Dunsrim Lough through local wetlands. The lough and preceding streams and drainage are the main receptors for potential surface water impacts that 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 of it.

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. 948m south) and the River BUNNOE_030 (ca. 687m southeast) [114].

### 8.3.2.2 Flood Risk Assessment (FRA)

The OPW's Catchment Flood Risk Assessment and Management (CFRAM) maps [115], 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 [115].

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 8-3 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 recurring flood events is 2.97km southeast of the Site, resulting from the Mill Race and River overflowing after heavy rain.

### 8.3.2.3 Surface Water Monitoring

The Registered Area 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 stormwater drainage as outlined in Section 3.5.3 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 the Registered Area (Refer to Figure 8-5 below). The water is then carried via 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).

Historic surface water monitoring was carried out by MCC onsite between May 2016 to November 2019 on water discharging from onsite. More recent monitoring was completed onsite between October 2022 and February 2023 at the discharge point and at various points along the drainage ditch.

**Figure 8-5: Surface Water Discharge Point**


Based on three (3 No.) flow monitoring events in January and February 2023, there is an approximate discharge rate of ca. 99 $m^3$/day. Although, there were only three discharge flow measurements and there is no seasonal, the 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).

Between May 2016 to November 2019, eight (No. 8) surface water quality monitoring events were completed at the discharge point. No exceedances of the ELVs were noted for pH (between pH 6-9), BOD (5mg/l) and molybdate reactive phosphate (as P) (0.3mg/l).

Exceedances of the suspended solids ELV (20mg/l) were noted in four (No. 4) monitoring events (September 2017, November 2018, July 2019, November 2019), with a maximum value of 49mg/l occurring in November 2018.

Exceedances of total ammonia (as N) ELV (0.3mg/l) were noted in five (No. 5) monitoring events (May 2016, October 2016, September 2018, July 2019, November 2019), with a maximum value of 1.06mg/l occurring in both July and November 2019.

When compared to S.I. No.–272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended) [106], the discharge exceeds surface water acceptance criteria (SWACs) for “Good” quality total ammonia as N (≤0.065mg/L N annual mean) in all monitoring events. It should be noted that MCC were completing the monitoring at the discharge point for this period. MCC never identified to the Applicant that there were exceedances observed, and as such the Applicant was unaware until now (at the time of writing).

Four (No.5) monitoring events were carried out in for surface water in October, November December 2022, January 2023 and February 2023. These events 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 (excluding January 2023), SW4 sampled the drainage ditch downstream of the discharge (excluding January 2023), SW5 sampled the drainage ditch before the wetlands adjacent to Dunsrim Lough (only January 2023) and SW6 sampled the water flowing from the wetlands adjacent to Dunsrim Lough (only January 2023).

An exceedance of the suspended solids ELV (20mg/l) was noted during the December 2022 monitoring event at SW2 (34mg/l). Two (No. 2) exceedances of the total ammonia (as N) ELV (0.3mg/l) were occurred 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), with concentrations ranging between 0.11 - 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) [106], 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, with concentrations ranging between 0.12 - 0.2mg/l N. Upstream (SW3) and further downstream (SW5 and SW6) monitoring events showed no detections above the laboratory detection limit (<0.1mg/l) for total ammonia as N.

Also of note is a single exceedance of the SWAC for molybdate reactive phosphate (as P) (≤0.035mg/L P annual mean) at SW6 (0.058mg/L P) in January 2023, though this exceedance is likely unrelated to onsite activities as there no other exceedances occur within or around the discharge.

### 8.3.3 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 5.5km to the southwest. Further discussion of the ecological sites in the vicinity of the Site can be found in Chapter 6 of this report.

### 8.3.4 Wastewater

There is a portable toilet stationed just inside the Site entrance gate (within the Permitted Site). There is a septic tank opposite the site office within the Permitted Site. 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.

## 8.4 Characteristics & Impact of the Development

Prior to the extraction works, the Site consisted of agricultural fields with the primary contaminants of concern being nutrients, pesticides and suspended solids if a suitable pathway was present.

Removal of soils, subsoils and bedrock from the quarry due to historical activities onsite would have had the potential to pose a risk to the underlying bedrock aquifer given that it has been demonstrated that quarrying activities have taken place below the water table. However, groundwater monitoring data at the newly installed monitoring wells GW1 and GW2 showed no contamination present in the underlying bedrock aquifer from pesticides or hydrocarbons.

Sulphate concentrations and water hardness exceedances occurred at GW2, however, no exceedances occurred at GW1, which is situated in the currently active Permitted Area. In addition, samples from the private well only showed exceedances in water hardness, which is naturally occurring. Moreover, the elevated concentrations of sulphate detected may be naturally occurring like those associated with the evaporitic lenses found in the Cooldaragh Limestones (Refer to Section 8.3.1.3 above). Therefore, it is believed that the Development

had a imperceptible impact on the groundwater quality of the aquifer beneath and in the vicinity of the Site.

The results show that GW1 and GW2 have a very low hydraulic conductivity (< 0.001m/d) and indicate that the bedrock is unlikely to be conveying significant quantities of groundwater. The Development will have had imperceptible impact on surface water flow rates. The low permeability of the bedrock will also mean that the Development is likely to have had an imperceptible impact on groundwater availability for groundwater abstraction in the vicinity of the Site.

Surface water monitoring shows that discharges of these concentrations led to exceedances in SWACs for total ammonia as N within the drainage ditch directly after the discharge, leading to a slight negative impact on the water quality. However, as the drainage ditch approaches the wetland total ammonia as N concentrations decrease and this impact becomes imperceptible before the waterway merges with Dunsrim Lough. The wetland likely assimilates some of the available nutrients before they can reach Dunsrim Lough, providing potential natural attenuation. The noted elevations of molybdate reactive phosphate as P entering Dunsrim Lough at SW6 are unrelated to Site activity, as no comparable elevations of molybdate reactive phosphate as P are seen in any other surface water monitoring location. From the recent monitoring results, the decrease in discharge concentration of total ammonia as N is linked to a decrease below the laboratory detection limit (<0.1mg/l) in the drainage ditch downstream of the discharge point. Therefore, it is considered that the discharge may have had an adverse but short-term impact on the drainage ditch. It is considered that after surface water has passed through the wetland, the impact on Dunsrim Lough was likely “not significant”. Given the low magnitude of the impact to Dunsrim Lough, an imperceptible impact occurred to River GORTNANA_010 downstream of Dunsrim Lough.

It is considered that once the Restoration Plan has been implemented, the potential for suspended solids and ammonia entering the discharge from the Site will be minimised, through the reduced presence of sediment and decreased potential for run-off.

## 8.5 Mitigation Measures

The Applicant has indicated that mitigation measures completed at the Site (and Registered Area) were generally in accordance with the EPA (2006) Environmental Management Guidelines: Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [101], whereby;

- All plant and HGVs used were refuelled onsite, on a concrete plinth which flows into settlement tanks before reaching the interceptor;
- Items of plant unsuitable for travelling to the refuelling area (dry screening plant), were refuelled utilising adequately sized and positioned drip trays;
- Fuel (diesel) was stored in a double skinned tank and was appropriately bunded;
- Spill kits were available adjacent to all refuelling and fuel storage operations;
- Unauthorised access was prevented in so far as possible; and
- Waste oils and hydraulic fluids were collected in leak-proof containers and removed from the site for disposal or recycling.

For the Restoration works, the following mitigation measures should be implemented;

- All plant and HGVs used will be refuelled at the Permitted Area in accordance with existing procedures by trained personnel;
- Items of plant unsuitable for travelling to the refuelling area (dry screening plant), will be refuelled utilising adequately sized and positioned drip trays;
- Fuel (diesel) will be stored in a double skinned tank in the Permitted Area in accordance with existing procedures;

- Spill kits will available adjacent to all refuelling and fuel storage operations;
- Unauthorised access will be prevented in so far as possible; and
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the Registered Area for disposal or recycling.
    - Soils stored in berms onsite will be re-used as part of the Restoration Plan, respread and seeded.

## 8.6 Cumulative and In-combination Effects

There is potential for a cumulative and in-combination effects from the Development and the activities within the Permitted Area. The Permitted Area contains the majority of plant and equipment for secondary and tertiary crushing and screening, hot macadam plant and extractive activities. Run-off from the Site flows towards the Permitted Area and is discharged via the licensed discharge point. As such, the surface water which was sampled and analysed provides data on the cumulative discharge from the Registered Area. As such, the impact identified above have already taken cognisance of the cumulative and in-combination effect.

The other land use activities in the area are agriculture and some residential properties, with the land within the Site area previously being grassland before extraction. It is not envisioned that the grazing of livestock in the lands surrounding the Site or Dunsrim Lough ceased during extraction. As such the agricultural input of nutrients from fertiliser and animal waste into surface waters may have occurred, potentially adding further total ammonia as N into surrounding surface waters.

No other cumulative or in combination impacts are noted to have occurred as part of this extraction.

## 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 impacts on human health can occur through the contamination of water used for abstraction. This assessment has indicated that the Development has an imperceptible effect on groundwater quality;
- Chapter 6 (Biodiversity). Potential impacts on hydrology can also impact on ecological conditions and ecologically designated sites. Given that 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 impacts on biodiversity are assessed in detail in Chapter 6; and
- Chapter 7 (Land, Soils and Geology). Impact on soils/bedrock can result in related impacts on surface water and groundwater. Given that soils were removed onsite due to historical activities and the results of the groundwater beneath the site showed not significant impact on the water quality, the impact on soils/bedrock was determined to be imperceptible. These impacts on the bedrock are discussed in Chapter 7.

## 8.8 Indirect Impacts

No indirect impacts were noted to have occurred as a result of the onsite works.

## 8.9 Residual Impact of the Site

Based on the low permeability of the bedrock underlying the Development, there was likely an imperceptible impact on groundwater availability for groundwater abstraction in the vicinity of the Site.

Given the groundwater results for the monitoring wells at GW1, GW2 and the private well north of the Registered Area did not contain contaminants likely associated with the Development activities, it is considered that an imperceptible impact on the groundwater quality of the aquifer beneath and in the vicinity of the Site.

From the monitoring results, it is considered that the discharge may have had an adverse short-term impact on the drainage ditch. It is considered that after surface water has passed through the wetland, the impact on Dunsrim Lough was likely “not significant”. As such, impact on the downstream section of River GORTNANA_010 were likely imperceptible given the low magnitude of impact at the Dunsrim Lough source.

It is considered that once the Restoration Plan has been implemented, the potential for suspended solids and other deleterious items entering the discharge from the Site will be minimised, through the reduced presence of sediment and decreased potential for run-off, thereby potentially reducing the effect of run-off from the to imperceptible.

## 8.10 Monitoring

No groundwater monitoring occurred as part of historical activities. Historical and recent surface water monitoring and recent groundwater monitoring is discussed above in Section 8.3.1.4 and Section 8.3.2.3.

## 8.11 Reinstatement

Following the S261 registration, an after-care plan was created for the whole site as it stood at the time. A further after-care plan has been created for the Substitute Consent area as it stood when work ceased in this area in 2021. Both these plans were submitted to the relevant planning authority. See section 3.6 above and Appendix 3-3 for further details.

## 8.12 Difficulties Encountered

A common difficulty encountered throughout the rEIAR was the issue of attempting to identify potential historic impacts which may have once existed, but which are now absent or which may have reduced over time. Similar difficulties arose regarding the establishment of any historic periods when certain impacts may have become apparent only to subsequently abate. The rEIAR has been limited by the availability, completeness and accessibility of publicly available data from the period of time applicable to the Development subject to the substitute consent.

Where relevant, this rEIAR therefore utilises best practice in risk assessment and prediction to characterise likely impacts, based on the information known regarding the Development.

# 9 AIR QUALITY

## 9.1 Introduction

This chapter of the rEIAR provides a description and assessment of the likely impacts of the 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 impacts on air associated with the Development:

- Department of Environment, Heritage and Local Government (DEHLG) – Quarries and Ancillary Activities: Guidelines for Planning Authorities (2004) [11];
- Institute of Air Quality Management (IAQM) - Guidance on the Assessment of Mineral Dust Impacts for Planning [13];
- EPA - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (2006) [97]
- IEMA – Environmental Impact Assessment Guide to: Assessing Greenhouse Gases and Evaluating their Significance [116];
- Irish Concrete Federation (ICF) Environmental Code (2005) [117]
- EPA - Air Quality in Ireland 2013– Indicators of Air Quality; [118]
- EPA - Air Quality in Ireland 2014– Indicators of Air Quality [119];
- EPA - Air Quality in Ireland 2015– Indicators of Air Quality [120]
- EPA - Air Quality in Ireland 2016– Indicators of Air Quality [121]
- EPA - Air Quality in Ireland 2017 – Indicators of Air Quality [122]
- EPA - Air Quality in Ireland 2018 – Indicators of Air Quality [123];
- EPA - Air Quality in Ireland 2019 – Indicators of Air Quality [124];
- EPA - Air Quality in Ireland 2020 – Indicators of Air Quality [125];
- EPA - Air Quality in Ireland 2021 – Indicators of Air Quality;
- EPA – Air Dispersion Modelling from Industrial Installations Guidance (AG4) (2019) [126].

The main potential impacts from the historical activities associated with the Development are airborne particulate matter ($PM_{10}$) and nuisance dust deposition. The potential impact caused by the release of $NO_2$ from plant operations were screened out of this assessment. This is based off of guidance from the Institute of Air Quality Management (IAQM) [13], which determines that the potential impacts on air quality from diesel based plant operations are not significant (section 9.4 below).

Therefore, the only potential impacts from the Development on air quality will come from ambient $PM_{10}$ concentrations and nuisance dust deposition.

To determine the potential historical risks associated with emissions (both ambient $PM_{10}$ and nuisance dust), a Dust Risk Assessment was completed in accordance with the methodology set out by the IAQM guidance on Mineral Dust [127]. This DRA was completed to provide an estimation of the risks associated with the Development and past activities, which would give insight on potential likely and significant impacts (if there were any). Further details are presented in section 9.4.2 and section 9.4.3 below.

### 9.2.1 Policy/Legislative Context

The following sections will review and highlight relevant policies and legislation relating to the Development in the context of national, regional and local air quality objectives.

#### 9.2.1.1 Draft Clean Air Strategy

The Department of Communications, Climate Action and Environment (DCCAE) are currently developing a Draft Clean Air Strategy, with information currently available through a public consultation document [128] . 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 [128].

The Draft 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.

The primary emissions to air associated with quarries and associated extraction activities are dust, which contains particulate matter. According to the IAQM, the majority of suspended dust associated with quarries will be in the coarse fraction i.e. $PM_{2.5-10}$ (i.e. $PM_{10}$). According to the draft document, emissions related to $PM_{10}$ amounted to 27.69kt in 2019, which was a 41.7% reduction from 1990 levels [128].

#### 9.2.1.2 Monaghan County Council Development Plan 2019-2025

The Monaghan County Development Plan 2019-2025 [22] details various aims and objectives relating to Air Quality, relevant to the Development:

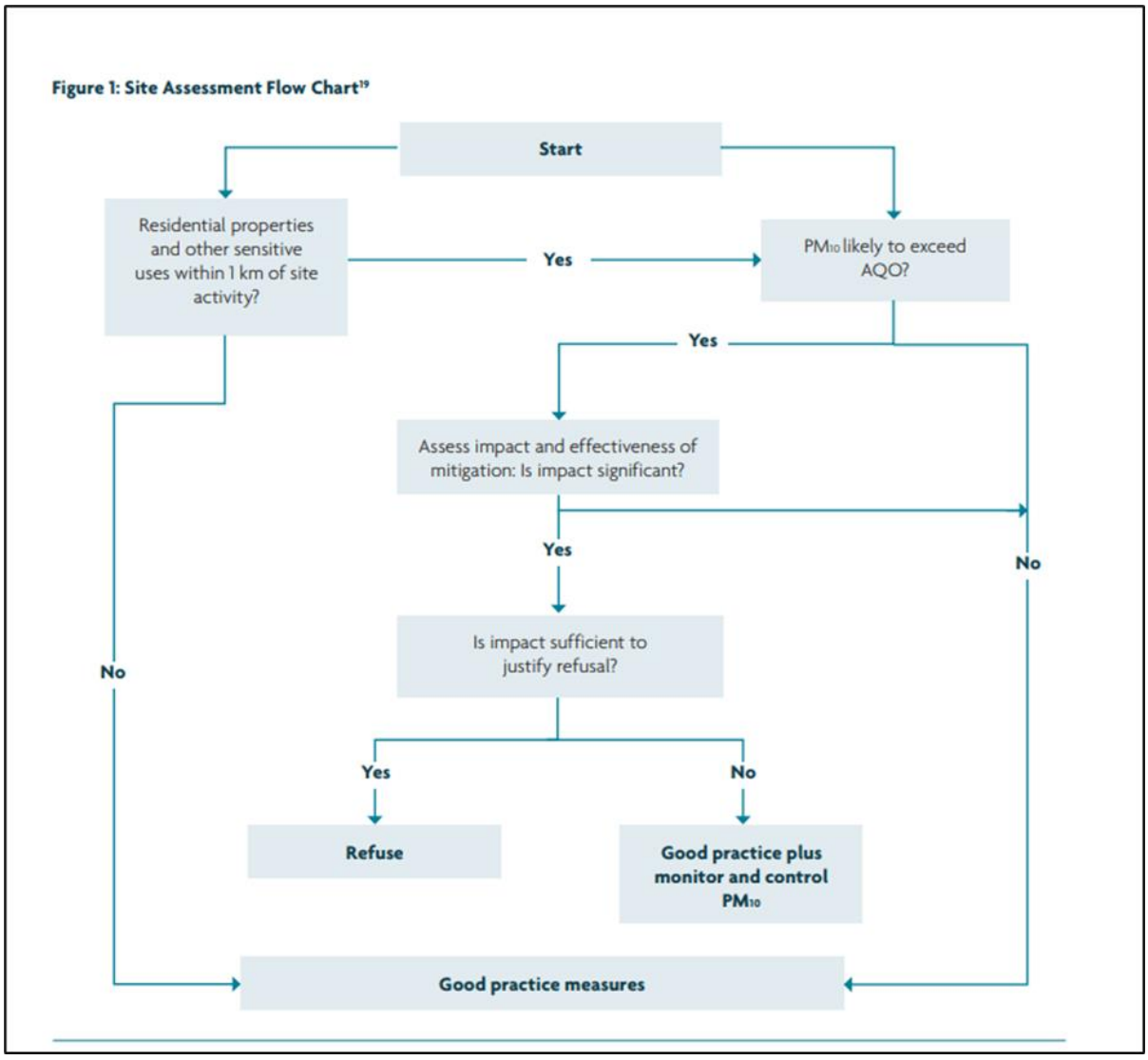
**Air Quality**

> **AQP 1:** *Quality and Cleaner Air FoIrope (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 that may have arisen from activities associated with the Development was completed in accordance with the IAQM guidance [127]. A flow chart outlining the various steps associated with the preparation of the mineral dust risk assessment are outlined in Figure 9-1 below [127], with further details provided in Appendix 9-1.

**Figure 9-1:Flowchat of steps associated with a Mineral Dust Risk Assessment**




Greywhacke is not a scheduled mineral, however, for consistency with the IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning, the definition of minerals in this Chapter is taken from Statutory Instrument (S.I.) No. 600 of the 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*".

### 9.2.3 Dust Deposition Limits

According to the EPA's Guidelines for Extractive Industries and the DEHLG, Quarries and Ancillary Activities [96], 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 typically used for monitoring of dust deposition in Ireland . 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 developments [129]. The results of monitoring results conducted at the Registered Area have been compared to the TA Luft dust deposition limit value of 350mg/m$^2$/day.

### 9.2.4 Air Quality Standards

Assessment of the significance of emissions to air is made with reference to limit values established in the latest EU legislation, the Clean Air Europe (CAFE) Directive (2008/50/EC) which was transposed into Irish law in 2011 (S.I. No. 180 of 2011).

The Air Quality Standards (AQS) set out in Air Quality Directive (2008/50/EC) and S.I. No. 180 of 2011 are shown in Table 9-1 below. The AQS are based on the effects of pollutants on human health, although other factors such as effects on vegetation and ecosystems are sometimes considered.

**Table 9-1: EU and Irish Limit Values for Relevant Pollutants**

| Pollutant | Objective | | | |
|---|---|---|---|---|
| | Concentration ($\mu g/m^3$) | Maximum No of Exceedances Permitted/Annum | Exceedance as % | Measured as |
| **Particular Matter $PM_{10}$** | 50 | 35 | 90.4$^{th}$ percentile | 24-hr mean |
| **Particulate Matter $PM_{10}$** | 40 | N/A | N/A | Annual mean (calendar year) |

The above AQS are applicable to the air quality in locality of the Site during historical operations.

## 9.3 Receiving Environment

### 9.3.1 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 2021 [130] which is the most up to date report on air quality in Ireland.

For ambient air quality management and monitoring in Ireland, four zones (A, B, C and D) are defined in the AQS Regulations (S.I. No. 180 of 2011) and are defined as follows:

- Zone A: Dublin Conurbation;
- Zone B: Cork Conurbation;
- Zone C: 24 cities and large towns. Includes Galway, Limerick, Waterford, Clonmel, Kilkenny, Sligo, Drogheda, Wexford, Athlone, Ennis, Bray, Naas, Carlow, Tralee, Dundalk, Navan, Newbridge, Mullingar, Letterkenny, Celbridge and Balbriggan, Portlaoise, Greystones and Leixlip; and,
- Zone D: Rural Ireland, i.e. the remainder of the State excluding Zones A, B & C.

According to the above classification, the Development is in Zone D. To contextualise the background air quality data that would have been present during the peak operations of the Development (2010-2020), baseline air quality data between 2013-2020 is shown for the Zone D region. No baseline data was available for Zone D prior to 2013. Table 9-2 displays the air quality data for this period.

**Table 9-2: Annual Mean Concentration of $PM_{10}$ Measured at Zone D between 2013-2020**

| Monitoring Stations | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|
| Castlebar | 15 | 12 | 13 | 11.9 | 11.2 | 11 | 16 | 14 |
| Cobh | - | - | - | - | - | 15 | 13 | 13 |
| Claremorris | 13 | 10 | 10 | 10.1 | 10.8 | 12 | 11 | 10 |
| Kilkitt | 11 | 9 | 9 | 8.1 | 7.8 | 9 | 7 | 8 |
| Roscommon Town | - | - | - | - | - | 12 | 12 | 11 |
| Enniscorthy | - | 22 | 18 | 17.3 | - | - | 18 | 15 |
| Macroom | - | - | - | - | - | - | 28 | 15 |
| Tipperary Town | - | - | - | - | - | - | 9 | 12 |
| Carrick-on-Shannon | - | - | - | - | - | - | - | 10 |
| Birr | - | - | - | - | - | - | - | 10 |
| Askeaton | - | - | - | - | - | - | - | 7 |
| Cavan | - | - | - | - | - | - | - | 9 |
| **Average Zone D** | **13.0** | **13.3** | **12.5** | **11.9** | **9.9** | **11.8** | **14.3** | **11.2** |

The maximum concentration recorded in Zone D for $PM_{10}$ was recorded at the Macroom Station in 2019 (28µg/m$^3$). Annual concentrations across Zone D range between 7 and 28µg/m$^3$. The closest EPA station to the Development is Cavan Town (Station 78), ca. 15km to the south of the Site.

According to the EPAs Guidance on Air Dispersion Modelling (AG4), when determining background concentrations, a minimum of two-consecutive years are to be used [126]. Given the retrospective nature of the assessment, the average of the 8No. years of available data for Zone D was used (2013-2020). The mean annual concentration of $PM_{10}$ across this period was 12.2µg/m$^3$. This is higher than the 5-year average of 11.8µg/m$^3$ (2017-2021), which is typically used as background conditions as per the EPAs AG4 Guidance [126].

### 9.3.2 Other Sources of Emissions to Air

Notable sources of emissions to air in the vicinity of the Development include:

- Traffic associated with the regional R212 road and local roads;
- Agricultural activities; and
- Residential dwellings (solid fuel fires etc.) from the nearby town of Scotshouse.

The IAQM Guidance states that potential impacts of $PM_{10}$ on sensitive receptors needs to be assessed if there are sensitive receptors within 1km of the dust generating activities [127]. Therefore, a 1km buffer around the Development was used to identify potential historical sources of cumulative dust emissions.

As there were no Industrial Emission Licences within 1km of the Site, potential cumulative and in-combination effects from facilities locally are determined unlikely and not significant.

### 9.3.3 Dust Deposition Monitoring

Between November 2022 and January 2023, Bergerhoff monitoring was conducted at six (6No.) locations around the Registered Area. Monitoring was managed and conducted by BHP laboratories. These results are reflective of the current baseline dust deposition levels at the Registered Area (Table 9-3 below)

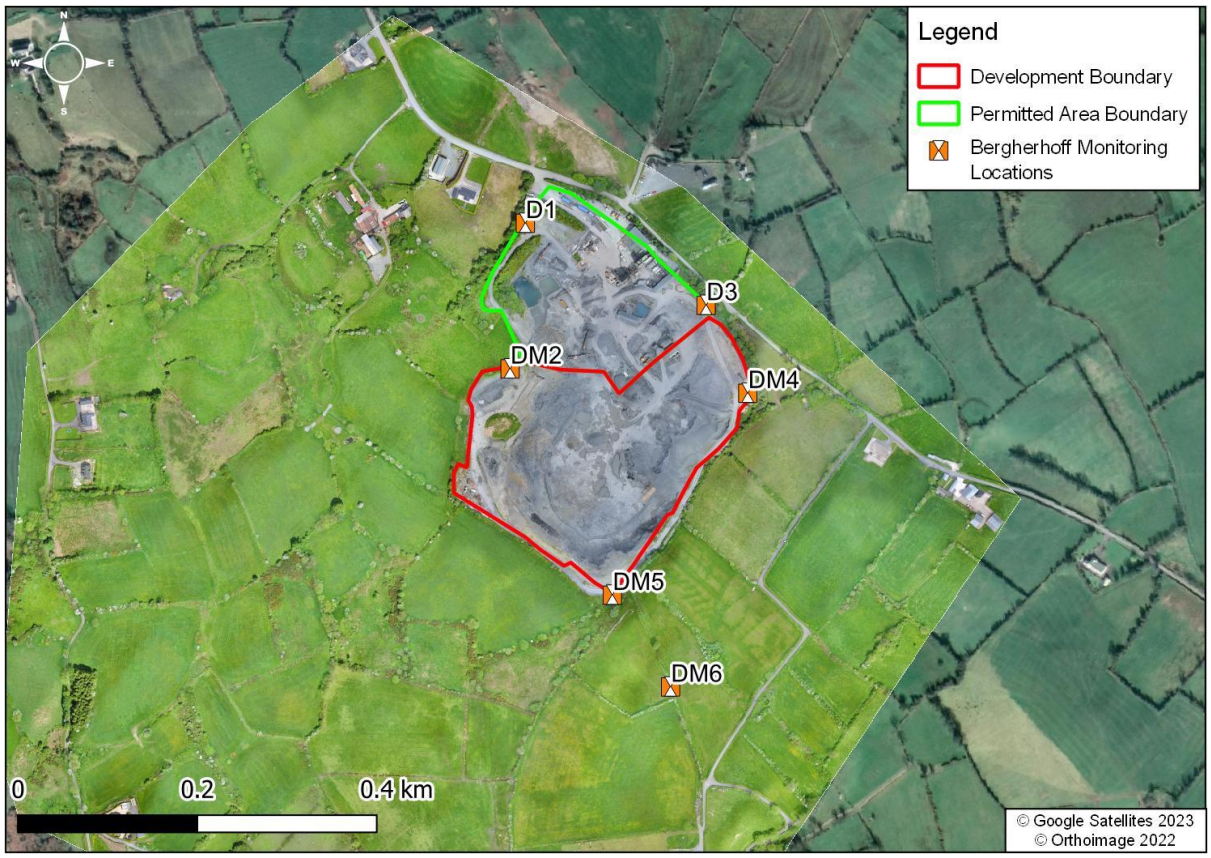
**Table 9-3:Bergerhoff Monitoring Results between November 2022 and January 2023**

| Dust monitoring location | November Dust Deposition Value (mg/m$^2$/day) | December Dust Deposition Value (mg/m$^2$/day) | January Dust Deposition Value (mg/m$^2$/day) | TA Luft Value Limit (mg/m$^2$/day) |
|---|---|---|---|---|
| D1 | 151 | 88 | 119 | 350 |
| D2 | 101 | 33 | 87 | 350 |
| D3 | 141 | 155 | 308 | 350 |
| D4 | 110 | 30 | 130 | 350 |
| D5 | 245 | 32 | 100 | 350 |
| D6 | 106 | 38 | 85 | 350 |

Across the entire monitoring period, all dust deposition values were below the TA Luft limit value of 350mg/m$^2$/day. Concentrations ranged from 32mg/m$^2$/day at D5 to 308mg/m$^2$/day at D3. As discussed in section 9.2.3 above, Bergerhoff monitoring represents the best industry standard for measuring dust deposition. The values presented do not correspond to the limit values designated by the 'Frisbee'' method, further detailed in section 9.2.4 above.

Figure 9-2 below shows the locations of the Bergerhoff monitoring locations around the registered Area.

**Figure 9-2: Bergerhoff Monitoring Locations**




## 9.3.4 Dust Sensitive Receptors

The activities associated with the Development included blasting, breaking of rock, extraction and primary processing, including potential dust generating activities, such as

- Site preparation/restoration (working soil and overburden);
- Materials handling;
- Mineral extraction;
- Offsite transportation; and,
- Onsite transportation.

A risk assessment of sensitive receptors and the potential impacts from historical dust generation associated with the Development was completed in accordance with the IAQMs Guidance on *The Assessment of Mineral Dust Impacts for Planning* [127].

According to the IAQM Guidance, adverse impacts from sand and gravel quarries are uncommon beyond 250m, and beyond 400m from hard rock quarries measured from the nearest dust-generating activities [127]. As such, receptors were identified within 400m of the Site. Details on these sensitive receptors are shown in Table 9-4 below.

A total of ten (10No.) receptors were identified within 400m of dust generating activities at the Site (SR01-SR08, SR10-SR11). One receptor (SR10) was identified as currently vacant by Geodirectory services. However, to consider the historical impacts of the Development, this receptor was treated as an occupied residential property.

The sensitive receptors are presented in Table 9-4 below and shown in Figure 9-3 below.

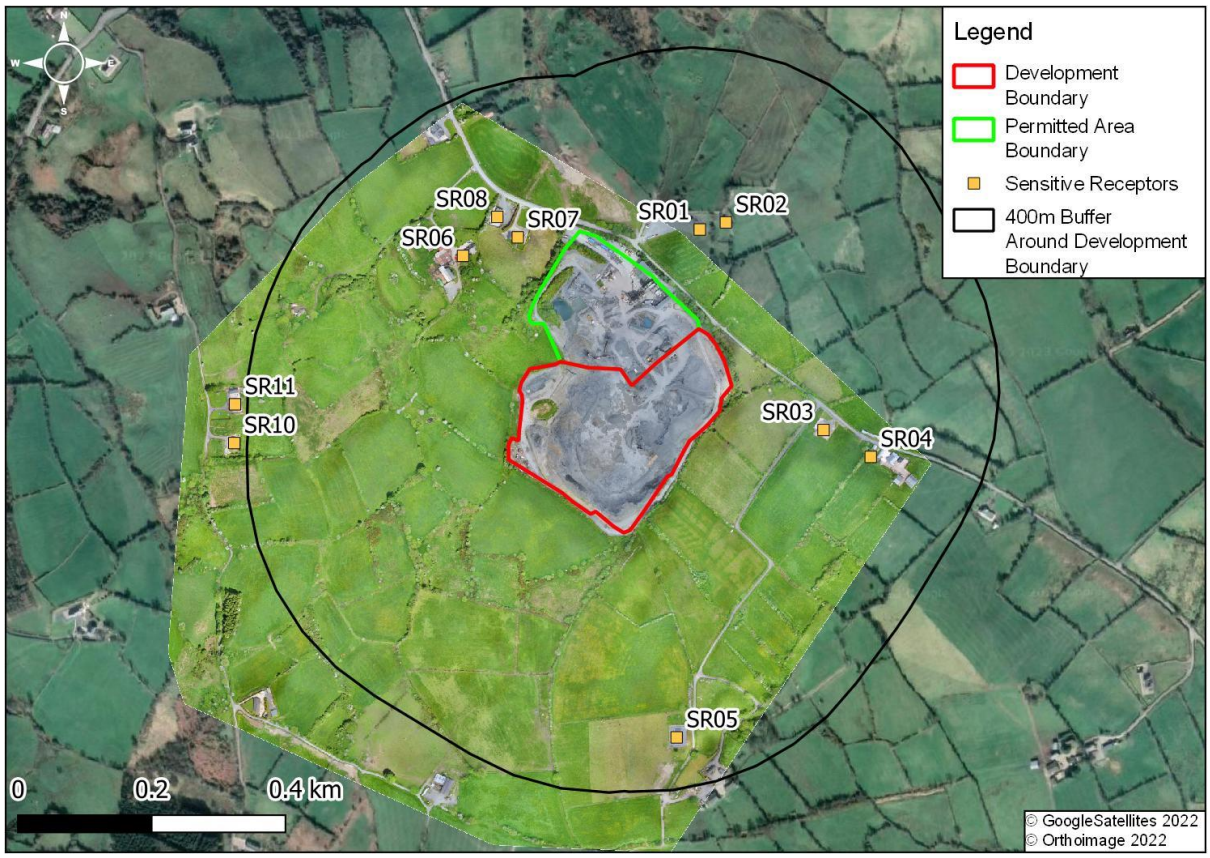
**Table 9-4: Identification of Receptors**

| ID | ITM (Easting, Northing) | | Description of Sensitive Receptor | Distance/ Orientation from the Development Boundary (m) | Terrain between Site and Receptor |
|---|---|---|---|---|---|
| | E | N | | | |
| SR01 | 649667 | 5818318 | Residential Dwelling | ca.148m (northeast) | The presence of a tree line to the northeast of the Development would have provided a significant buffer to fugitive dust emissions. |
| SR02 | 649706 | 818329 | Residential Dwelling | ca.164m (northeast) | The presence of a tree line to the northeast of the Development would have provided a significant buffer to fugitive dust emissions. |
| SR03 | 649852 | 81019 | Residential Dwelling | ca.152m (east) | The presence of hedges to the southeast of the Development would have provided a significant buffer to fugitive dust emissions. |
| SR04 | 649923 | 817979 | Residential Dwelling | ca.233m (east) | The presence of hedges to the southeast of the Development would have provided a significant buffer to fugitive dust emissions |
| SR05 | 649633 | 817560 | Residential Dwelling | ca.317m (south) | The dominant landscape are the agricultural fields that surround the Development. |
| SR06 | 649313 | 818279 | Farm/Storage facilities | ca.196m (northwest) | The presence of a tree line to the northwest of the Development would have provided a significant buffer to fugitive dust emissions. |
| SR07 | 649395 | 818307 | Proxy for Residential Properties to the northwest | ca.199m (northwest) | The presence of a tree line to the northwest of the Development would have provided a significant buffer to fugitive dust emissions. |
| SR08 | 649365 | 818337 | Storage Facilities | ca.232m (northwest) | The presence of a tree line to the northwest of the quarry would have provided a significant buffer to fugitive dust emissions. |
| SR10* | 648971 | 818002 | Residential Dwelling | ca. 410m (west) | The dominant landscape feature are the agricultural fields that surround the Development. |
| SR11 | 648972 | 818057 | Residential Dwelling | ca.413m (west) | The dominant landscape feature are the agricultural fields that surround the Development. |

**Notes: ***denotes classified as vacant by Geodirectory services

Two receptors (SR10, SR11) were located outside of the 400m associated with the Site. However, the gardens of both residential properties were located within the buffer and were therefore included as there was potential for the amenities of the properties to have been reduced due to historical activities associated with the Development.

**Figure 9-3: Location of Sensitive Receptors**

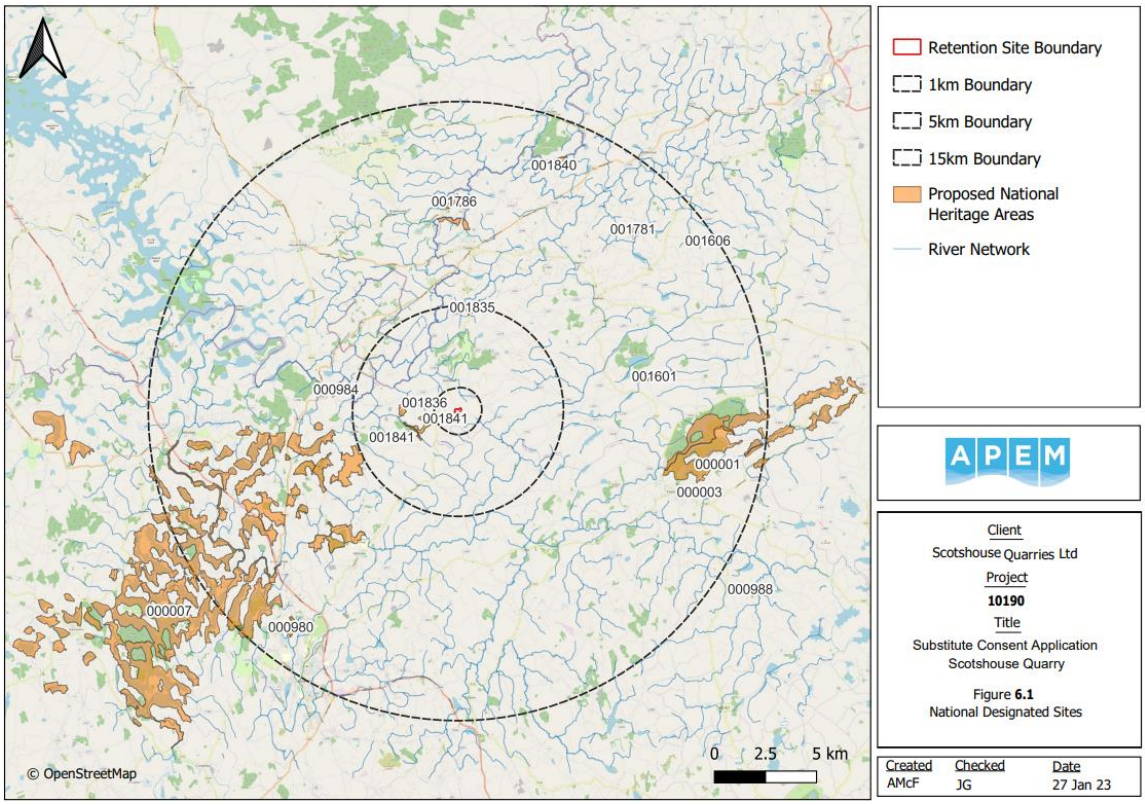



## 9.3.5 Designated Ecological Receptors

There is no European Protected Designated Site (Natura 2000) located within 5km of the Development, with the closest (Lough Oughter SAC) located ca. 5.6km to the west. The Drumcon Lough proposed Natural Heritage Site (pNHA) is located ca. 1.4km to the southwest of the Site. For further details on the potential historical impacts of the Development on ecological receptors, refer to Chapter 6 above and shown in Figure 9-4.

As per the IAQM Guidance on assessing the effects of mineral dust on ecological receptors, as none of the identified ecological receptors are located within 400m of the Development, the historical potential of fugitive dust emissions impacting these receptors are determined as negligible.

**Figure 9-4: Ecological receptors identified within 5km of the Development**




## 9.3.6 Weather

Weather conditions can have a significant effect on the dispersion of ambient dust, thus influencing the impacts on nearby sensitive receptors. Higher levels of dust deposition typically occur during dry spells associated with medium to strong breezes (>5.5m/s) [127].

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 Development.

A windrose diagram was constructed to determine the potential influence of wind direction and speed on airborne dust particles, shown in Figure 9-5 below. As the period of highest activity associated with the Development occurred between 2010-2020, a ten-year windrose was created to represent meteorological conditions at the time.

Due to its relative proximity to the Site, a windrose utilising data from the Ballyhaise station is determined to be representative of relative wind conditions.

**Figure 9-5:Windrose Diagram from Ballyhaise, Co. Cavan (2010-2020)**

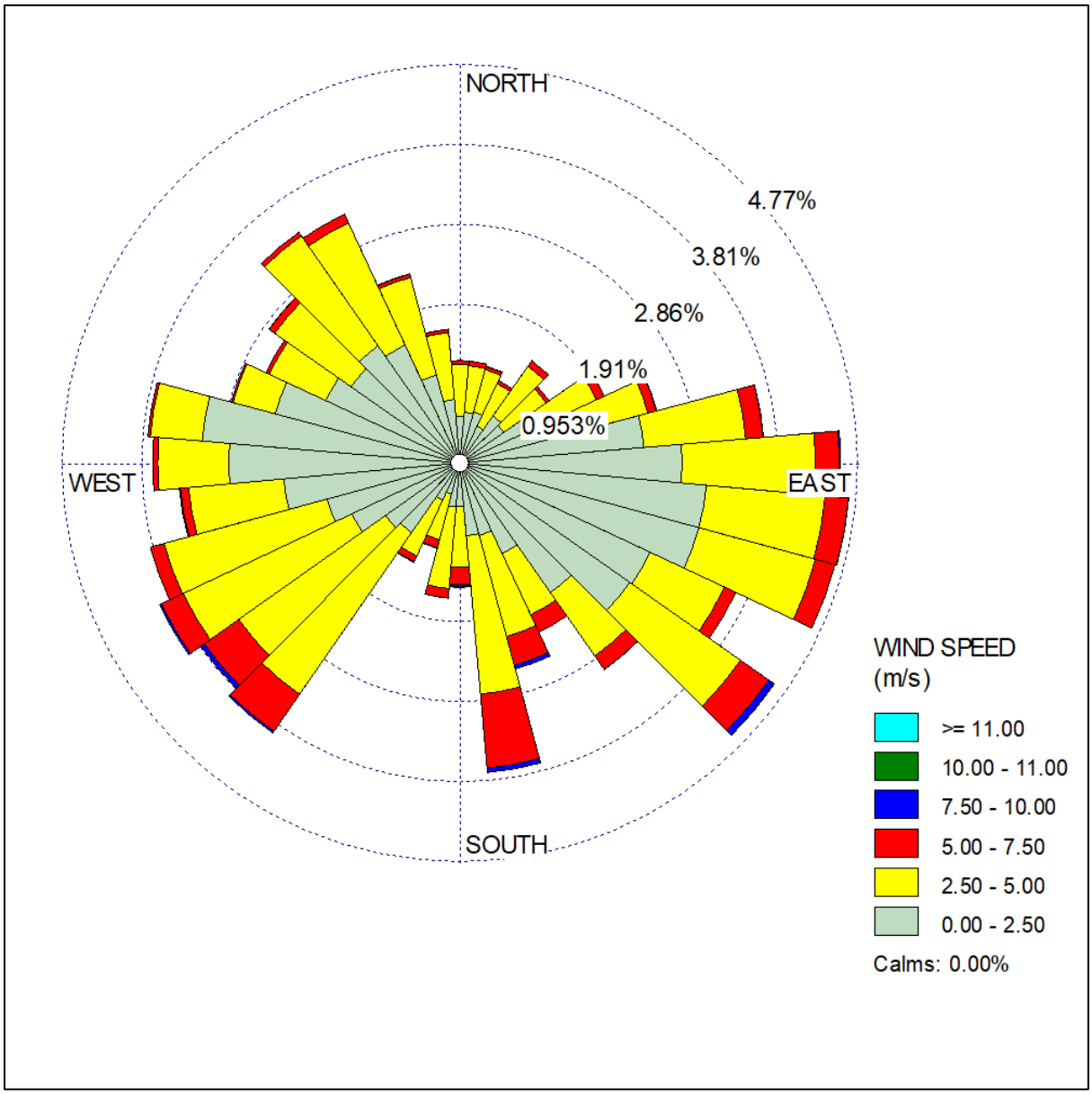



Table 9-5 below summarises the important meteorological variables recorded at the Ballyhaise station between 2010-2020.

**Table 9-5: Meteorological Data at Ballyhaise, Co. Cavan (2010-2020)**

| Year | Total Precipitation (mm) | Average Windspeed (m/s) |
|---|---|---|
| 2010 | 875.8 | 2.9 |
| 2011 | 1077.8 | 3.6 |
| 2012 | 1030.8 | 3.3 |
| 2013 | 958.8 | 3.4 |
| 2014 | 1107.8 | 3.3 |
| 2015 | 1262 | 3.5 |
| 2016 | 893.4 | 3.1 |
| 2017 | 952.4 | 3.2 |
| 2018 | 937.7 | 3.3 |
| 2019 | 1114.7 | 3.2 |
| 2020 | 1161.8 | 3.4 |

## 9.4 Characteristics and potential Impacts of the Development

Each stage of the historic activities of the Development had the potential to generate fugitive dust (site preparation and operational phases). The potential future restoration phase of the Site, discussed in section 3.6 above, will also generate fugitive dust. Therefore, as a conservative estimation of potential dust impacts, these phases will be considered together. The main potential effects on air quality from quarries are dust emissions, which can have the following impacts:

- Disamenity, due to dust deposited on surfaces, which leads to 'soiling'; and,
- Increased concentrations of dust particles suspended in the air ($PM_{10}$).

It is estimated that 20% of HGV vehicles were attributed to the Development, which would have been involved in both onsite and offsite transportation of materials. The potential impact from the remainder of the HGVs was discussed regarding the cumulative impacts between the Development and the Permitted Area (section 9.9.1). Processing of material is limited to the equipment discussed in section 9.5.1 below.

The operations of onsite plant, which were powered by diesel engines, would have emitted nitrogen oxides, particulate matter and carbon monoxide, all which had the potential to impact air quality. According to the IAQM Guidance on Demolition and Construction [13, 131], exhaust emissions from onsite plant are unlikely to make a significant impact on air quality. Therefore, the potential historical impacts of the onsite equipment on air quality have been screened out, as the effects are not likely and not significant.

### 9.4.1 Historical Activities Associated with the Development

Topsoil and overburden have been stripped and used to create berms for around the periphery of the Site. The rock is then extracted via drilling and blasting. The blast rock is subjected to primary processing prior to transport back to the Permitted Area for further processing. The following mobile equipment was operational as part of the 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
- One (1) x Volvo L180 Wheel Loader

This plant was of high-specification, highly efficient and fuel-efficient.

### 9.4.2 Ambient Dust Risk Assessment

### 9.4.3 Suspended Dust

The IAQM Guidance on Mineral Dust states: [127]

> "*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*"

According to the IAQM Guidance [127], the estimated maximum annual process contribution for mineral extraction activities is 15µg/m$^3$, although it can be occasionally higher. The greatest potential for high rates of dust deposition and elevated $PM_{10}$ concentrations occurs within 100m of dust generating activities.

As described in section 9.4.1 above, given the retrospective nature of this assessment, the background concentrations of $PM_{10}$ were determined from the 8-year average of $PM_{10}$ concentrations from Zone D stations. Between 2013-2020 the Zone D average was 12.2µg/m$^3$

Table 9-6 below details the Predicted Environmental Concentrations (PEC) of ambient $PM_{10}$, which sums the expected process contribution to the background concentrations.

**Table 9-6: Predicted Environmental Concentrations of $PM_{10}$ (µg/m$^3$)**

| Parameters | $PM_{10}$ Concentrations (µg/m$^3$) |
|---|---|
| Maximum Process Contribution* | 15µg/m$^3$ |
| Background Concentrations** | 12.2µg/m$^3$ |
| Predicted Environmental Concentration (PEC) | 27.2µg/m$^3$ |
| Annual Mean Objective* | 32µg/m$^3$ |
| Annual AQS Limit | 40µg/m$^3$ |

**Notes: ***taken from the IAQM Guidance [127]**. **** determined from the 8-year average of Zone D EPA monitoring

The predicted environmental concentration associated with the Development is 27.2µg/m$^3$, which is below the annual mean objective of 32µg/m$^3$. According to the IAQM Guidance [39], 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 [127]. As such, the Development posed little risk of exceeding the annual AQS based on the data above.

### 9.4.4 Disamenity Dust Risk Assessment

As per the IAQM Guidelines [127], 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 impacts of disamenity dust. Residual source emissions were

determined for all activities associated with the Development and are discussed as cumulative sources of dust emissions.

The magnitude of the residual source emissions was determined based on the estimated scale of the historical operations at any one time and was classified between small and large. As discussed above, the potential magnitude caused by the restoration phase was also included as a conservative estimation. The assessment in Table 9-7 was completed in accordance with the IAQM Mineral Dust Guidance [127], see Appendix 9-1. The maximum rate of extraction (350,000tpa) for the entire Registered Area was used for the Development in this assessment. As discussed above, HGV movements for Offsite and Onsite transportation were estimated to have been 20% of the total HGVs used. The primary route options for the offsite transportation were located within the Permitted Area and are therefore discussed cumulatively in section 9.7 below.

**Table 9-7: Residual Source Emissions associated with the Development**

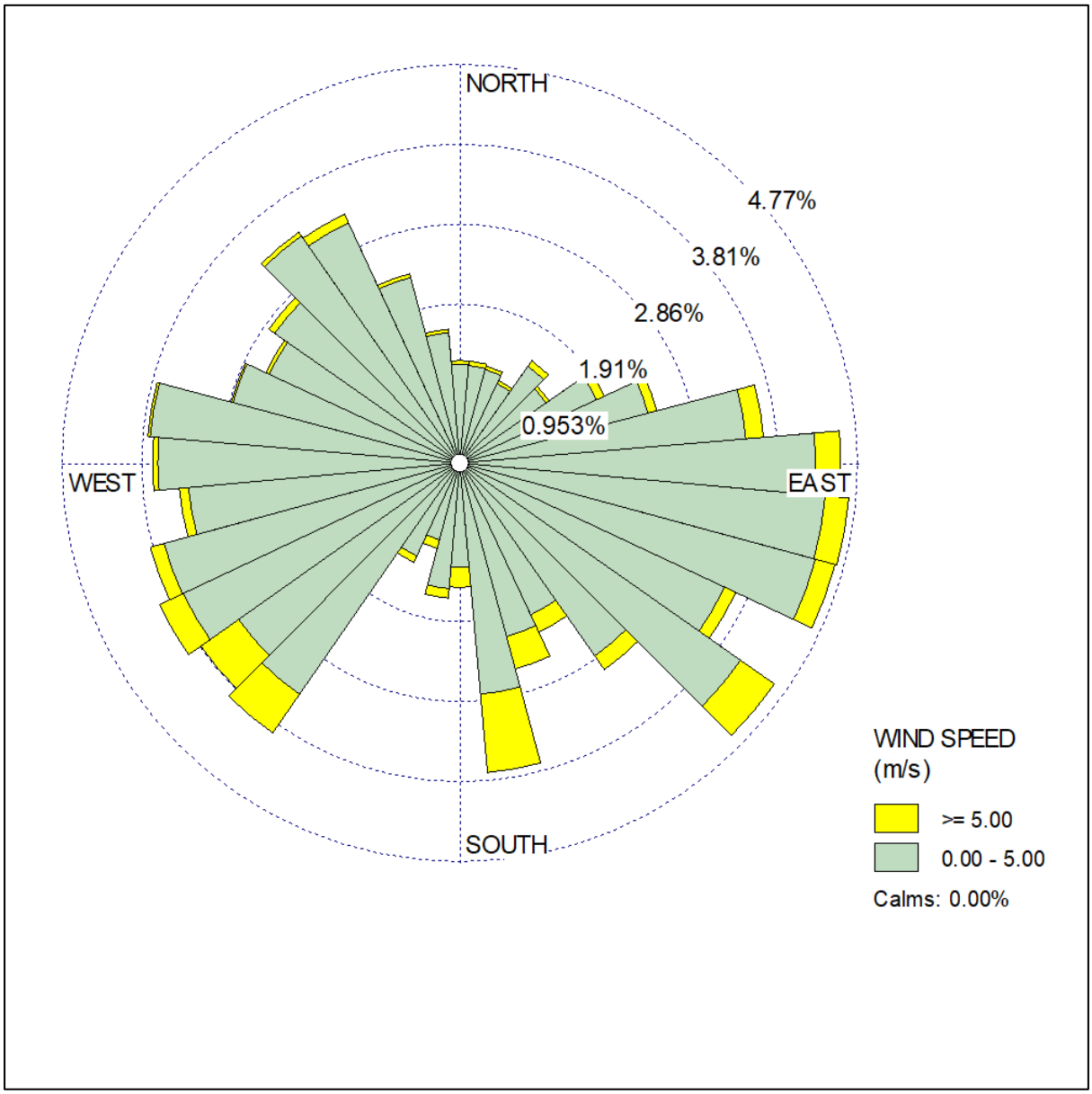
| Activity | Activity Details (all values are approximate) | Magnitude of Residual Source Emissions |
|---|---|---|
| Site Preparation/Restoration | • Total site area for the Development is ca. 5.6ha;<br>• 1No. excavator used, 1No. bull dozer & 1No. loader; and<br>• Construction of berms from soil materials around periphery of the Site | **Small** |
| Mineral Extraction | • Drilling and blasting used;<br>• Primary crushing of blast rock;<br>• Greywhacke materials extracted – potentially dusty aggregate; and<br>• Approximately 350,000 tonnes of materials extracted per annum | **Medium** |
| Material Handling | • 2No. loading plant used at any one time;<br>• Potentially dusty materials transported over uneven ground. | **Small** |
| Mineral Processing | • Primary crushing of blast rock;<br>• Greywhacke materials extracted – potentially dusty aggregate; and<br>• Approximately 350,000 tonnes of materials extracted per annum | **Medium** |
| Onsite transportation | • Transport of material to the Permitted Area was primarily via a wheel loader;<br>• Maximum transport speed was ca.15km/h;<br>• <100 movements per day | **Small** |

| Activity | Activity Details (all values are approximate) | Magnitude of Residual Source Emissions |
|---|---|---|
| Offsite Transportation | • 20% of total HGVs attributed to Development – specific cases where aggregates after primary screening was transported directly from the Development out of the Registered Area. | **Small** |
| Stockpiles/Exposed Surfaces | • Stockpiles frequently created as part of operations;<br>• Some stockpiles were located within 50m of the Site boundary; and<br>• Exposed rockface within 50m of the Development boundary. | **Medium** |

The residual source of emission quantifies how much dust was likely to be generated by the activities performed during the Development (without the implementation of mitigation measures). To determine the impact on sensitive receptors, it is important to consider how the dust will be transported, known as the Pathway Effectiveness [127]. 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 direction.

For each receptor, wind frequency with speeds >5.5m/s from the direction of the dust source emissions was calculated for the ten years of Met Eireann data from the Ballyhaise meteorological station. The 5.5m/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 [127]. According to the IAQM, 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 wind during these dry days is shown in Figure 9-6 below.

**Figure 9-6: Windrose for Dry Days from Ballyhaise Station 2010-2020**




When determining the rating for the distance of the receptor 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. The dust source is represented as the boundary for the Development, where historical activities have occurred. The dominant wind direction was determined relevant to the closest site boundary to the sensitive receptor. Table 9-8 below details these sensitive receptors and their classification based on the Pathway Effectiveness.

**Table 9-8: Pathway Effectiveness for Sensitive Receptors**

| SR ID (Receptor Sensitivity) | Distance from the Emission Source (Orientation to emission source) [127] | Frequency of wind from the direction of dust source (dry weather) (>5.5m/s) | Pathway Effectiveness |
|---|---|---|---|
| SR01 **(High)** | ca.148m **(Intermediate)** | 0.5% (180 hours) coming from the south/southwest (175-215 degrees) **Infrequent** | **Ineffective** |
| SR02 **(High)** | ca.164m (**Intermediate**) | 0.9% (293 hours) coming from the southwest (185-225 degrees) **Infrequent** | **Ineffective** |
| SR03 **(High)** | ca.152m (**Intermediate**) | 0.3% (101 hours) coming from the west (305-345 degrees) **Infrequent** | **Ineffective** |
| SR04 **(High)** | ca.233m (**Distant**) | 0.3% (86 hours) coming from the west (305-335 degrees) **Infrequent** | **Ineffective** |
| SR05 **(High)** | ca.317m (**Distant**) | 0.1% (49 hours) coming from the north and northwest (335-25 degrees) **Infrequent** | **Ineffective** |
| SR06 **(Low)** | ca.196m (**Intermediate**) | 1% (330 hours) coming from the southeast (85-125 degrees) **Infrequent** | **Ineffective** |
| SR07 **(High)** | ca.199m (**Intermediate**) | 1.1% (366 hours) coming from the southeast (105-145 degrees) **Infrequent** | **Ineffective** |
| SR08 **(Low)** | ca.232m (**Distant**) | 0.9% (299 hours) coming from the southeast (105-135 degrees) **Infrequent** | **Ineffective** |
| SR10 **(High)** | ca. 410m (**Distant**) | 0.8%(270 hours) coming from the east (75-105 degrees) **Infrequent** | **Ineffective** |
| SR11 **(High)** | ca.413m (**Distant**) | 0.8% (280 hours) coming from the east (85-115 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.**

Eight (8No.) receptors were identified to have a high sensitivity to dust deposition, as residential dwellings. Two (2No.) receptors were identified as having a low sensitivity to dust deposition (SR06, SR08), as the level of amenity is not expected to have been reduced as a result of the Development.

Having considered the distance of the receptors from the emission source and the frequency of winds (>5.5m/s) on dry days, the pathway effectiveness was derived for each sensitive receptor.

Table 9-8 above shows that all sensitive receptors had an “ineffective” pathway.

To identify the potential risk of dust impacts on the receptors, the pathway receptors, the pathway effectiveness and residual source emissions were considered together. As the

classifications of the residual source emission ranged from “small” to “medium”, medium was applied to them all as recommended in the IAQM guidelines [127].

The estimation of dust impact risk from this process is outlined in Table 9-9 below.

**Table 9-9: Dust Impact Risk for Sensitive Receptors**

| SR 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** |
| **SR10** | **Medium** | **Ineffective** | **Negligible Risk** |
| **SR11** | **Medium** | **Ineffective** | **Negligible Risk** |

The risk of dust impact has been assessed to have been “Negligible” for all sensitive receptors, as a result of the historical use of the Development and the future restoration of the Site (see 3.6 for further details).

To identify the magnitude of dust impact on the receptors, the risk of dust impact and the receptor sensitivity was considered together. As mentioned above, all residential properties were determined to have a high sensitivity, whilst farm/storage facilities were determined to have a low sensitivity to dust deposition.

The descriptor for the magnitude of dust impact is detailed in Table 9-10 below.

**Table 9-10: Magnitude of Disamenity Effects 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** | **Low** | **Negligible Risk** | **Negligible Effect** |
| **SR10** | **High** | **Negligible Risk** | **Negligible Effect** |
| **SR11** | **High** | **Negligible Risk** | **Negligible Effect** |

The estimated magnitude of dust effect was determined as an “Negligible Effect” on all sensitive receptors, as a result of the historical activities and future restoration associated with the Development. The accuracy of the findings presented is strengthened, given the Applicant has not received a complaint in relation to dust.

## 9.5 Unplanned Events

From information provided by the Applicant it is understood that there have been no recorded unplanned events since they assumed ownership of the Site.

## 9.6 Mitigation Measures

### 9.6.1 Previous Dust Mitigation Measures

To date, no records of dust complaints have been received by the Applicant or MCC as a result of activities associated with the Development.

Under planning permission P83/9 the following condition (7a) was set:

> *“A screen belt of trees 6 in. in depth to be planted along the north-western and the south eastern boundaries of the quarry site…”*

Despite not being directly linked to the Development, the presence of trees to the north of the dust source would have provided some degree of screening to the receptors north of the Development.

Under the conditions attached to quarry registration Section 261, condition 2a recommended that “adequate measures” should be taken to supress fugitive dust conditions. The mitigation measures that were followed during the Site Operation of the Development (and will be followed for Restoration) are shown in Table 9-11 below.

**Table 9-11: Mitigation measures implemented at the Development**

| General Mitigation Measures for the Development |
|---|
| Design Measures<br>• Presence of a tree belt to the north of the Development would have provided further screening to sensitive receptors from activities.<br>• HGVs used established haul routes, which were regularly maintained;<br>• All HGVs exiting the site used the wheel wash facilities. |
| Operational Measures<br>• Systems were established to record all potential dust complaints associated with the Development.<br>• Training was provided to Site personnel on dust mitigation measures.<br>• The boundaries of the Development were regularly inspected for potential dust.<br>• Public roads near the Development were regularly inspected for potential dust.<br>• Speed restrictions were applied within the Site (15km/hr.).<br>• Site roads were regularly cleaned and maintained. |
| Restoration Measures<br>• Record all dust and air quality complaints, identify cause(s), take appropriate action;<br>• Provide training to Site personnel on dust mitigation measures to be implemented at the Site;<br>• Complete regular inspections of Site works to ensure compliance with the DMP. The frequency of these inspections should be increased to coincide with activities where the risk of impact is higher during dry and/or windy conditions;<br>• Public roads outside of the Site, should be regularly inspected;<br>• During dry and/or windy conditions, dampening of appropriate surfaces (i.e. roads, routes, berms, stockpiles if necessary) should be completed as required; and<br>• All vehicles used during the Proposed Development, should be maintained to a high standard to allowing optimum operation conditions. |

The results of the risk assessment was that there was a negligible risk of dust impacts on receptors as a result of the Development.

## 9.7 Cumulative and In-combination Measures

The surrounding landscape from the Site 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 typically occur during the summer months. As such, only giving rise to a short period of seasonal dust generation each year, where potential for cumulative and in-combination effects to exist. The cumulative and in-combination impact from agricultural activity within the vicinity of the Site was negligible.

### 9.7.1 Potential Cumulative Ambient Dust Impacts

The background concentrations of $PM_{10}$ (or ambient dust) have been considered in 9.4.2. As Zone D (which is reflective of baseline conditions) has been taken as the background concentration, there is little risk of the annual AQS limit being exceeded and no further consideration of the risk posed by ambient $PM_{10}$ was warranted in cumulative sense.

### 9.7.2 Potential Cumulative Disamenity Dust Impacts

There is potential for a cumulative and in-combination dust impact from the Development and the activities within the Permitted Area. As presented in Chapter 3, the activities in the Permitted Area are largely centred around mineral processing and offsite transportation. The Permitted Area and the Development form the Registered Area. As such, the Development can be considered more of an extension to the Permitted Area rather than an intensification of activities. Nevertheless, there are activities which have occurred within the Permitted Area

that are distinct, and their ability to give rise to cumulative and in-combination effects are considered below.

Table 9-12 below details the reclassification of these categories including activities that are related directly to activities within the Permitted Area (Increased Mineral Processing and Offsite transportation).

**Table 9-12: Dust Emission Magnitude for cumulative activities**

| Activity | Activity Details | Previous Residual Source of Emission | Magnitude of Residual Source Emissions |
|---|---|---|---|
| Mineral Processing | • Secondary and tertiary processing of aggregates through crushing facility; and<br>• Operation of the hot macadam plant. | **Medium** | **Medium** |
| Offsite Transportation | • 56No. HGVs movements offsite per day associated with the Permitted Area;<br>• Access Route to site is paved;<br>• Wheel wash utilised at entrance to quarry | **Small** | **Medium** |

The residual source emission for mineral processing remained at medium when considered in tandem with the additional activities occurred within the Permitted Area. The residual source emission for offsite transportation increased from small to medium, primarily given the number of HGVs leaving the Site from the Permitted Area. To ensure potential cumulative and in-combination impacts were fully realised, the DRA was revisited. To identify potential impacts between the Development (future Restoration) and the Permitted Area, a 400m buffer was extended from the Permitted Area boundary to identify additional potential receptors. Of the ten (10No.) sensitive receptors in section 9.4.7 above (Table 9-8), three (3No.) were identified to not be within the buffers for the Development and Permitted Area (SR05, SR10, SR11). As with the assessment of the historical impacts of the Development, a “medium” classification was applied to all receptors, as per the IAQM guidelines [127].

Sensitive receptors located to the northwest and northeast (SR01, SR02, SR06, SR07, SR08) had their distances modified, as they were now closer to the Permitted Area boundary. The sensitive receptors closest to the Development boundary (SR03, SR04) had the same distance. Based on the reclassification of the receptor distances, the frequency of dry wind (>5.5m/s) was calculated and used to determine the pathway effectiveness. Table 9-13 below details the pathway effectiveness for potentially impacted sensitive receptors.

**Table 9-13: Pathway Effectiveness for Potential Cumulative Impact**

| 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 (northwest) **(Close)** | 1.6% (584 hours) coming from the south/southwest (195-245 degrees degrees) **Infrequent** | **Ineffective** |
| SR02 **(High)** | ca.113.4m (northwest) **(Intermediate)** | 1.3% (442 hours) coming from the southwest (195-235 degrees) **Infrequent** | **Ineffective** |
| SR03 **(High)** | ca.151.9m (northwest) **(Intermediate)** | 0.3% (101 hours) coming from the west (305-345 degrees) **Infrequent** | **Ineffective** |

| 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 |
|---|---|---|---|
| SR04 **(High)** | ca.233.2m (northwest) **(Distant)** | 0.3% (86 hours) coming from the west (305-335 degrees) **Infrequent** | **Ineffective** |
| SR06 **(Low)** | ca.126m (west) **(Intermediate)** | 1.1% (366 hours) coming from the southeast (105-145 degrees) **Infrequent** | **Ineffective** |
| SR07 **(High)** | ca.72.3m (northwest) **(Close)** | 1.5% (497 hours) coming from the southeast (85-135 degrees) **Infrequent** | **Ineffective** |
| SR08 **(Low)** | ca.111.6m (east) **(Intermediate)** | 1.2% (394 hours) coming from the southeast (95-135 degrees) **Infrequent** | **Ineffective** |

Despite some receptors increasing their classification of distance (e.g. SR01) between the main and cumulative assessments, the pathway effectiveness for all receptors was remained as ineffective. Combined with the maximum residual source emission of 'Medium', following the IAQM Guidelines, the potential cumulative dust impact risk on sensitive receptors was determined as 'Negligible'. Considering the sensitivity of the receptors to disamenity dust, as discussed in section 9.6.2 above, combined with the 'Negligible' risk to potential cumulative dust impacts, the Magnitude of Disamenity Effects on sensitive receptors as a result of the cumulative dust generated by both the Permitted Area and the Development is determined as 'imperceptible.

## 9.8 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 has the potential to impact human health. However, the assessment on air quality showed there was little risk that the Development would have exceeded the AQS–standards.
- Chapter 6 - Biodiversity: Air quality can potentially impact ecosystems; however, this assessment demonstrated that the emissions to air from the Development will have no negative impacts on ecosystems.
- Chapter 13 - 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 impacted local or regional air quality.

## 9.9 Residual Impacts

Based on the receiving environment, type and intensity of activities (associated with the Development and will be associated with the Restoration Plan), the mitigation measures employed, the residual impact on air quality from dust is considered to have been imperceptible.

## 9.10 Monitoring

It is recommended that the Bergerhoff monitoring completed as part of this assessment (refer to Figure 9-2 for monitoring locations) should be continued until the Site has been restored.

## 9.11 Reinstatement

Following the S261 registration, an after-care plan was created for the whole site as it stood at the time. A further after-care plan has been created for the Substitute Consent area as it stood when work ceased in this area in 2021. Both these plans were submitted to the relevant planning authority. See section 3.6 above and Appendix 3-3 for further details.

## 9.12 Difficulties Encountered

A common difficulty encountered throughout the rEIAR was the issue of attempting to identify potential historic impacts which may have once existed, but which are now absent, or which may have reduced over time. Similar difficulties arose regarding the establishment of any historic periods when certain impacts may have become apparent only to subsequently abate. The rEIAR has been limited by the availability, completeness and accessibility of publicly available data from the period of time applicable to the Development subject to the substitute consent.

# 10 CLIMATE

## 10.1 Introduction

This chapter of the rEIAR provides a description and assessment of the likely impacts of the Development on climate in the context of national Greenhouse Gas (GHG) emissions.

## 10.2 Methodology

The following standards and guidance documents were used to assess the baseline conditions and in the assessment of potential impacts on climate associated with the Development:

- International Panel on Climate Change: Guidelines for National Greenhouse Gas Inventories; [132]
- IEMA – Environmental Impact Assessment Guide to: Assessing Greenhouse Gases and Evaluating their Significance [116]
- Monaghan County Council Climate Adaption Strategy [133];
- Monaghan County Council Development Plan 2019-2025 [22]; and,
- Department of Communication, Climate Action and Environment – National Adaption Framework, Planning for a Climate Resilient Ireland [134]

The assessment for climate will utilise existing standards to identify potential sources of GHG associated with the Development. According to IEMA Guidance, the boundary of baseline GHG emissions should consider the physical boundary (e.g. the project boundary line around the site), its geographical location (local, regional or national scale project) and its temporal boundary [116]. Given the retrospective nature of this assessment, the physical boundary shall be defined as the redline boundary associated with the Development and will be examined as historical emissions during a period of peak activity (2010-2020). Any potential GHG emissions associated with the Permitted Area will be examined cumulatively in section10.8 below. The quantification of GHG emissions will be estimated in tonnes of $CO2_e$.

The potential historical impacts of these GHG emissions, associated with the Development, will be determined by following the IEMA guidance, *Assessing Greenhouse Gas Emissions and Evaluating their Significance* [116], as far as practical. These guidelines specify the use of emission factors when determining GHG emissions and will be compared to historical national emission projections for the relevant sector, as discussed in section 10.3.3 below.

Due to the size and nature of the Development, there was no potential historical impacts on microclimate, as processes undertaken did not result in features that would give rise to wind tunnelling or shading outside of the Registered Area. As such, the potential historical impacts of the Development on microclimate were not assessed further.

### 10.2.1 Policy/Legislative Context

The following sections will review and highlight relevant policies and legislation relating to the Development in the context of national, regional and local climate objectives.

#### 10.2.1.1 Monaghan County Council Development Plan 2019-2025

The Monaghan County Development Plan 2019-2025 [22] details various aims and objectives relating to Climate, relevant to the Development:

**Climate:**

> **CCP4:** *To ensure new development is appropriately located, so as not to be exposed to 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.*

#### 10.2.1.2 Monaghan County Council Climate Adaption Strategy 2019-2024

The Monaghan County council climate Change Adaption Strategy 2019 – 2024 was adapted by the elected members at the Council in 2019 [135].

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;
- Ensure the climate adaption considerations are mainstreamed into all plans and policies and integrated into all operations and functions of Monaghan County Council.

#### 10.2.1.3 The National Adaption Climate Framework

The National Adaption Climate Framework was developed in 2018 [134], under the Climate Action 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 to improve the enabling of adaption through ongoing engagement with the civil society, the private sector, and the research community.

The key objective of the National Adaption Framework is to support climate action by setting out policy with a view to becoming resource-efficient and contributing to a low carbon economy. As the extractive industry is currently not identified under the National Adaption Climate Framework [136] this assessment has utilised this plan to provide context only (i.e. the direct contributions of GHG emissions from machinery, associated with the extraction of quarry material, will be discussed within the context of the Transport Sectoral Adaption Plans). This will be further discussed in section 10.3.3 below.

### 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 a development at a local level is inconsequential to these global emissions.

According to the Intergovernmental Panel on Climate Change (IPCCs) 2019 refinement of the 2006 publication of *Guidelines for National Greenhouse Gas Inventories* [132]*,* GHG emissions can be split into three categories (or 'scopes'[7])

- Scope 1: Direct emissions from sources that are 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 purchased electricity, heat or steam;
- Scope 3: Other indirect emissions that occur in the value chain.

Currently, in Ireland, 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 depends on the size and type of activities that are occurring within a site. Operational quarry activities (e.g. crushing and blasting) that used typical machinery contributed to the carbon footprint of the site, due to the use of diesel in such machinery.

[7] Direct and Indirect emissions do not relate to the EIAs Directive of "Direct" and "Indirect" effects and are assessed separately.

According to the description of the activities relating to the Registered Area, power was obtained from onsite diesel generators until 2018/2019, when an ESB substation or external energy purchased was the source primary source of electricity. These diesel generators powered the crushing and macadam plants located within the Permitted Area. As they are located outside the Development Site boundary, their potential impacts were discussed as cumulative GHG emissions in section 10.8 below. As the power supplied by the ESB substation only contributed slightly to the total power consumption used during the main activity period (2010-2020), Scope 2 emissions will not be considered within the context of this assessment. Scope 3 type emissions, life-cycle assessments, are outside the scope of this assessment.

The primary source of Scope 1 GHG emissions associated with the Development is from the operation of machinery and movement of HGVs. HGV movements attributed to the Development were estimated as 20% of the total HGVs used per day (total = 56No.). Therefore, an assessment on potential GHG emissions from the operations of eleven (11No.) HGVs was completed. The remainder of the HGV movements (45No. outward HGV movements and 2No. lorries deliveries) were assessed cumulatively in section 10.8.1 below. These emissions are presented in carbon dioxide equivalent ($CO_{2e}$), as specified above.

### 10.2.3 Operational Greenhouse Gas Emissions

Due to the retrospective nature of the rEIAR, emissions associated with the Development will be discussed in the context of peak operations, which occurred between 2010-2020. The Site preparation phase and operational phase have been considered together for the purpose of this assessment.

Scope 1 emissions associated with the historical operations of the Development was from the operation of plant equipment and movement of HGVs onsite. Based on the information received, potential sources of Scope 1 emissions that were located within the boundary of the Development include:

- 1No. excavator;
- 6No. HGV vehicles operating on mineral diesel;
- 1No. Jaw Crusher;
- 2No. Scalping Screen;
- 1No. Conveyor; and,
- 1No. Wheel Loader

In order to estimate the potential GHG emissions associated with the plant equipment, assumptions were made regarding their operation during the peak years of operation. The calculation of $CO_{2e}$ required information relating to the fuel capacity of the equipment. Estimations were made based on typical industry standards. These standards showed ranges in the fuel consumption for the equipment, ranging from 5L/hr for the conveyor to 34L/hr for the wheel loader. All fuel types were assumed to be 100% mineral diesel. The operating hours of the equipment was conservatively estimated to be throughout the entire working day (08:00 to 18:00 Monday to Friday) for 294 days per year.

For the 6No. HGV movements, due to the lack of available information, it was conservatively estimated that the HGVs would travel 100% laden for 23.7km per day. The distance was based a review of the Monaghan County Council Development Plan (2019-2025), which identified a series of road projects that are expected to be undertaken. Whilst this project examines the retrospective impacts of the Development, it was assumed that the destinations of the aggregate material would be similar to those currently proposed. Further details on this approach are discussed in section 10.8.1.

The estimation of the tonnes of $CO_{2e}$ that were emitted as part of the historical operations of the Site were determined from the UK Government's '*Greenhouse Gas reporting conversion factors 2022*' [137]. The most recent conversion factors were used as they were the highest

values attributed to the fuel type (100% mineral diesel) since 2016. Pre-2016 conversion factors did not show measurements in the desired unit (litres). Table 10-1 below summarises the data used in the assessment for GHG emissions. For HGV vehicles, emissions were calculated based on the $kgCO_{2e}$ emitted per km travelled (Table 10-1 below).

**Table 10-1: Summary of GHG emission input data**

| Equipment Type | Fuel Consumption (L/hr) | Operational Hours | Conversion Factor (Total kg $CO_{2e}$/litre) |
|---|---|---|---|
| 1No. excavator | 14 | 10 | 2.7 |
| 1No. Jaw Crusher | 14 | 10 | 2.7 |
| 2No. Scaling Screen | 20* | 20* | 2.7 |
| 1No. Conveyor | 5 | 10 | 2.7 |
| 1No. Wheel Loader | 34 | 10 | 2.7 |
| **No. of HGV vehicles** | **Distance Travelled (km)** | **Load** | **Conversion Factor ($kgCO_{2e}$)** |
| 11 | 23.7 | 100% | 1.19 |

***Values for the operation of 2x scalping screens**

## 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 comparisons.

The closest station that has a 30-year average of variables produced is the Clones meteorological station, located ca. 7km north of the Site. The station was closed in 2007/2008 and therefore does not 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 10-2 below summarises the climate data for the Clones station.

**Table 10-2:Climate averaged data from the Clones station (1978-2007)**

| Variable | 1978-2007 Average |
|---|---|
| Mean Temperature (°C) | 9.4 |

| Variable | 1978-2007 Average |
|---|---|
| Precipitation (sum of monthly means in mm) | 960.4 |
| Mean wind speed (kn) | 7.8 |
| Mean number of days with gale force winds | 2.2 |

The EPAs report '*Irelands Climate Status Report 2020'* [138] provides an update, which includes new datasets and analysis, since the previous addition of the report (2013). To summarise, the following observations are made regarding changes observed in Irelands climate:

- Average annual surface air temperatures have increased by approximately 0.9°C over the last 120 years;
- The number of warm spell days (observation above a threshold for at least 6No.consecuative days) have increased slightly over the past 60 years; and,
- Annual precipitation was 6% higher in the period between 1989-2018, compared to 1961-1990. The decade 2006-2015 was the wettest on record;

Other aspects of Climate Change, including ocean and terrestrial observations also show changes in line with the global projections, these will be discussed in section 10.5.2 below.

### 10.3.2 Extreme Weather Events

According to the Climate Adaption Plan from Monaghan County Council [133], 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 the winter months;
- Increase in precipitation during the winter months resulting in milder and wetter winters; and
- Sporadic prolonged cold events and snow events.

A review of the Monaghan County Council Climate Adaption plan identified nine (9No.) severe weather events in the county, during the period 2010-2020. These weather events include extreme rainfall, severe flooding, severe cold spells and increased summer temperatures [133]. Some of the major events registered as national major weather events including numerous storm events (Ophelia in 2017, Desmond in 2015, Frank in 2015) and the national drought recorded in the summer of 2018.

In the context of the Development, many of these registered weather events were recorded on the nearest meteorological station, Ballyhaise. In December 2015, Ballyhaise weather station recorded 270.9mm monthly precipitation, which was a 265% increase on the 3-year average. This period of high rainfall was driven by the occurrence of Storm Desmond and Storm Frank [133].

### 10.3.3 Baseline Greenhouse Gas Emissions

According to the EPA, the annual GHG emissions for Ireland in 2020 was estimated to be 57.7 million tonnes of carbon dioxide equivalent ($MtCO_{2e}$), which is 3.6% lower than 2019 emissions [139].

The sector relevant to GHG emissions associated with the historical use of the Development is Transport. Transport currently accounts for approximately 20% of Ireland's GHG emissions, with road transportation accounting for 96% in total [139]. Table 10-3 below details the $CO_{2e}$

emissions for the period associated with the Development (2010-2019), with 2020 omitted due to the outlying emissions associated with the COVID-19 pandemic.

**Table 10-3 National Emissions for Road Transportation between 2010-2019**

| Year | $CO_{2e}$ (Mt) |
|---|---|
| 2010 | 11.0 |
| 2011 | 10.7 |
| 2012 | 10.4 |
| 2013 | 10.6 |
| 2014 | 10.8 |
| 2015 | 11.3 |
| 2016 | 11.8 |
| 2017 | 11.5 |
| 2018 | 11.6 |
| 2019 | 11.6 |
| **Average $CO_{2e}$(Mt) 2010-2019** | **11.1** |

Transport emissions ranged between 11.8Mt of $CO_{2e}$ in 2016 to 10.4Mt in 2012. In 2020, Road emissions were estimated at 9.7Mt of $CO_{2e}$. These reduced emissions were linked to the COVID-19 pandemic, with lockdown policies decreasing the number of vehicles on the road. Therefore, as a conservative estimation of emissions, the average $CO_{2e}$ emissions associated with normal traffic flows will be used for this assessment, which was 11.1Mt of $CO_{2e}$ (2010-2019).

## 10.4 Characteristics and potential Impacts of the Development

The site preparation and operational phases have been considered together.

Topsoil and overburden have been stripped and used to create berms for around the periphery of the Site. The rock is then extracted via drilling and blasting. The blast rock is subjected to primary processing prior to transport back to the Permitted Area for further processing. The following mobile equipment was operational as part of the 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

As discussed in section 10.2.3 above, it is estimated that 20% of HGV vehicles were attributed to the Development, which would have been involved in both onsite and offsite transportation of materials. The potential impact from the remainder of the HGVs was discussed regarding the cumulative impacts between the Development and the Permitted Area (section 10.8.1).

This plant was of high-specification, highly efficient and fuel-efficient. Nevertheless, the potential impacts from the characteristics outlined above are the emission of GHGs to the atmosphere which contribute climate change.

The restoration plan, once implemented, is likely provide some level of carbon sequestration, however given the minor extent of the Site, this is likely to be imperceptible in wider national context.

## 10.5 Climate

As discussed above, the primary source of potential GHG emissions relating to the Development are Scope 1 emissions, as per the IPCC standards [132]. These emissions were attributed to the historic operations of the plant equipment (6No.) and the 10% of HGV movements attributed to the Development. As there is no relevant sectoral emissions for the extractive industry, the historic emissions were compared to the average Road Transportation emissions occurring between 2010-2019 (Table 10-3 above), 11.1Mt$CO_{2e}$.

Dust generated by the historic activities of the Development were determined to be short-term and precipitated out of the atmosphere overtime. Therefore, the historical impacts on climate from dust are determined as imperceptible.

### 10.5.1 Emissions of Greenhouse Gases

To determine potential direct contributions of GHG emissions associated with the Development, a conservative estimation on the operating regime of the planting equipment was used, as discussed in section 10.2.3 above. Table 10-1 above describes these conditions, which were used to calculate historical GHG emissions associated with the Development.

To calculate the historical release of these GHG emissions associated with the equipment, emission factors from the UK Governments Conversion Factors 2022 were used, as described in section 10.2.3 above. These emission factors were based off the assumed annual fuel consumption of the plant equipment and the estimated $CO_{2e}$ for the movement of HGVs travelling outbounds for 23.7km. Table 10-4 displays the potential emissions associated with the Development for a typical year of activity.

**Table 10-4: Calculation of $CO_{2e}$ for plant and equipment**

| Plant Name | Annual Fuel Consumption (L/year*) | Conversion Factor for Mineral Diesel (Total kg $CO_{2e}$) | Kg of $CO_{2e}$ per year | Mt of $CO_{2e}$ per year |
|---|---|---|---|---|
| Volvo 300 excavator | 41,160 | 2.7 | 111,132 | 0.0001 |
| Sandvik Q134 Jaw Primary Crusher | 41,160 | 2.7 | 111,132 | 0.0001 |
| Roco 1600 Scalping Screen (x2) | 117,600 | 2.7 | 317,520 | 0.003 |
| Raco tracked conveyor/stacker | 14,700 | 2.7 | 39,690 | 0.00004 |
| Volvo L180 Wheel Loader | 99,960 | 2.7 | 269,892 | 0.003 |
| **Number of HGVs** | **Distance Travelled** | **Conversion Factor (100% laden)** | **Kg of $CO_{2e}$ per year** | **Mt of $CO_{2e}$ per year** |
| 11 | 23.7 | 1.19 | 91,342.35 | 0.00009 |
| **Total $CO_{2e}$ (Mt) for a typical year** | **0.00094** | | | |

***Typical operating year of 294 days not inclusive of public holidays and Sundays**

Based on a typical operating year associated with the Development, emissions from the plant and equipment and HGV movements are estimated to have produced 0.00094Mt of $CO_{2e}$. Over the course of the peak activity period (2010-2020) this equates to 0.0094Mt of $CO_{2e}$ per annum, based on the known plant and equipment list provided for the operational year.

Table 10-5 below shows the estimations of $CO_{2e}$ produced as a result of the historic operations associated with the Development described in the context of the national GHG emissions for the Road Transportation. This follows the IEMA Guidance on assessing GHG emissions [116]. Given the retrospective nature of the assessment, it is not practical to determine compare GHG emissions based on future historic emission scenarios, with the implementation of "with existing measures" and "with additional measures".

Based on the average GHG emissions attributed to Road Transportation between 2010-2019 (11.1Mt of $CO_{2e}$), the Development contributed approximately 0.01% of the emissions.

**Table 10-5:Contributions of the Development to Total Transport– GHG Emissions**

| $CO_2$eq - Development (Mt) | $CO_{2e}$ – Average Road Transportation (2010-2020)(Mt) | % of contribution from the Development |
|---|---|---|
| 0.0009 | 11.1 | 0.008% |

Based on the assessment of GHG emissions associated with HGV movements, the impacts of the Development on climate are determined as 'not significant'.

### 10.5.2 Climate Change Adaption

Due to the retrospective nature of this assessment, climate change adaption could have only occurred over the period of activity. Therefore, adaption measures are not required to be assessed.

### 10.5.3 Unplanned Events

From information provided by the Applicant it is understood that there have been no recorded unplanned events since they assumed ownership of the Site.

## 10.6 Mitigation Measures

### 10.6.1 Past Climate Mitigation Measures

Over the period of activity associated with the Development, various measures were implemented which would have reduced the potential GHG emissions. Some of these measures include:

- Reducing the idle times by implementing an efficient material handling plan that minimises the waiting time for loads and unloads;
- Turning off vehicle engines when not in use for more then 5-minutes;
- Preventative/regular maintenance of plant and equipment;
- The use of low energy equipment (where practicable); and
- Upgrading of vehicles used onsite, when required.

### 10.6.2 Restoration Plan Mitigation Measures

For the Restoration works, the following mitigation measures should be implemented;

- Reducing the idle times;
- Turning off vehicle engines when not in use for more then 5-minutes;
- Preventative/regular maintenance of plant and equipment;

## 10.7 Cumulative and In-combination Measures

Potential cumulative impacts on climate as a result of the Development is the emissions associated with the Permitted Area. Additional vehicles and equipment that were associated with the operational phase of the Permitted Area have been included in the cumulative assessment of GHG emissions.

### 10.7.1 Potential Cumulative Greenhouse Gas Emissions

As discussed above, potential Scope 1 emissions associated with the Registered Area include the operation of machinery and the movement of HGV vehicles. Based on the information available, potential sources of cumulative emissions associated with historic activities of the Registered Area include:

- The operation of plant equipment associated with the Permitted Area;
- The movement of HGV vehicles; and,
- The movement of employee vehicles.

As detailed in section 3.2.1, activities associated with the Permitted Area that would have potentially emitted GHG, include:

- Two (2No.) crushers;
- Screening plant; and,
- Conveyors.

In addition to the above plant equipment, 2No. diesel generations were in operation during the peak activity period to power the macadam and crushing plant. Following typical industry information available online, the fuel capacity of a 300kVA diesel generator is 58L/hr. For a 450kVA diesel generator it is estimated at approximately 90L/hr. Under the assumption of a maximum extraction rate associated with the Registered Area of 350,000tpa, this assumes that the screening plant would process approximately 119 tonnes of material per hour. This would be a typically of a small screening plant, which according to available information 153 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. As shown in Table 10-1 above, the fuel capacity of the crushers is estimated at 14L/hr. For the purpose of the assessment, the conversion factors and hours of operation follow the methods and assumptions outlined in section 10.3.4 above.

Table 10-6 below summarises the parameters assumed for the equipment associated with the Permitted Area.

**Table 10-6: Parameters for Permitted Area plant equipment.**

| Plant Description | Fuel capacity (L/hr) | Operating Hours | Conversion Factor (Total kg $CO_{2e}$/litre) |
|---|---|---|---|
| Crusher (x 2No.) | 28 | 10 | 2.7 |
| Screening Plant | 20 | 10 | 2.7 |
| Conveyors (x2No.) | 15 | 20 | 2.7 |
| Diesel generator (300kVa) | 58 | 10 | 2.7 |
| Diesel generator (450kVa) | 90 | 10 | 2.7 |

The estimated $CO_{2e}$ emissions associated with the historic operation of the Permitted Area is shown in Table 10-7 below.

**Table 10-7: Estimation of $CO_{2e}$ from Permitted Area**

| Plant Description | Kg of $CO_{2e}$ | Tonnes of $CO_{2e}$ |
|---|---|---|
| Crusher (x 2No.) | 222,264 | 222.25 |
| Screening Plant | 158,760 | 158.76 |
| Conveyors (x2No.) | 238,140 | 238.14 |
| Diesel generator (300kVa) | 460,404 | 460.4 |
| Diesel generator (450kVa) | 714,420 | 714.42 |
| **Total Mt of $CO_{2e}$ per year** | **0.002** | |

An estimation on the number of HGV vehicles associated with the Registered Area was based on 80% of the materials being transported by 20-tonne HGVs and the remaining 20% being transported by 29-tonne HGVs. At maximum capacity, the Registered Area would have exported 350,000 tonnes of aggregates per year. Based on these numbers, an estimation of 48No. 20-tonne HGVs and 8No. 29-tonne HGVs would be required per day to achieve this maximum capacity of extraction. In addition, there were also supply trucks that would have imported material such as bitumen, asphalt sand and burner fuel, which would not have exceeded more than 2No. deliveries a day. Therefore, taken into account the 6No. HGVs assessed as part of the Development, 52No. HGVs are determined to have potentially contributed cumulative emissions to the Development.

As the GHG emissions are only attributed to outward movements, to destinations where the material is required, then the HGVs are also assumed to be 100% laden. For employee vehicles, a maximum of 20No. were assigned 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).

The $CO_{2e}$ that was emitted as part of the maximum capacity of the Registered Area is determined based on the UK Governments emission factors, as discussed in section 10.2.3 above. The conversion factors for HGV vehicles were based on the product of the net calorific value per km (measured based on kWh) and the $CO_{2e}$ produced. For the passenger vehicles, the fuel type is assumed to be petrol and is calculated based on the $CO_{2e}$ of $CO_2$ produced per km for an average car. Table 10-8 below details the emission factors used for the calculation of historic cumulative $CO_{2e}$ produced based on the maximum capacity of the Registered Area.

**Table 10-8: Conversion Factors for vehicle emissions associated with Registered Area**

| 100% laden HGV vehicles ($kgCO_{2eq}$/km) | Averaged sized petrol passenger vehicle (kg $CO_2$ of $CO_2$/km) |
|---|---|
| 1.19 | 0.17 |

As discussed in section 10.2.3, the destinations of the HGV vehicles that would have been in operation during the main period of activity associated with the Registered Area (2010-2020) is currently unknown. Therefore, a review of the most recent Monaghan County Development Plan identified a series of road projects located within reasonable distance to the Registered Area Given the retrospective nature of this assessment and the availability of data, the average distance of the Registered Area to these future developments was used. Table 10-9 below details these future road projects.

**Table 10-9: Future Road Development Plans located in proximity to the Registered Area**

| Town | Development | Distance from Quarry |
|---|---|---|
| Monaghan | Development of Northern Link Road from N54 Clones Road to N2 North | ca.12.2km |
| Monaghan | Continuation of Oriel Way Southern Link Road from the N54 Clones Road to R188 | ca.22.3km |
| Monaghan | Development of Southern link road from R162 Ballybay Road to N2 at Corlat roundabout | ca.23km |
| Carrickmacross | Completion of Industrial link Road (R178 to R-180) | ca.37km |
| Castleblayney | Link from Monaghan Road (R938) to Keady Road (R181) | ca.33.7km |
| Ballybay | Link from Clones Road (R183) to Cootehill Road (R190) | ca.14km |
| **Average distance from material sources to Development** | | **23.7km** |

Based on the above road projects, which would reasonably require material provided by the Registered Area, an estimation of 23.7km (single trip) was chosen to represent potential distances travelled by HGVs during the peak operation period.

Using the emission factors specified in Table 10-8 above, $CO_{2e}$ emissions were estimated for vehicles associated with the Permitted Area. Table 10-10 below details the emissions that would have cumulative occurred with the Development GHG emissions.

**Table 10-10: $CO_{2e}$ emissions associated with the Permitted Area**

| Vehicle Type | Distance Travelled | Number of movements per day | Conversion Factor | Total Emissions (Mt of $CO_{2e}$) |
|---|---|---|---|---|
| 100% laden HGVs | 23.7km | 56 (outward) | 1.19 | 0.0004 |
| Passenger Vehicles (Average Petrol Car | 30km | 52 (roundtrip) | 0.17 | 0.0001 |
| **Total Mt of $CO_{2e}$** | **0.00051** | | | |

Table 10-11 below details the total estimation of $CO_{2e}$ emissions associated between the Development and the Permitted Area, for all plant and vehicle movements.

**Table 10-11: Cumulative GHG Emissions between the Development and Permitted Area**

| Source of CO2e | Onsite Plant | HGV Movements | Employee Vehicles |
|---|---|---|---|
| The Development (tonnes of $CO_{2e}$ per year) | 849.37 | 91.34 | NA |
| The Permitted Area (tonnes of $CO_{2e}$ per year) | 1,793.99 | 373.7 | 77.8 |
| Cumulative Emissions (tonnes of $CO_{2e}$ per year) | 2,643.35 | 465.01 | 77.8 |
| Cumulative Emissions (Mt of $CO_{2e}$) | 0.003 | 0.0005 | 0.00008 |
| **Total $CO_{2e}$ (Mt of $CO_{2e}$)** | **0.0032** | | |

Based on the estimation of cumulative emissions associated with the Development and Permitted Area, the emissions were estimates as 0.0032Mt of $CO_{2e}$ for a typical operating year between 2010-2020. These emissions would have only contributed 0.03% of the total emissions associated with Road Transportation and therefore the impacts are determined as "imperceptible" in a national context.

## 10.8 Interactions with other Environmental Attributes

- Chapter 5 - Population and Human Health: Climate change and GHG emissions are an important consideration for human health and a pleasant living environment. GHG emissions associated with the historic operations of the Development were shown to have imperceptible effect on national GHG emissions and in turn, climate change that can impact–human health.
- Chapter 6 - Biodiversity: Climate Change has the potential to impact ecosystems, however, the influence of GHG emissions associated with the Development was shown to be imperceptible.
- Chapter 8- Hydrology: Changing climate conditions over the occupational period of the Development had the potential to influence the occurrence of flood events. No impacts from flooding was recorded during the main period of activity. Therefore, the potential effects of historical climate change on hydrology are determined as not significant.
- Chapter 13 - Material Assets: Traffic & Transport: Climate change is directly linked to GHG emissions, with road traffic one of the highest contributors to national emissions. The assessment on GHG emissions from employee and HGV vehicles has shown that there was no retrospective impact on climate as a result of the vehicles. The impacts are therefore determined as imperceptible.

## 10.9 Residual Impacts

The impact on national GHG emissions as a result of the historical operation of the Development was classified as imperceptible.

## 10.10 Reinstatement

Following the S261 registration, an after-care plan was created for the whole site as it stood at the time. A further after-care plan has been created for the Substitute Consent area as it stood when work ceased in this area in 2021. Both these plans were submitted to the relevant planning authority. See section 3.6 above and Appendix 3-3 for further details.

## 10.11 Difficulties Encountered

A common difficulty encountered throughout the rEIAR was the issue of attempting to identify potential historic impacts which may have once existed, but which are now absent, or which may have reduced over time. Similar difficulties arose regarding the establishment of any historic periods when certain impacts may have become apparent only to subsequently abate. The rEIAR has been limited by the availability, completeness and accessibility of publicly available data from the period of time applicable to the Development subject to the substitute consent.

# 11 NOISE & VIBRATION

## 11.1 Introduction

This Chapter of the EIAR provides a description and assessment of the likely impact of the 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 associated with the Development;
- Assess the likely significant impacts which may have arisen from the 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 (DEHLG) - Quarries and Ancillary Activities: Guidelines for Planning Authorities, 2004; [11]
- EPA 2006, Environmental Management Guidelines, Environmental Management in the Extractive Industry (Non-Scheduled Minerals), 2006; [97]
- BS5228-1:2009, Code of practice for noise and vibration control on construction and open sites, Noise; [140]
- SI No 140/2006 Environmental Noise Regulations 2006; [141]
- ANC Guidelines (Greenbook) Environmental noise measurement guide 2013; [142]
- BS4142:2014 Methods for rating and assessing industrial and commercial sound, 2014; [143]
- IEMA Guidelines for environmental noise impact assessment, 2014; [144]
- ISO 1996-1:2016 Acoustics - Description, measurements and assessment of environmental noise - Part 1: Basic quantities and assessment procedures 2003; [145]
- ISO 1996-2:2017 Acoustics - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels; [146]
- NRA Guidelines for the treatment of noise and vibration in National Road Schemes, 2004; [147]
- NRA Good practice guidance for the treatment of noise during the planning of National Road schemes, March 2014; [148]
- Smith, Peterson and Owens Acoustics and Noise Control, 1996; [149]
- World Health Organization's (WHO) Night noise guidelines for Europe; [150]
- World Health Organization's (WHO) Guidelines for Community Noise; [151]
- Monaghan County Development Plan 2019-2025; [22]
- Aggregate Levy Sustainability Fund (ALSF): Sustainable Aggregates Theme 1 - Reducing the environmental effect of aggregate quarrying: Dust, noise and vibration, year unknown [152] and
- Irish Concrete Federation (ICF) 2005, Environmental Code, Second Edition, October 2005. [153]

This chapter assesses noise impacts that have arisen from the Development through three distinct means.

- An assessment on the likely historical changes in the acoustic environment, as audible noise at sensitive receptors. This methodology is based on the IOA/IEMA guidelines above.
- An assessment on the likely historical site-specific noise emissions that were audible at sensitive receptors rated against industry standard limits for noise nuisance.

- A review of the site history of complaints and enforcements where noise is presented as a nuisance/impact.

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 [22] 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 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 83/09) 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 shall 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 [97] and by the Irish Concrete Federation [117] detail recommended noise limits of:

- Daytime (i.e. 08:00 to 20:00) $L_{Aeq,1hr}$ 55dB(A)
- Night-time (i.e. 20:00 to 08:00) $L_{Aeq,1hr}$ 45dB(A)

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.

### 11.2.2 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. 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 ($L_{in}$)'*

### 11.2.3 Criteria Noise Impact

The limits outlined here are derived utilising best practice, standards for the industry, planning conditions and industrial standards.

The limits are similar to international criteria for the protection of human health from noise nuisance and protection of human health. These limits were therefore applied as the criteria within this Chapter for noise impact from the Development.

#### 11.2.3.1 Site Preparation

Site preparation phase noise was assessed utilising the British Standard BS5228-1 [140], 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)** | | |
|---|---|---|---|
| | **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 significant effect has been deemed to occur if the total $L_{Aeq}$ noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level. |
| **Note 2** | If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total $L_{Aeq}$ noise level for the period increases by more than 3dB due to construction activity. |
| **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. |
| **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. |

This method requires an understanding of the receiving environmental at NSRs to allocate suitable construction noise limits at receiving building facade.

### 11.2.3.2 Operational Site-Specific Noise

#### 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 EPA [154] and ICF [153] relating to blast limits at sensitive receptors are outlined in Table 11-2:

**Table 11-2: Blasting Limits**

| Parameter | EPA | ICF |
|---|---|---|
| Ground borne Vibration Limit | **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 | **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). |
| Other Notes | 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.<br>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;
AOP - 125dB (Lin) max peak

Limits are respective to the closest receiving properties.

#### 11.2.3.3 Site Associated Road Traffic

The L6280 adjoins the R212 to the west, which is the primary transport route for HGVs accessing and egressing the Registered Area. The surrounding roads are not major roads as per the Environmental Noise Regulations 2006 and therefore no strategic noise maps have been developed locally.

Traffic from the Registered Area during the period of the Development was in line with existing authorised traffic movements from the Permitted Area. Furthermore, Quarry traffic was, and continues (within the Permitted Area) to be, constrained to operational daytime hours, removing any associated road traffic noise during the night-time period.

This Chapter based on the following has not identified significant and likely impacts arising from the Development for road traffic noise and it has therefore been screened out of further assessment:

Existing road traffic movements are established from the Permitted Area;
No significant change on traffic occurred, refer to Chapter 14 (Material Assets); and,
No traffic associated with the Site during the night-time period.

### 11.2.4 Noise Modelling

Noise modelling was carried out using Soft Noise Predictor version 2023 software. The noise model has been developed for the Site to incorporate the noise emission sources during the operation of the Development, and the layout of the local environment. The model only assesses site specific emissions – i.e., it does not incorporate existing ambient sources such as road traffic.

The model was run utilising ISO 9613 1 & 2 for the basis of sound transmission from source to receiver.

#### 11.2.4.1 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 modelling inputs and outputs are presented in Appendix 11-2 and 11-3. In developing the model all operational sources are deemed on for the full daytime period, i.e., it is calculated as been on for the full 12-hour period and operating at full duty capacity. In reality, many emissions will operate below duty capacity at times. As such this 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 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 | Distance from Site Boundary (m) |
|---|---|---|---|---|
| | E | N | | |
| NSR01 | 649667 | 818318 | North of the Site | ca.159m |
| NSR02 | 649706 | 818329 | North of the Site | ca.161m |
| NSR03 | 649852 | 818019 | East of the Site | ca.154m |
| NSR04 | 649923 | 817979 | East of the Site | ca.234m |
| NSR05 | 649633 | 817559 | South of the Site | ca.317m |
| NSR06 | 649313 | 818279 | North of the Site | ca.197m |
| NSR07 | 649394 | 818309 | North of the Site | ca.199m |
| NSR09 | 649269 | 818460 | North of the Site | ca.379m |

| ID | ITM (Easting, Northing) | | Location Relevant to Site | Distance from Site Boundary (m) |
|---|---|---|---|---|
| | E | N | | |
| NSR10 | 649006 | 817608 | Southwest of the Site | ca.414m |
| NSR11 | 648973 | 818055 | West of the Site | ca.413m |
| NSR12 | 649006 | 817608 | Southwest of the Site | ca.525m |

Where feasible, the numbering IDs of the NSR's match the sensitive receptors (SR's) presented in Chapter 9 Air Quality, to provide clarity on in-combination effects.

Sensitive Receptor no.8 was discarded as, following investigation, it was identified as a storage facility and therefore not inhabited.

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, NSR01, being located approximately 159m 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 11-4. 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**

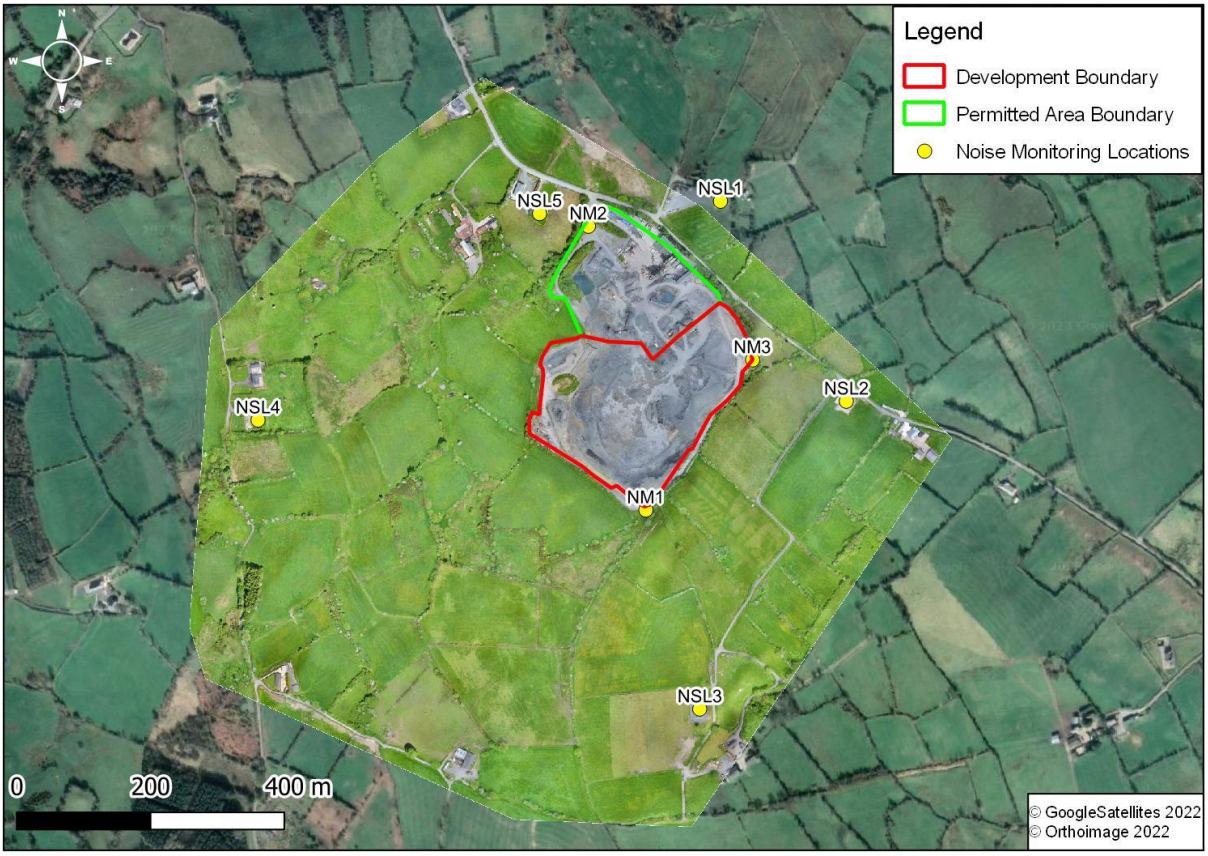


**Table 11-4: Ambient Daytime Sound Levels 2022**

| 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.<br>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.<br>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. |

| Location | Start Time | $L_{Aeq,T}$ (dB) | $L_{A10,T}$ (dB) | $L_{A90,T}$ (dB) | $L_{AFmax}$ (dB) | Description |
|---|---|---|---|---|---|---|
| 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 Levels 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 activities;
- Transport - traffic noise from local road movements.

Generally higher levels of ambient acoustic sound were found at NM2 and NM3 due to the macadam plant and the movement of vehicles near the SLM. The macadam plant is considered a noise source separate from the quarry as it's not controlled by the S261 conditions.

All monitoring locations recorded $L_{Aeq,\ 1hour}$ values of 47dB to 55dB during 2022 and 36dB to 47dB during 2023 survey.

The background ambient acoustic environment for all monitoring locations as $L_{A90,1hour}$ ranged from 36dB to 52dB in 2022 and 25dB to 31dB in 2023.

### 11.3.2 Conclusion of Existing Ambient Acoustic Environment

Based on the desk-based review of the area and the baseline survey carried out it is reasonable to conclude that the ambient existing sound levels surrounding the Site are low to moderate. It is further reasonable to conclude, that the levels are in-line with historic sound levels based on the limited development or change, and the long operational history of the Permitted Area within the Registered Area.

## 11.4 Characteristics and Potential Impacts of the Development

In the Permitted Area, the processing plant for finishing aggregates products, including secondary, tertiary, crushing and screening, along with washing of aggregates, occurs. Final stockpiling and the loading of haulage trucks also occurs in this location. Much of this plant is fixed and is powered by three phase electricity.

Historically within the Site, processing included primary crushing and primary screening, along with stockpiling. These activities used mobile plant which followed the quarry face as it progressed through the Site. Occasionally some trucks would be filled at the stockpiles for clients requiring a rougher stone, though typically dump trucks were loaded and material was brought back to the finishing area for further crushing and grading.

Since 2021 the activities in this area have ceased. These activities have been restricted to the Permitted Area since.

The activities assessed in this chapter are concerned with Site Preparation and the Operational Phases associated with the Development. These sources of historical noise and the potential likely impacts that would have occurred at NSRs are distinctly different and therefore have been discussed separately.

### 11.4.1 Site Preparation Phase Noise

Noise during the Site Preparation Phase of the Development would have consisted mainly of topsoil and overburden removal and construction of soil embankments. The Site Preparation Phase work required 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 would have had 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 historical construction noise impact at NSRs, which utilised the BS5228 ABC Method for peak noise, associated with the Site Preparation Phase of the Development (utilising combined sound power of 79dB at 10m)

The predicted historical 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: Site Preparation Noise Assessment (BS5228 ABC Method)**

| NSR | Distance to Main Construction Site (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 | 159 | 55 | 65 | Compliant |
| NSR02 | 161 | 55 | 65 | Compliant |
| NSR03 | 154 | 55 | 65 | Compliant |
| NSR04 | 234 | 52 | 65 | Compliant |
| NSR05 | 317 | 49 | 65 | Compliant |
| NSR06 | 197 | 53 | 65 | Compliant |
| NSR07 | 199 | 53 | 65 | Compliant |
| NSR09 | 379 | 48 | 65 | Compliant |
| NSR10 | 414 | 47 | 65 | Compliant |
| NSR11 | 413 | 47 | 65 | Compliant |
| NSR12 | 525 | 45 | 65 | Compliant |

All NSRs identified would have experienced 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 when plant was 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 $L_{Aeq,1hr}$ 65dB.

### 11.4.2 Site Preparation Phase Vibration

Historical impacts from the Development on vibration from the Site Preparation Phase of works were imperceptible.

During this stage of works, activities would have consisted of heavy machinery moving soils within the Site boundary and site security development.

### 11.4.3 Operational Phase 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 11-8 and Table 11-9 respectively. The blasting records were measured at NSR06, refer to Figure 11-1 above.

**Table 11-8: Air overpressure records for the 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 |

| Date | PPSL (dB) | ZC Freq (Hz) | Compliant? <125dB |
|---|---|---|---|
| 07/09/2022 12:26 | 113 | 11 | Compliant |

**Table 11-9: Vibration records for the 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 |
| 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 10.3.6. by the EPA and the ICF.

### 11.4.4 Operational Phase Noise

Historically within the Site, processing included primary crushing and primary screening, along with stockpiling, utilising mobile plant.

Table 11-10 presents typical sound pressure ($L_{Aeq,T}$) values for plant utilised within the Site as part of the operational phase of the Development.

**Table 11-10: 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.2022-1, has been prepared to assess predicted noise emissions at the Site during the Development works. The site-specific emissions from the Development, outlined in Table 11-10 above, are supplied in Table 11-11 below and displayed in Figure 11-3 below.

The results are compared against the EPA & IFC recommended limit for daytime. The results are predicted at 1.5m height, as the quarry only operated during daytime periods.

**Table 11-11:Predicted Operational Noise Emissions**

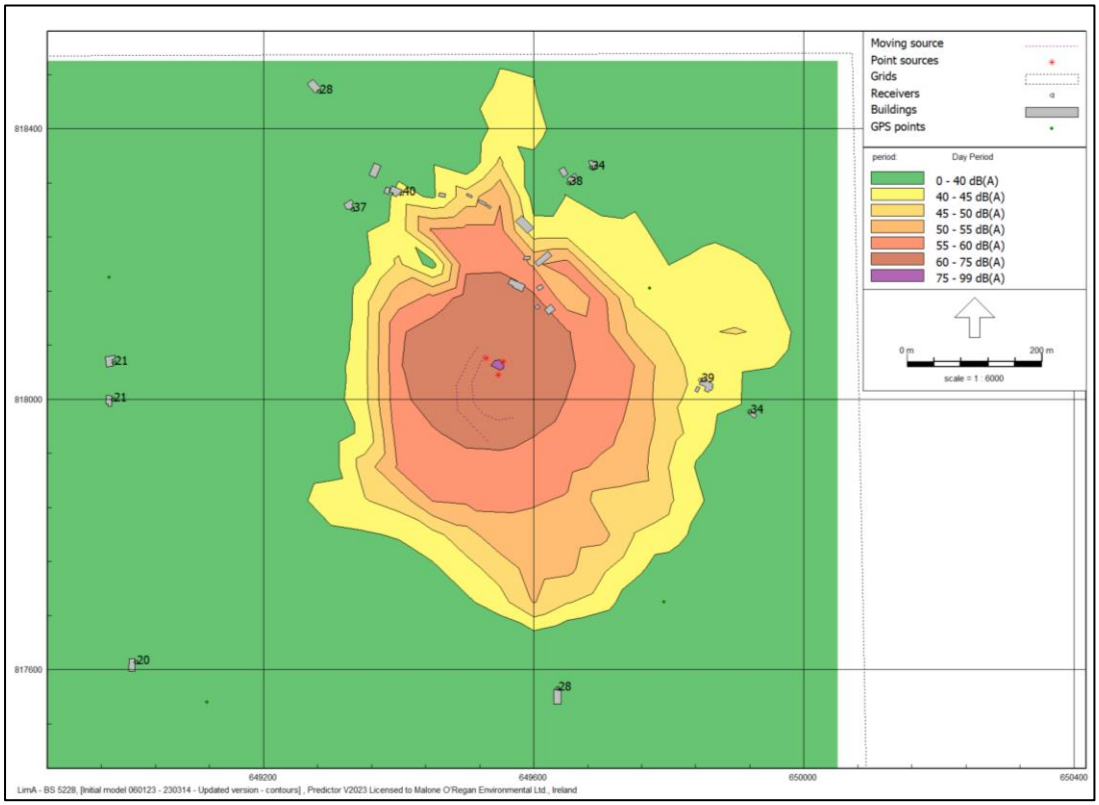
| NSR | Predictor Output $L_{Aeq,1hr}$ (dB) | EPA & ICF $L_{Aeq}$ Limit (dB) | Complaint? |
|---|---|---|---|
| NSR01 | 38 | 55 | Yes |
| NSR02 | 35 | | Yes |
| NSR03 | 39 | | Yes |
| NSR04 | 34 | | Yes |
| NSR05 | 28 | | Yes |
| NSR06 | 37 | | Yes |
| NSR07 | 40 | | Yes |
| NSR09 | 28 | | Yes |
| NSR10 | 21 | | Yes |
| NSR11 | 21 | | Yes |
| NSR12 | 20 | | Yes |

Predicted cumulative sound level at all NSRs were predicted to be below noise nuisance criteria as typically specified Section 11.1.1.4.

The noise presented in the ambient survey in Section 11.3.1 include the plant used in the Operational phase located in the Permitted Area since 2020. All monitoring locations recorded $L_{Aeq,\ 1hour}$ values of 47dB to 55dB, which are in compliance with the noise nuisance criteria used above.

As no complaints were recorded during the operation of the Development, a review of the effectiveness of mitigation in-place during the time of operation has been undertaken.

**Figure 11-3: Predicted Daytime contours for Operational Phase**




## 11.4.5 Restoration Phase Noise

Noise during the restoration of the Site will be associated with the following:

- Spreading topsoil;
- Seed planting; and,
- Setting of hedgerows.

This activity will require minimal plant, consisting of tractor to spread seeds. 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: Restoration – Ground Grading Sound Pressure Levels**

| Plant | Activity | Reference BS5228-1 | Sound Pressure $L_{Aeq}$ at 10m dB |
|---|---|---|---|
| Bulldozer | Spreading topsoil; | C.2.01 | 75 |
| Excavator | Remove of embankments | C.2.02 | 77 |
| Combined Sound Pressure Level (at 10m) | 79dBA<br>Combined Sound Pressure Level (at 10m) | | |

Following the above step, the land will need time to settle, prior to the use of an agricultural tractor and planter. This will be followed by repeated site visits to ensure seed health and growth. During this time planting of hedgerow species will also be undertaken. This step will be primarily manual, with a vehicle and trailer used to carry the tree root stock to where it is needed. In both cases the peak noise levels will be the individual vehicles, with a sound pressure of less than 80dBA.

These activities will predominantly occur within the existing pit floor, with the exception of the movement of the boundary stockpiles to the pit floor. The peak site-specific emissions from the Development at the closest Noise Sensitive Receptor, NSR03 ca.154m from the Site Boundary, is calculated to be 55dBA. This is below noise nuisance limits of $L_{Aeq,1hour}$ of 55dBA. Furthermore, during this stage of works, existing activities within the Permitted 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 task 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 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.

## 11.5 Mitigation Measures and/or Factors

### 11.5.1 Previous Mitigation Measures Noise

To date, no records of noise complaints have been received by the applicant as a result of activities associated with the Development.

Plant operating hours were from 08:00 to 18:00, Monday to Friday and 08:00 to 14:00 on Saturdays. No quarrying activities took place on Sundays or Public Holidays.

The associated equipment during the Operational Phase were in proximity to the working face of the quarry at different intervals during the operational lifetime. This had a reduction for noise emissions from the operations on-site, as plant was not fixed throughout. Acoustic berms were created during the Site Preparation Phase to reduce noise emissions from the Site.

The following mitigation measures were in place as part of the Development onsite:

- All plant (fixed and mobile) were maintained to a high standard to reduce any tonal or impulsive sounds;
- All plant was throttled down or switched off when not in use;
- Drop heights of material were minimised;
- Rubber linings were used on chutes and transfer points;
- Where possible, plant and machinery was enclosed or cladded; and,
- Internal routes were 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 were a key factor in reducing any startle effects to residents during the Development works.

### 11.5.2 Previous Mitigation Measures - Vibration

Operational stage vibration arise during quarry face blast events. The control of the ground borne vibration was a key aspect of the blast engineer's approach. Design methods to reduce ground borne vibration included the following items as identified in BS 5228-2 [155]:

- Accurate setting out and drilling;
- Appropriate charging;
- Appropriate stemming with appropriate material such as size 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 was 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.

The Client confirmed that they sent, and continue to send, advance notification of blasting to nearby residents.

### 11.5.3 Recommended Mitigation Measures

#### 11.5.3.1 Site Preparation Phase - Noise

This stage of works is finished. No mitigation required for the Site Preparation Phase relating to noise control.

#### 11.5.3.2 Site Preparation Phase - Vibration

This stage of works is finished. No mitigation required for the Site Preparation Phase relating to vibration control.

#### 11.5.3.3 Operational Phase - Noise

This stage is finished. No mitigation required for the Site Operational Phase.

#### 11.5.3.4 Operational Phase - Vibration

This stage is finished. No mitigation required for the Site Operational Phase.

#### 11.5.3.5 Restoration Phase - Noise

Plant operating hours will be from 08:00 to 18:00, Monday to Friday and 08:00 to 14:00 Saturdays. No activities will take place on Sundays or Public Holidays.

The equipment associated with the Restoration Phase will be mobile during the operational lifetime within the Site. This will aid in reducing noise emissions from the operations on-site to any individual receptor.

The following mitigation measures will be in place as part of the Development:

- 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;
- Internal routes are reduced in gradients and routed to minimise noise emissions from vehicles on-site.

## 11.6 Interactions with Other Environmental Attributes

- Chapter 5: Noise is closely linked with human beings, as residential receptors are the primary noise sensitive receptors, and have been discussed as the primary receptor in this chapter.
- Chapter 6: Noise can influence fauna though disturbance of animals. Impacts on specific have been outlined in this chapter where relevant.

## 11.7 Residual Impacts

The residual noise impact, based on the emissions, phasing and intensity of the Site, the mitigation and practices employed and within the context of the existing ambient environment, and the lack of any noted submissions, complaints or enforcements (on noise) is deemed to have been long term not significant on a local level, and imperceptible in the wider environment.

The Development has been modelled to show that it complied with, noise limits for the construction, operation and restoration phases.

## 11.8 Monitoring

All blast events were monitored at NSR06 for vibration and air overpressure. The results are presented in Tables 11-8 and 11-9 and they are below the limits outlined in Table 11-2.

A ground borne limit of 12mm/s for PPV at any direction, and air overpressure limit of 125dB linear with a 95% confidence limit has been used for compliance assessment against best practice.

There was not any monitoring related with the general activities on site. However there have been no complaints regarding noise during the Development works operational life.

Future monitoring associated with the proposed restoration is not deemed necessary.

## 11.9 Reinstatement

Following the S261 registration, an after-care plan was created for the whole site as it stood at the time. A further after-care plan has been created for the Substitute Consent area as it stood when work ceased in this area in 2021. Both these plans were submitted to the relevant planning authority. See section 3.6 above and Appendix 3-3 for further details.

## 11.10 Difficulties Encountered

A common difficulty encountered throughout the rEIAR was the issue of attempting to identify potential historic impacts which may have once existed, but which are now absent or which may have reduced over time. Similar difficulties arose regarding the establishment of any historic periods when certain impacts may have become apparent only to subsequently abate. The rEIAR has been limited by the availability, completeness and accessibility of publicly available data from the period of time applicable to the Development subject to the substitute consent.

Where relevant, this rEIAR therefore utilises best practice in risk assessment and prediction to characterise likely impacts, based on the information known regarding the Development.

# 12 LANDSCAPE AND VISUAL

## 12.1 Introduction

This Remedial Environmental Impact Assessment Report (rEIAR) has been prepared to accompany a substitute consent application for an existing quarry at Aghnaskew, Scotshouse, Co. Monaghan. The remedial Landscape and Visual Impact Assessment (rLVIA) was prepared by Macro Works Ltd.

This chapter of the rEIAR considers and assesses potential significant effects resulting from quarrying related activities that have been carried out to date on the Site in question and on its surrounding environment.

## 12.2 Methodology

### 12.2.1 Guidance Documents

Landscape and Visual Impact Assessment (LVIA) is a tool used to identify and assess the effects of change and the significance of these effects, resulting from development on both the landscape and on people's views and visual amenity.

The methodology for remedial assessment of the landscape and visual effects is informed by the following key guidance documents for LVIA and EIAR, namely:

- *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition 2013, (UK Landscape Institute and Institute of Environmental Management and Assessment– [156] - hereafter referred to as the GLVIA,
- Environmental Protection Agency (EPA) publication 'Guidelines on the Information to be contained in Environmental Impact Reports (2022) [7],
- EPA Advice Notes on Current Practice in the Preparation of Environmental Impact Statements [8] and
- Monaghan County Development Plan 2019-2025 [22]

It should, however, be noted that there is no specific guidance in relation to Remedial EIAR or LVIA reports. This is specifically addressed in Section 12.2.2.

### 12.2.2 Landscape Impact

A key distinction to make in a LVIA is that between landscape effects and the visual effects of development. These are related but assessed separately.

**Landscape Impact Assessment** 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. The landscape assessment takes account of both physical impacts on the terrain and landcover and the consequence of these for landscape character.

### 12.2.3 Visual Impact

**Visual Impact Assessment** 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).

#### 12.2.3.1 Assessment process for Remedial LVIA

A typical LVIA will assess the landscape and visual effects of a *proposed* development, on the *existing* receiving environment, or baseline. This *remedial* LVIA assesses the effects of the

Development *which have occurred to date*, and any that are *still occurring*. For this remedial LVIA, the assessment of landscape and visual effects is carried out on the previously existing receiving environment.

- A desktop study to establish an appropriate study area, relevant landscape and visual designations in the Monaghan County Development Plan 2019-2025, as well as other sensitive visual receptors. The desktop exercise is based on historic data, including aerial imagery, land cover mapping, and available documentation. Previous development plans were not obtained and so are not referred to;
- Fieldwork to establish the landscape character of the receiving environment and to confirm and refine a 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;
- 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 that has occurred to date. This aspect of the assessment is supported by present-day photography captured at each of the selected viewpoints, but effects over time can only be generally estimated based baseline material that does not include previous viewpoint photography.

#### 12.2.3.2 Landscape Assessment Criteria

When assessing the potential effects on the landscape resulting from a quarry development, the following criteria are considered:

- Landscape character, value and sensitivity;
- Magnitude of likely effects; and
- Significance of landscape effects

The sensitivity of the landscape to change is the degree to which a particular landscape receptor (Landscape Character Area (LCA) or feature) can accommodate changes or new features without unacceptable detrimental effects to its essential characteristics. Landscape Value and Sensitivity is classified using the following criteria as laid out in Table 12-1.

**Table 12-1: Landscape Value and Sensitivity**

| Sensitivity | Description |
|---|---|
| **Very High** | Areas where the landscape/townscape character exhibits a very low capacity for change. Examples of these include landscapes/townscapes with unique and highly valued elements / character, protected at an international or national level (e.g. World Heritage Site), where the principal management objectives are likely to be protection of the existing character. |
| **High** | Areas where the landscape/townscape character exhibits a low capacity for change. Examples of these include landscape/townscapes with rare and highly valued elements / character, protected at a national or regional level, where the principal management objectives are likely to be the conservation of the existing character. |
| **Medium** | Areas where the landscape/townscape character exhibits some capacity for change. Examples of which are landscapes/townscapes, that include notable elements / character and are likely to have a designation of protection at a county level or at non-designated local level where there is evidence of local value. |
| **Low** | Areas where the landscape/townscape character exhibits reasonable capacity for change. Typically, this would include lower value, non-designated landscapes/townscapes that may also have some elements or features of recognisable quality, where management objectives include, enhancement, repair and restoration. |
| **Negligible** | Areas of landscape/townscape character that include derelict sites and degradation where there would be a strong capacity for change. Management objectives in such areas are likely to be focused on enhancement or restoration. |

The magnitude of a predicted landscape effect is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed development. The magnitude takes into account whether there is a direct physical effect resulting from the loss of landscape components and/or a change that extends beyond the proposal site boundary that may have an effect on the landscape character of the area (Refer to 12-2 below).

**Table 12-2: Magnitude of Landscape/Townscape Impacts**

| Sensitivity | Description |
|---|---|
| **Very High** | Change that would be large in extent and scale, involving critically important landscape/townscape elements and patterns, which may also involve the introduction of new uncharacteristic elements or features that contribute to fundamental change of the landscape/townscape, in terms of character, value and quality. |
| **High** | Change that would be large to moderate in extent and scale, involving important landscape/townscape elements and patterns, which may also involve the introduction of new uncharacteristic elements or features that contribute to substantial change of the landscape/townscape, in terms of character, value and quality. |
| **Medium** | Changes that are modest in extent and scale, involving notable landscape/townscape elements and patterns, which may also involve the introduction of new, uncharacteristic elements or features that would lead to distinguishable changes in landscape/ townscape character, and quality. |
| **Low** | Changes that are small in extent and scale, involving common or indistinct landscape/townscape elements and patterns, which may also involve the introduction of new elements or features that are not uncharacteristic within the receiving context and would lead to subtle changes in landscape/ townscape character, and quality. |

| Sensitivity | Description |
|---|---|
| **Negligible** | Changes that are small or very restricted in extent and scale involving common or indistinct landscape/townscape elements and patterns, which may also involve the introduction of new elements or features that are entirely characteristic of the receiving context and would lead to barely discernible changes in landscape/ townscape character, and quality. |

The significance of a landscape/townscape impact is based on a balance between the sensitivity of the landscape receptor and the magnitude of the impact. The significance of landscape impacts is arrived at using the following graph set out in Table 12-3 below. Impacts of 'Substantial' or greater are considered to be significant impacts in the context of this assessment and EIA terms.

**Table 12-3: Significance Matrix**

| | Sensitivity of Receptor | | | | |
|---|---|---|---|---|---|
| **Scale/Magnitude** | **Very High** | **High** | **Medium** | **Low** | **Negligible** |
| **Very High** | Profound | Profound-substantial | Substantial | Moderate | Slight |
| **High** | Profound-substantial | Substantial | Substantial-moderate | Moderate-slight | Slight-imperceptible |
| **Medium** | Substantial | Substantial-moderate | Moderate | Slight | Imperceptible |
| **Low** | Moderate | Moderate-slight | Slight | Slight-imperceptible | Imperceptible |
| **Negligible** | Slight | Slight-imperceptible | Imperceptible | Imperceptible | Imperceptible |

*Note: The significance matrix provides an indicative framework from which the significance of impact is derived. The significance judgement is ultimately determined by the assessor using professional judgement. Due to nuances within the constituent sensitivity and magnitude judgements, this may be up to one category higher or lower than indicated by the matrix. Judgements indicated in light blue (substantial and above) are considered to be 'significant impacts' in EIA terms.*

### 12.2.3.3 Visual Impact Assessment Criteria

As with the landscape impact, the visual impact of the Proposed Development will be assessed as a function of sensitivity versus magnitude. In this instance the sensitivity of the visual receptor, weighed against the magnitude of the visual effect.

Viewshed Reference Points (VRP's) are the locations used to study the likely visual impacts associated with the Proposed Development. The selected viewpoints are intended to reflect a range of different receptor types, distances and angles. The visual impact of a Proposed Development is assessed using up to 6 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;
- Amenity and heritage features.

Sensitivity of Visual Receptors

Unlike landscape sensitivity, the sensitivity of visual receptors has an anthropocentric (human) basis. It considers factors such as the perceived quality and values associated with the view, the landscape context of the viewer, the likely activity they are engaged in and whether this heightens their awareness of the surrounding landscape. A list of the factors considered by the assessor in estimating the level of sensitivity for a particular visual receptor is outlined below to establish visual receptor sensitivity at each VRP:

Susceptibility of Receptors

In accordance with the Institute of Environmental Management and Assessment ("IEMA") Guidelines for Landscape and Visual Assessment [156], visual receptors most susceptible to changes in views and visual amenity are:

- "Residents at home;
- People, whether residents or visitors, who are engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focussed on the landscape and on particular views;
- Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience;
- Communities where views contribute to the landscape setting enjoyed by residents in the area;
- Travellers on road rail or other transport routes where such travel involves recognised scenic routes and awareness of views is likely to be heightened".

Visual receptors that are less susceptible to changes in views and visual amenity include:

- "People engaged in outdoor sport or recreation, which does not involve or depend upon appreciation of views of the landscape;
- People at their place of work whose attention may be focussed on their work or activity, not their surroundings and where the setting is not important to the quality of working life".

Values Associated with Views

**Recognised scenic value of the view** (County Development Plan designations, guidebooks, touring maps, postcards etc). These represent a consensus in terms of which scenic views and routes within an area are strongly valued by the population because in the case of County Developments Plans, for example, a public consultation process is required;

**Views from within highly sensitive townscape areas**. These are likely to be in the form of Architectural Conservation Areas, which are incorporated within the Development Plan and therefore subject to the public consultation process. Viewers within such areas are likely to be highly attuned to the townscape around them;

**Primary views from residential receptors**. Even within a dynamic city context, views from residential properties are an important consideration in respect of residential amenity;

**Intensity of use, popularity**. This relates to the number of viewers likely to experience a view on a regular basis and whether this is significant at a national or regional scale;

**Viewer connection with the townscape**. This considers whether or not receptors are likely to be highly attuned to views of the townscape i.e. commuters hurriedly driving on busy roads versus tourists focussed on the character and detail of the townscape;

**Provision of vast, elevated panoramic views.** This relates to the extent of the view on offer and the tendency for receptors to become more attuned to the surrounding landscape at locations that afford broad vistas;

**Sense of remoteness and/or tranquillity.** Receptors taking in a remote and tranquil scene, which is likely to be fairly static, are likely to be more receptive to changes in the view than those taking in the view of a busy street scene, for example;

**Degree of perceived naturalness**. Where a view is valued for the sense of naturalness of the surrounding landscape it is likely to be highly sensitive to visual intrusion by distinctly manmade features;

**Presence of striking or noteworthy features**. A view might be strongly valued because it contains a distinctive and memorable landscape / townscape feature such as a cathedral or castle;

**Historical, cultural and / or spiritual significance**. Such attributes may be evident or sensed by receptors at certain viewing locations, which may attract visitors for the purposes of contemplation or reflection heightening the sense of their surroundings;

**Rarity or uniqueness of the view**. This might include the noteworthy representativeness of a certain townscape type and considers whether the receptor could take in similar views anywhere in the broader region or the country;

**Integrity of the townscape character**. This looks at the condition and intactness of the townscape in view and whether the townscape pattern is a regular one of few strongly related components or an irregular one containing a variety of disparate components;

**Sense of place**. This considers whether there is special sense of wholeness and harmony at the viewing location;

**Sense of awe**. This considers whether the view inspires an overwhelming sense of scale or the power of nature.

Those locations which are deemed to satisfy many of the above criteria are likely to be of higher sensitivity. No relative importance is inferred by the order of listing. Overall sensitivity may be a result of a number of these factors or, alternatively, a strong association with one or two in particular. Visual sensitivity classification includes the same categories used throughout this assessment in respect of the sensitivity of receptors and magnitude of effects i.e. Very High; High; Medium; Low; and, Negligible.

Visual Impact Magnitude

The visual impact magnitude relates to the scale and nature of the visual change brought about by the proposal and this is reflected in the criteria contained in Table 12-4 below.

**Table 12-4: Magnitude of Visual Impacts**

| Criteria | Description |
|---|---|
| **Very High** | The proposal alters or obstructs a large proportion or critical part of the available vista and is, without question, the most distinctive element. A high degree of visual change is generated, directly and strongly altering the visual amenity of the scene |
| **High** | The proposal alters a substantial proportion or important part of the available vista and is one of the most noticeable elements. A considerable degree of visual change is generated that directly influences the visual amenity of the scene |
| **Medium** | The proposal represents a modest alteration to the available vista, introducing a distinguishable degree of visual change that directly influences the visual amenity of the scene |
| **Low** | The proposal alters the available vista to a minor extent and may not be noticed by a casual observer and/or would not have a marked effect on the visual amenity of the scene. |

| Criteria | Description |
|---|---|
| **Negligible** | The proposal would be barely discernible within the available vista and would have an immaterial effect on the visual amenity of the scene. |

Visual Impact Significance

As stated above, the significance of visual impacts is a function of visual receptor sensitivity and visual impact magnitude. This relationship is expressed in the same significance matrix and applies the same EPA definitions of significance as used earlier in respect of townscape impacts (see Table 12.3).

Quality and Timescale of Effects

In addition to assessing the significance of landscape effects and visual effects, EPA Guidance for EIAs requires that the quality of the effects is also determined. This could be negative/adverse, neutral, or positive/beneficial. However, owing to the nature of the substitute consent area, and the quarrying activities that have occurred within this area, the quality of such effects are, by default, negative, unless otherwise specified in this chapter.

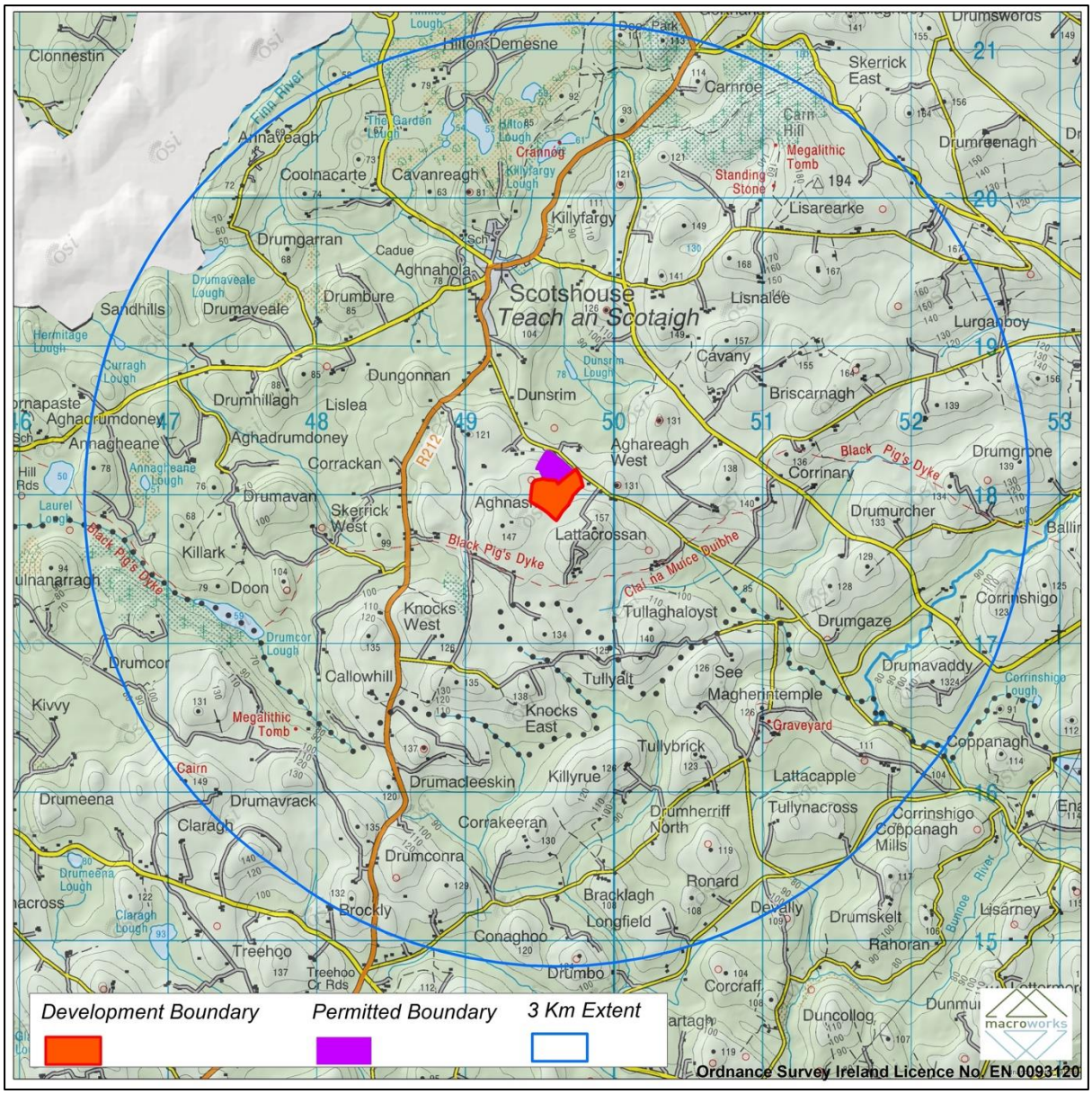
Landscape and Visual effects are also categorised according to their longevity or timescale:

- Temporary – Lasting for one year or less;
- Short Term – Lasting one to seven years;
- Medium Term – Lasting seven to fifteen years;
- Long Term – Lasting fifteen years to sixty years; and
- Permanent – Lasting over sixty years.

### 12.2.3.4 Study Area

From previous LVIA/rLVIA studies on quarry projects similar to this, a study area of 2-3km has frequently been adopted. However, the potential to generate significant impacts will typically reduce considerably after 1km. Out of an abundance of caution, a study area of 3km radius from the Registered Area will be used, in this instance. See Figure 12-1 below.

**Figure 12-1: rLVIA Study Area**




## 12.2.4 Limitations

This chapter uses the pre-Development landscape as a baseline for the assessment. While images, maps and documents all provide useful data, the description of landscape character and views/visual amenity is general and high-level, as one has to interpret the data in order to describe the context at that point in time.

In relation to the assessment of visual effects, the viewpoints are included to assist in determining the magnitude of change and, ultimately, significance of effect. However these viewpoints were captured in the present day - that is, post-Development. Therefore, it is not possible to give an exact description of a landscape in the past but rather an informed opinion based on available data. Additionally, it has not been possible to identify and date every element in the view.

Historic development plans which would have been in effect before the commencement of the quarrying activities were not available online. Indeed, the only County Development Plans available online are the currently adopted Monaghan County Development Plan [22] (2019-

2025), and the previous 2013-2019 County Development Plan [157], both of which are briefly reviewed in Section 12.3.1.

## 12.3 Receiving Environment

The baseline environment is defined as the landscape prior to the commencement of the quarrying activities outside of the Permitted Area. This section sets out the character of the landscape prior to the Development by starting with a description of the present-day characteristics, and then a description of the changes which are likely to have occurred in the time period before the Development to the present day.

### 12.3.1 Planning Policy

The Monaghan County Development Plan (CDP) 2019-2025 is the current CDP and will be addressed in Section 12.3.1.1 below.

The only other County Development Plan which is available online is the 2013-2019 Monaghan County Development Plan, which is addressed in Section 12.3.1.2 below. Where possible and applicable, comparisons will be made between the current and immediately preceding CDP, to examine how landscape and visual policy has altered over the last decade, as any known changes to designated landscape value.

#### 12.3.1.1 Monaghan County Development Plan (CDP) 2019-2025

Landscape Character

Monaghan Landscape Character Assessment (2008) is incorporated into the Monaghan County Development Plan 2019-2025 (2019) (MCDP). Within the Monaghan Landscape Character Assessment (2008), 14 different Landscape Character Types (LCTs) and nine Landscape Character Areas (LCAs) are identified. The assessment defines LCTs and LCAs as:

> *"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 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

'Farmed Foothills' is the LCT relevant to the Development and 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 description is given as:

> *"This landscape type has 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.

Landscape Character Areas

The Site is within the LCA5 '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)…"*

A number of policies are listed within the current Monaghan CDP, relating to Chapter 6 'Heritage, Conservation and Landscape.' The following are relevant to the Proposed Scheme:

- "**HLP 8** - 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.
- **HLP 9** - 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.
- **HLP 10** - 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.
- **HLP 11** - 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."

Scenic Designations

There are no known Co. Monaghan scenic designations within the study area.

### 12.3.1.2 Monaghan County Development Plan 2013-2019

Chapter 4 'Environment and Heritage' of the 2013-2019 Monaghan CDP [157] deals, in part, with landscape, of which the following are of direct and indirect relevance to the site and study area, during the operational life span of that now historical CDP.

Landscape Background

> *"The unique character of the Monaghan landscape is its intimate quality with drumlins, interspersed with lakes, trees and woodlands. This landscape of small, enclosed fields with foreshortened horizons is different and indeed unique from that of the more open landscape found in many other parts of Ireland. It is a landscape that has evolved over the centuries and has traditionally been moulded and protected by agricultural practices.*
>
> *"Today the demands being placed on our environment to satisfy the needs of farming, forestry, industry, housing, transport, leisure and urban growth are ever-changing and increasing. The unregulated spread of urban-generated housing with inappropriate siting, design and landscaping in rural areas represent a significant threat to our landscape."*

Objectives for Landscape Protection

- "**LPO 1**: Sustain, conserve, manage and enhance the landscape diversity, character and quality of the County for the benefits of current and future generations.
- "**LPO 2**: Zone important landscape features and elevated lands within settlements as Landscape Protection/Conservation Areas, to ensure that developments do not detrimentally impact on the amenity of the landscape or on the natural setting of settlements."

Please note, the site or its wider vicinity was not and is not zoned in any such Landscape Protection/Conservation Area.

- "**LPP 1**: Ensure the preservation and uniqueness of the county's landscape by having regard to the character, value and sensitivity of landscape as identified in the County Monaghan Landscape Character Assessment, August 2008 (or any subsequent versions) when determining a planning application.
- **LPP 2:** 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.
- **LPP 3:** Development which fails to appropriately integrate into the landscape with due regard to visual impact, landscape amenity, the protection of skylines, amenities such as lakes, designated walkways, heritage sites and recreational and tourist facilities shall be resisted."

Overall and in summary, the essence/intent of the previous CDPs are consistent with that shown in the current CDP.

#### 12.3.1.3 County Cavan Development Plan 2022-2028

As County Cavan enters the southern section of the study area, it's scenic designations will be addressed in this section.

There are no designated Co. Cavan scenic viewpoints or scenic routes (or any other scenic designations) within the study area.

#### 12.3.1.4 National Parks & Wildlife Service (NPWS)

There are no NHAs, SPAs or SACs within the study area. The nearest pNHA is that of Drumcor Lough, the catchment for which is more than 1km southwest of the site, while the lough itself remains more than 1.8km southwest of the site.

### 12.3.2 Landscape Character

Landscape character is described in terms of drainage and landform, land use and landcover for both the Site and its immediate surrounds, as well as for the wider landscape. While the County Monaghan Character Assessment describes the landscape character, sensitivity and value at a wider scale, a more detailed assessment is carried out in this section to assess the character of the Site and surrounds at a more granular level. The present-day landscape is described first, followed by consideration of changes that are likely to have occurred over the rLVIA period since the Development.

#### 12.3.2.1 Site and Immediate surrounds (present-day)

In terms of landform and drainage, like most opencast quarries, the Site takes the form of a deep depression or excavated hollow within the adjacent terrain. This is as a result of excavation within the Site, rather than any natural landform. As a demonstration of this, the quarry floor has been excavated down to approx. 105m AOD (see Figure 12.2 below), whereas the surrounding ridgetops (i.e., top of sharp surrounding quarry faces that enclose the quarry to all but the north-eastern end) range between 10m to 25m higher (see Figure 12.3 below). Outside the existing quarry, terrain gradually rises from the tops of the quarry

faces by a further 10-15m to the southwest and west of the Site, and up to 25m to the southeast. In terms of drainage, as with the 'pit floor' of almost all quarries, there is some standing water in places, visible within the existing quarry.

**Figure 12-2: Quarry Floor, with tall quarry face to rear**

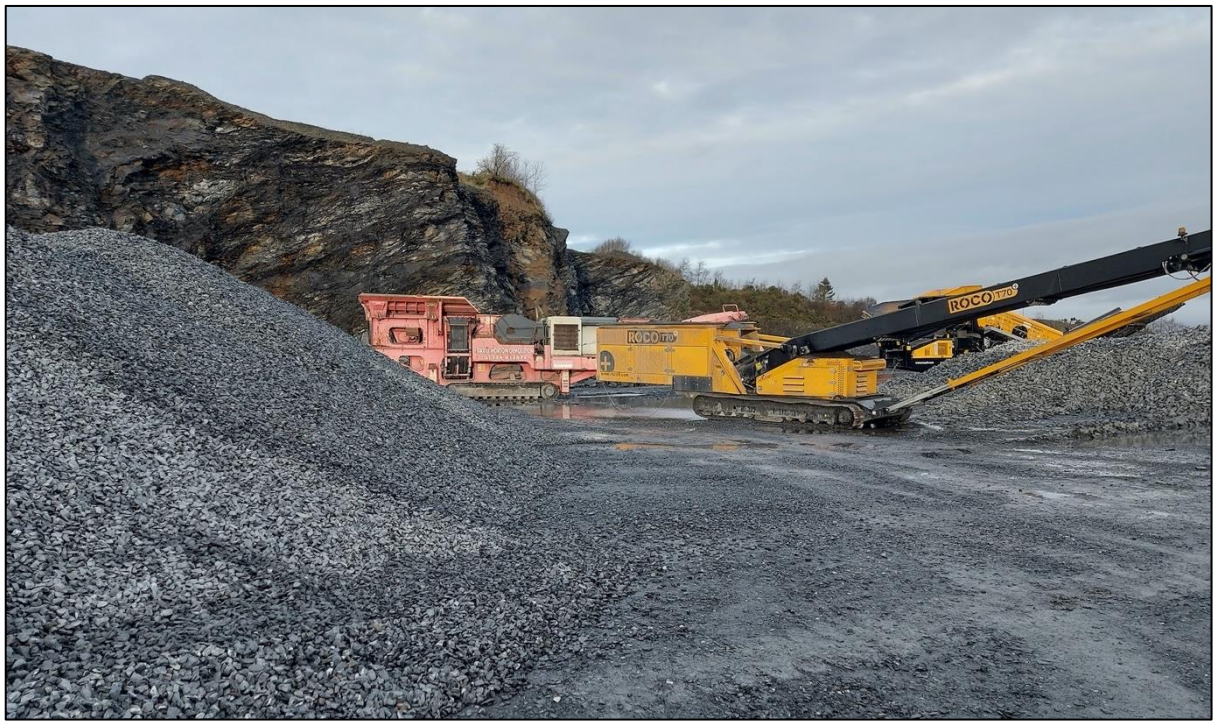



**Figure 12-3: Quarry Floor of the Site viewed from Eastern Quarry Face**

In terms of land use and land cover, the Registered Area is currently a substantial quarry operation with an internal processing plant (see Figure 12-4 below), some stockpiling and storage of materials, as well as some areas of standing water in the northwest corner of the quarry.

**Figure 12-4: Structures/Plant within Permitted Area**

The land surrounding the Registered Area is characterised by sloping, small pastoral fields with mature hedgerow lining the fields. A local road is located to the northeast and north of the quarry, while a private laneway/driveway aligns one section of the eastern boundary. Representive views are shown in figures 12-5 – 12-7.

**Figure 12-5: Pastoral Fields to immediate south of Registered Area**

**Figure 12-6: Pastoral Fields to immediate southwest of Registered Area**

**Figure 12-7: Context of Registered Area and immediate vicinity, view from northeast**

### 12.3.2.2 Site and Immediate surrounds (pre-Development to present-day)

A series of historical aerial maps were available from the OSI and Google Earth which have been used to determine the landscape context pre-development. The earliest available aerial map of the Site dates to c. 1995. As can be discerned from Figures 12.8 to 12.13 below, the excavated quarry has clearly grown in size considerably since 1995, with the aerial maps highlighting noticeable changes to the Site from 2005 onward.

The initial planning consent in 1983 was for 3.3ha which was open by 1995 (Figure 12.8). By 2005 the open area of quarrying activity was around 5.4ha, by which point the quarrying activities had also involved the removal of topsoil and overburden and the planting of the treeline along the L6280. Between 2005-2009 (Figure 12.10 and 12.11 below), quarrying activity extents began to visibly encroach beyond the Permitted Area. The aerial maps indicate that, prior to its inclusion in the quarrying activities, the land was primarily being used for agricultural purposes, likely as rough pasture for grazing livestock. It can only be assumed that prior to 1995, which is the earliest aerial photography available, the lands in the location of the Site were being used for agricultural purposes.

The inclusion of the Site as part of the quarrying activities began gradually, but by 2009 had begun to have a noticeable impression on the landscape. The inclusion of the Site in the quarrying activities created a more substantial scale void than had been there prior, having a stronger influence on the land use fabric, and therefore landscape character. It is important to note that this increase in influence was occurring at a location where a quarry had been an influence on landscape character since at least the early 1960s. Additionally, it is worth noting that the terrain and drainage outside of the site has not changed in any material way as a result of the Development, maintained as established as part of the Permitted Area.

Land cover has changed slightly in the vicinity of the Site, but in the manner of an evolving rural area that passes from one familiar land use to another in rotation (e.g., pasture or scrub transformed to patches of commercial conifer plantation). Although the granularity of earlier aerial photography can be influential, it would also appear that the farmed areas are generally in higher quality pasture at present than they were through the intervening period, whether due to more intensive farming practices or fertiliser application. The progressive extension of the Registered Area is presented in the sequence of figures below, which have been captured from the Ordnance Survey of Ireland ‘Ortho Series,’ and using historical imagery from Google Earth, both of which are publicly available (online).

**Figure 12-8: OSI 'Ortho' Series Showing Registered Area circa 1995**

**Figure 12.9: OSI 'Ortho' Series Showing Registered Area circa 2000**

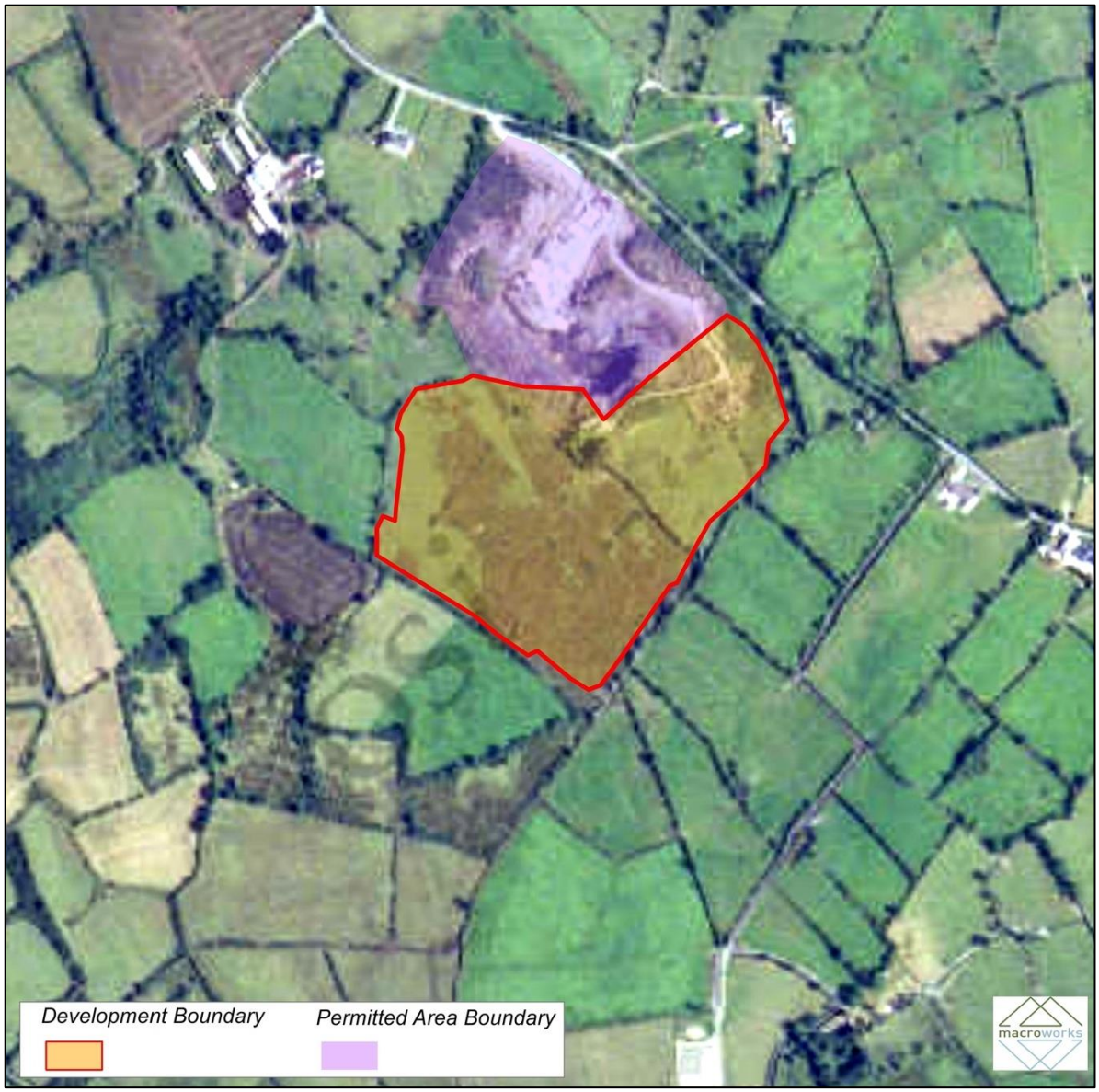


**Figure 12-10: OSI 'Ortho' Series Showing Registered Area circa 2005**

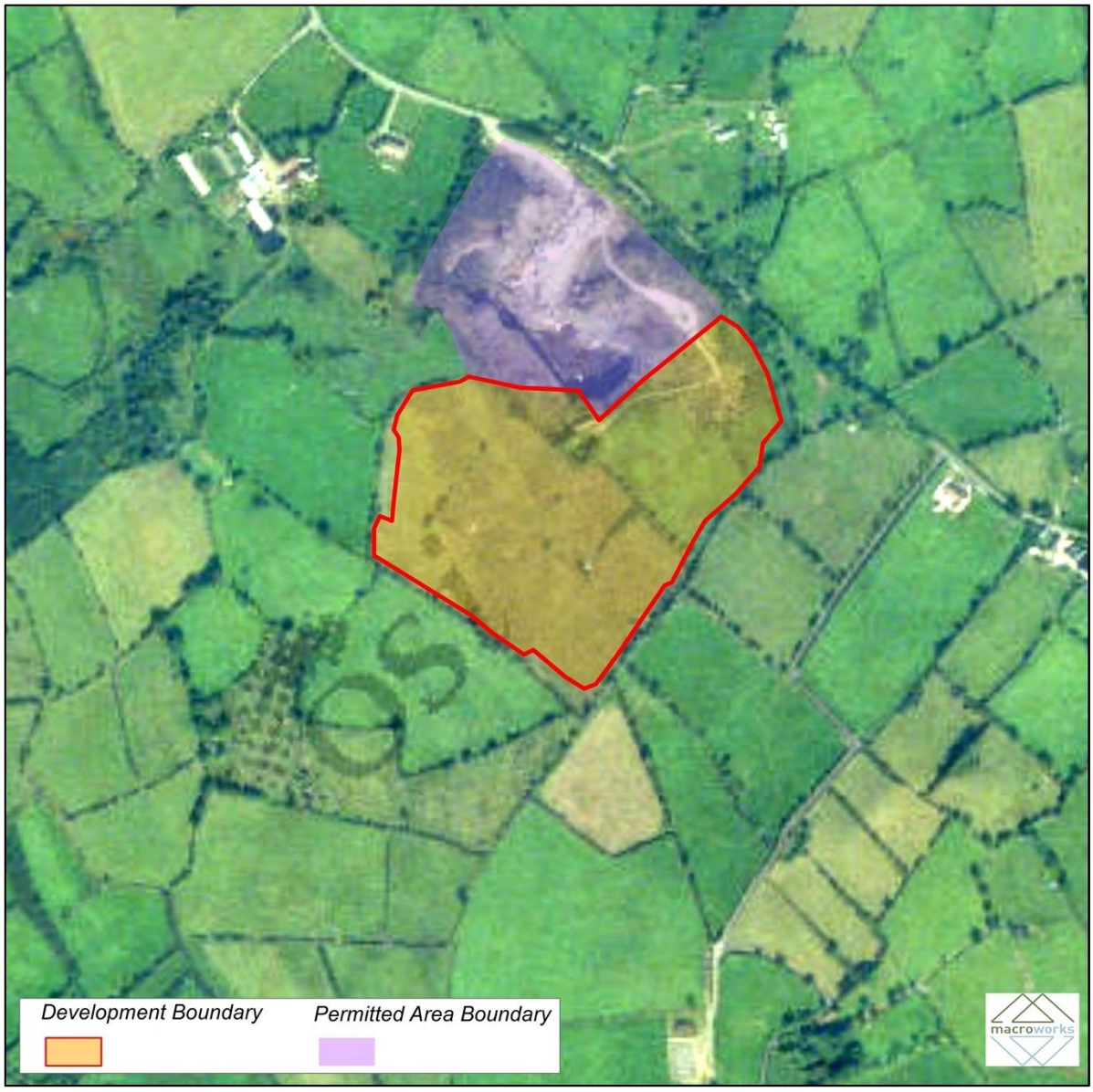


**Figure 12-11: OSI 'Ortho' Series Showing Registered Area circa 2009**

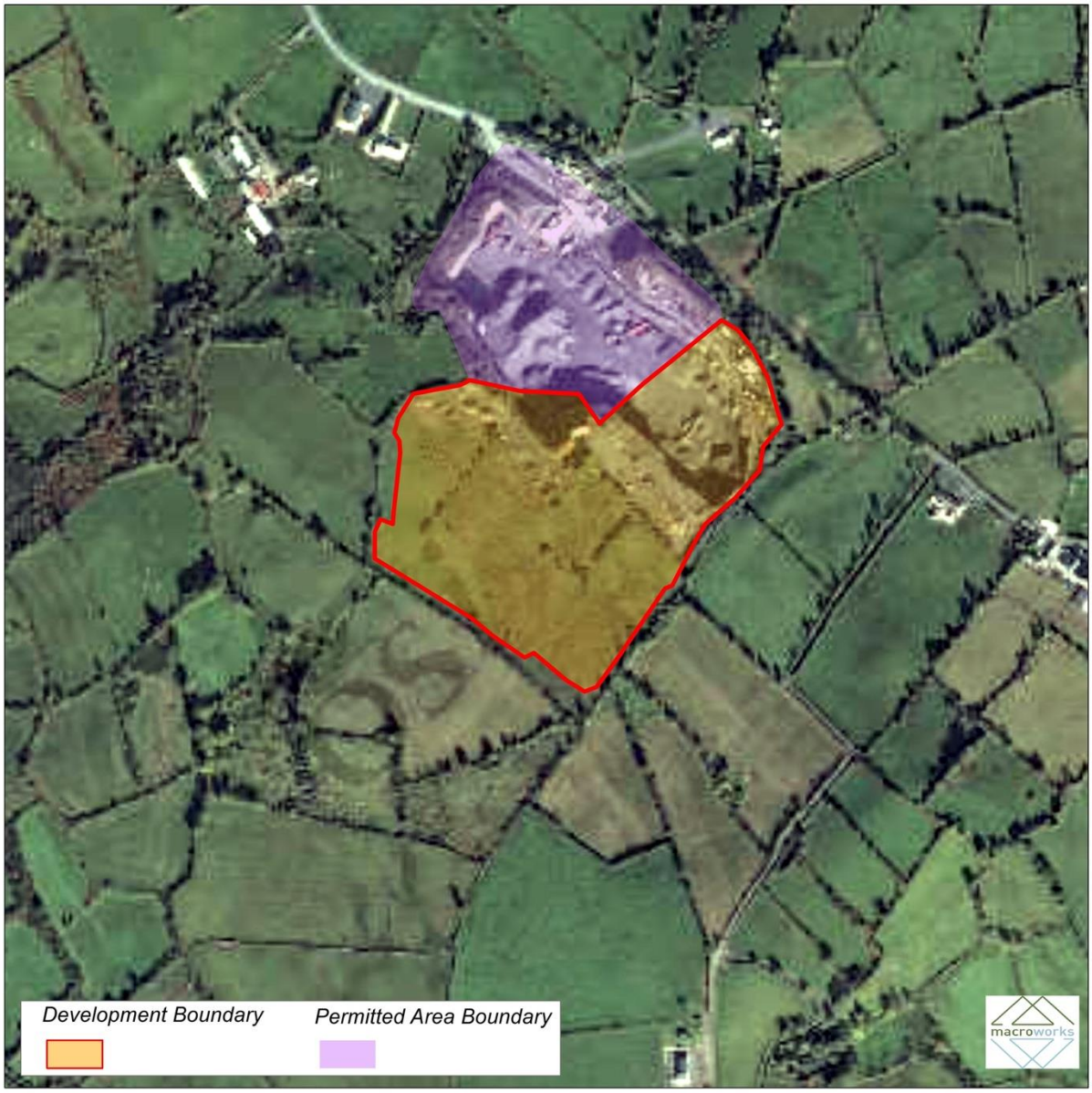


**Figure 12-12: OSI 'Ortho' Series Showing Registered Area circa 2014**

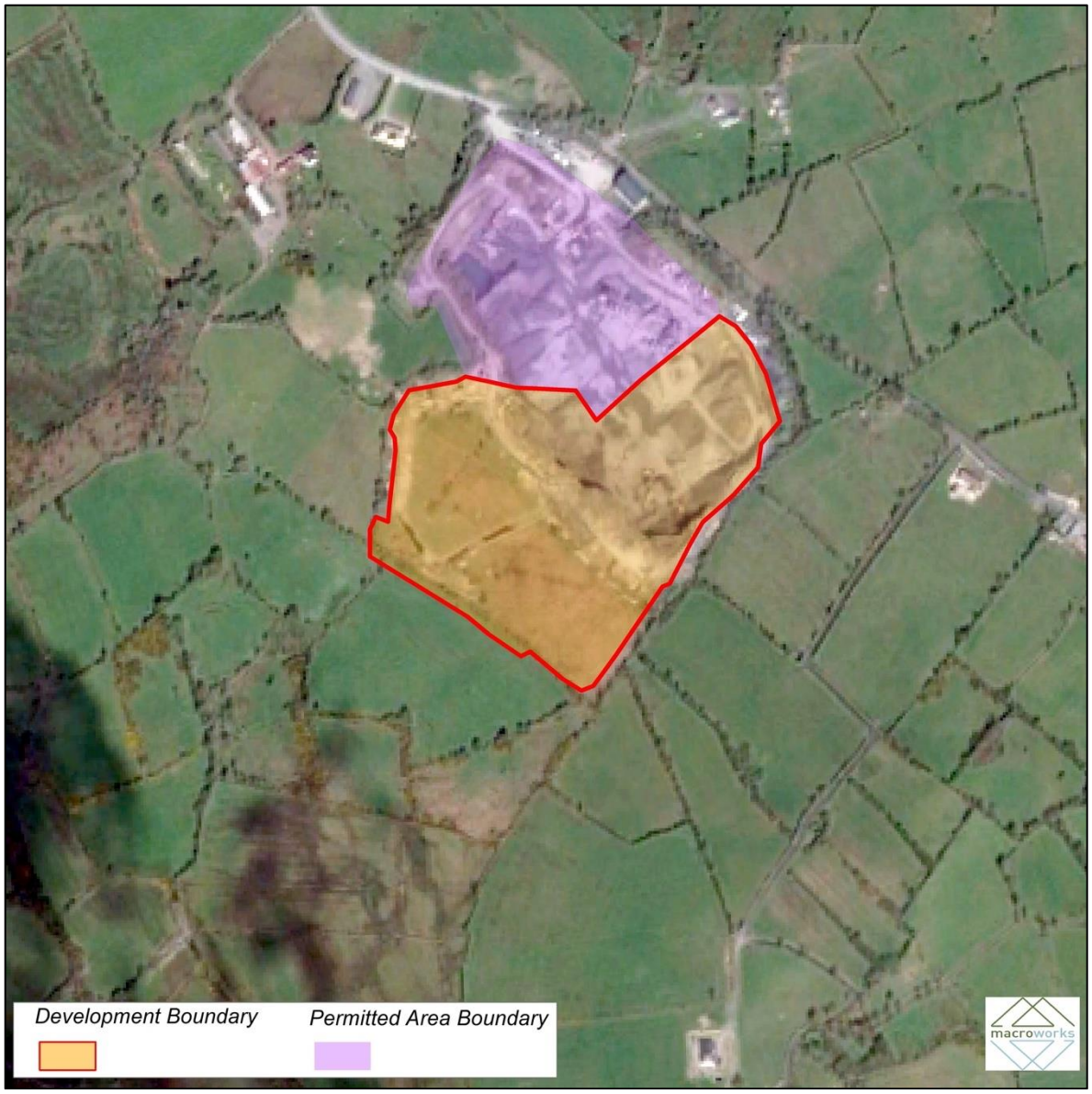
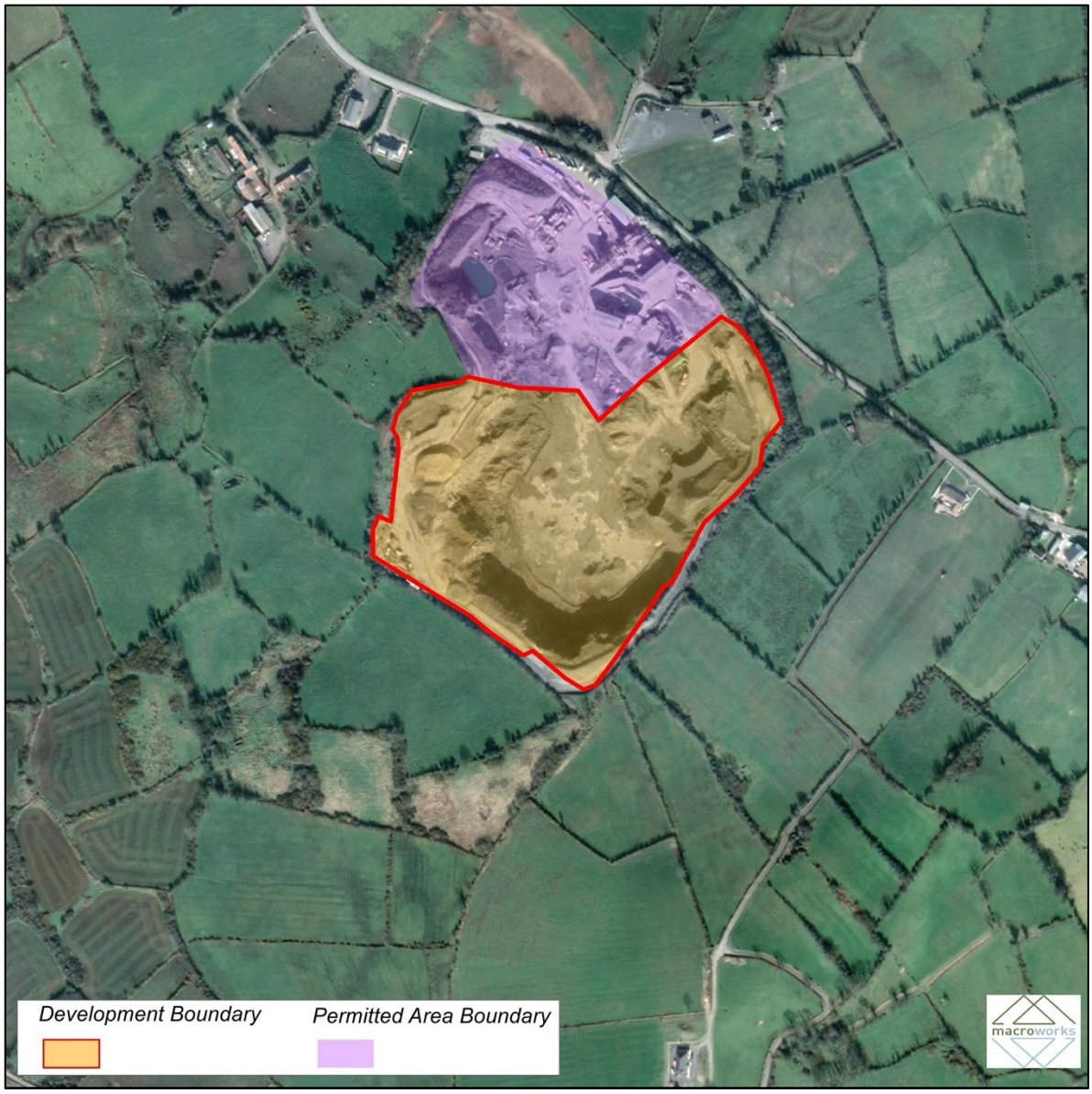


**Figure 12-13: OSI 'Ortho' Series Showing Registered Area circa 2022**




### 12.3.2.3 Wider Study Area (Present-day)

The wider study area is very much representative of west Co. Monaghan/northeast Co. Cavan, in that it is replete with the area's trademark low rolling hills and/or drumlins, across which is clad small-sized fields of pasture with native hedgerows aligning them, consisting mostly of Hawthorn and Blackthorn (see Figure 12.14 below). There are numerous streams present, as well as marshy areas located in low-lying hollows between such hills (see Figure 12.15 below). The study area includes medium sized tracts of commercial coniferous forestry in the west and north, while small loughs are more common in the southern half, the Bunmoe River is in the east and the similarly sized Finn River is in the north.

**Figure 12-14: Area-typical low hills including small pasture fields and native Hawthorn and Blackthorn hedges**

**Figure 12-15: Locally typical marshy area in low-lying hollow between low hills**

In terms of settlements, the nearest to the Site is the small village of Scotshouse, approx. 1.5km to the northwest. Across the rural realm of the study area, residences tend to be well located in secluded locations on the lower slopes of the hills. Notably, 300-350m downslope and southwards from the southern site boundary is a section of the remnants of the Black Pig's Dyke. The dyke takes the form of a series of discontinuous linear earthworks in Ulster, primarily, and are believed to be fortifications to prevent cattle raids dating back to at least 400 BCE. See Chapter 13 – Cultural Heritage for more detail.

#### 12.3.2.4 Wider Study Area (pre-Development to present-day)

Based on the available aerial imagery, the earliest of which dates to 1995, the wider study area does not appear to have changed markedly in terms of land cover and therefore landscape character. There is a marginal increase in the number of rural residences within the study area generally, which was also evident during fieldwork (i.e., the notable presence of

modern dwellings). Although some of these are in relatively close proximity to the site, most are concentrated around and within the small settlement of Scotshouse, approx. 1.5km to the northwest of the Site.

### 12.3.3 Visual Receptors

Visual receptors with the most potential to have been impacted by the Development are local residents and users of the local road network. A total of three viewpoints were captured during fieldwork. These will be used for the visual impact assessment and are shown on the viewpoint map (Figure 12.16 below).

**Figure 12-16: View Point Location Map**


Viewpoint Locations:

- **VP1** Residences to north of entrance to Registered Area
- **VP2** Scotshouse village
- **VP3** Local road northeast of the Registered Area

## 12.4 Assessment of Effects

### 12.4.1 Landscape Effects

#### 12.4.1.1 Landscape Sensitivity

Site and Immediate Vicinity

It is impossible to ignore the fact that the Site and its immediate surrounds were, pre-Development, strongly influenced by the existing quarry within the Permitted Area. Whilst the Development was an extension of the pre-existing quarrying land use, it does represent a departure from the more traditional pastoral aesthetic of patchwork farmland present in the surrounding landscape. Whereas the Site might originally have been considered a rolling pastoral patchwork in lands adjacent to an operational quarry, some settlement and occasional blocks of commercial conifer plantation, it is now characterised more considerably by extractive land uses.

Thus, as it would have been influenced by the existing quarry, the landscape sensitivity pre-Development is deemed to have been Low for the Site and immediate vicinity.

Wider Landscape

The wider study area, where the Permitted Area represented a smaller and less influential feature of the overall landscape fabric, was characterised by a much-modified, intensively managed pasture in mostly small field across low, rolling countryside. Elsewhere there are sections of commercial conifer plantations, human settlement and some relatively small loughs. There was some degree of everyday scenic amenity within this landscape, likely enjoyed by locals and passers-by, despite there being no scenic designations present. In addition, regarding the degree of perceived naturalness within the wider landscape, the only NPWS designation within the study area is a proposed Natural heritage Area, more than 1km from the site.

On balance, the sensitivity of the landscape within the wider study area was deemed to be Medium-low pre-Development.

#### 12.4.1.2 Effects which have occurred - Site and Immediate Vicinity

Magnitude of Change

As can be discerned from the figures included in Section 12.3.2.2 above, the excavated quarry area has more than doubled in size since 1995. According to records, the 3.3ha Permitted Area for quarrying activity had been predominantly opened by 1995. This area increased beyond the Permitted Area, and ca.4.1ha was open by 1999, increasing to 5.4ha by 2005. By 2015 the open area of quarrying was 7ha. At present the total area of the quarry is 9.6-10ha. Thus, it is a more substantial scale void than it was prior to the inclusion of the Site in quarrying activities; with a stronger influence on the land use fabric, and therefore landscape character, than it had prior to the Development. This is an increase in influence that has emerged gradually over a 28-year period, at a location where a quarry has been an influence on landscape character since at least the early 1960s. However, it is worth noting from Figure 12.8 to Figure 12.13 above that relatively little expansion took place between 1995 and 2005, while substantial expansion has taken place since.

The magnitude of change which has occurred at a local level relates primarily to the local landscape fabric, which has undergone a notable but not insurmountable magnitude of change. The extent of the Development is more than twice that of the Permitted Area and thus has enveloped multiple agricultural fields. The change resulted in the removal of parts of the field pattern and field boundary vegetation, thereby altering the patchwork farmland character of the immediate context.

The changes to landscape character are not considered to be as pronounced as changes to the physical landscape fabric, as the quarry is not an overtly visible feature from most receptors within the local landscape, with the exception of visibility from the northeast. Overall, the magnitude of landscape impact in the immediate context is deemed to be High.

Significance of Effect

At the localised landscape scale, the landscape effect is considered **Moderate** on the basis of a Low degree of landscape sensitivity weighed against a High magnitude of landscape change.

#### 12.4.1.3 Effects which have occurred - Wider Landscape

Magnitude of Change

The magnitude of change which has occurred at the wider landscape scale relates primarily to the landscape character (as opposed to physical effects).

Upon observation of the aerial imagery from 1995, the quarry presents as a more modestly scaled and discretely located feature that would have had marginally less effect on the prevailing landscape character prior to the inclusion of the Development. At this broader level, the landscape would have read as a rolling pastoral landscape with occasional variant features such as woodlands, conifer plantations and quarries. Consequently, the quarry would not have had a material impact on the broader landscape character of the study area. However, despite having at least doubled in extent, it is still not a strongly influential feature in the context of the wider landscape. It is contained in the base of a manmade, hollowed out depression and is relatively well screened, or at least obscured, by surrounding vegetation patterns and intervening landform. Unlike the site and its immediate context, the wider study area can still be classed as predominantly rolling patchwork farmland containing occasional variant rural land uses.

For the reasons outline above, the magnitude of landscape impact for the wider study area is deemed to be Low-negligible.

Significance of Effect

At the localised landscape scale, the landscape effect is considered **Slight-imperceptible** on the basis of a Medium-low degree of landscape sensitivity weighed against a Low-negligible magnitude of landscape change.

#### 12.4.1.4 Effects which are occurring

Magnitude of Change

In the context of the current quarry, the ongoing works at the Permitted Area are a continuation of quarrying processes that have been happening at Aghnaskew for at least 60 years. Whilst these processes have resulted in the quarry expanding outside of the Permitted Area over time, the rate of change to the landscape was very gradual. Quarrying activities outside the Permitted Area have ceased since April 2021, therefore ongoing effects are limited to those occurring as a result of the ongoing quarrying activities taking place within the Permitted Area. It is not considered that currently occurring effects are resulting in a notable change to the previously established landscape character. However, the movement of machinery within the Site and vehicles to and from the Site, coupled with the generation of dust from quarrying activities are a reminder that this is an intensive productive enterprise that contributes to the working character of the area.

Overall, the ongoing quarrying activity is considered to result in a **Low** magnitude of change to the Site and its immediate context.

Significance of Effect

The significance of ongoing effects is considered **Slight-imperceptible** in the context of the quarrying activities at the Permitted Area. These effects do not extend beyond the immediate site context where the daily quarrying activities are more noticeable.

## 12.4.2 Visual Effects

### 12.4.2.1 Effects which have occurred

Visual Receptor Sensitivity

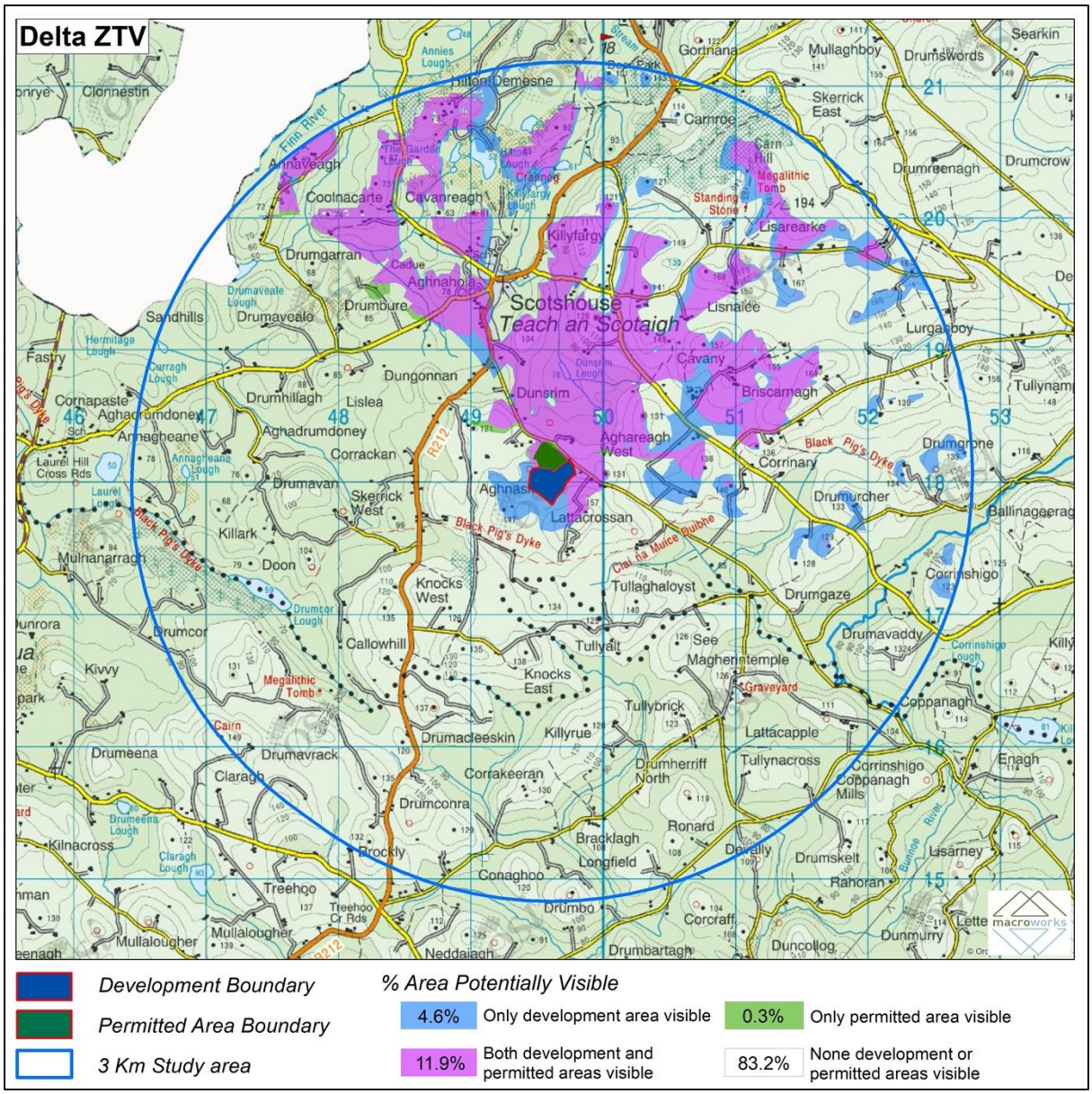
The sensitivity of visual receptors does not range widely across the study area and particularly that part of it that affords views of the Registered Area, as they are generally contained within the same basin landscape context. Views tend to be across a pleasant rural landscape setting of rolling fields, or from nearby settlement/residential receptors.

Owing to multiple of factors set out in Section 12.2.4.1, in combination with the relative proximity of receptors to the Site and one another, these three receptors are deemed to be of **Medium-low** visual sensitivity. Thus, the visual sensitivity does not have need to be repeated, in each instance.

In addition, it should also be noted that these three representative viewpoints were initially selected using a Zone of Theoretical Visibility (ZTV) map created to determine their potential for visibility of both the Permitted Area and the Site (see Figure 12.17 below). The ZTV was created using terrain-only, bare-ground data (i.e. not accounting for any vegetation, buildings, walls, embankments etc) to determine areas with potential for visibility of both the Permitted Area and the Site. This helps to rule out the areas within the study area where there is no potential for visibility of the Site.

The most notable areas of comprehensive ZTV pattern in the immediate surrounds of the Site occur within the adjacent agricultural fields, however there are very few, if any receptors located in this area. Otherwise, the areas with the potential for visibility of the Site are contained entirely within the northern half of the study area. Only 16.5% of the study area is afforded the potential for visibility of the Site in combination with the Permitted Area, in this bare-earth scenario. Furthermore, only 4.6% of the study area has the potential for visibility of the Site alone, not accounting for inherent screening by vegetation and landform. Potential for visibility is limited to the north of the Site, likely related to the openness of the northern portion of the Registered Area resulting from the quarry access. To the south of the quarry, topography screens the site entirely from view.

**Figure 12-17: Delta ZTV map indicating potential visibility of Permitted Area and Site**




## Viewpoint Assessment

The viewpoints (see section 12.3.3 above) are described below, under the headings 'Existing view', 'Magnitude of Change' (which has occurred) and the 'Significance of Effect'. Viewpoints are presented below Figure 12-18 – Figure 12-20.

**Figure 12-18: VP1 - Residences to the north of Registered Area entrance**

### Existing View

This location is along a local road near where it crests the summit of the low hill containing the quarry. There is some linear residential development present along this road in the form of one-off housing, particularly those constructed in the last quarter century. Approx. 200m to the southeast along the road from VP1 is the entrance to the Registered Area, with the Site lying slightly beyond this, approx. 350m to the southeast. In this scene, the tall, industrial infrastructure of the Hot Macadam Plant can be discerned upon the skyline, as well as deciduous trees and multiple utility poles. This scene is one that is of marginally lower sensitivity than other views within the study area, owing to the presence of the Hot Macadam Plant infrastructure. Notwithstanding, there is a degree of visual amenity at this location, facing toward the northeast, where a broad lowland pastoral basin begins to open up.

### Magnitude of Change

From this location, the expansion of the Registered Area beyond the Permitted Area is not discernible as a result of the intervening vegetation and topography. However, the Hot Macadam Plant infrastructure located within the Permitted Area is a visible but not prominent element in this setting. The Hot Macadam Plant equipment was granted planning permission in 2015 (Pl. Ref. 14/124) therefore should not be considered. Notwithstanding, the plant infrastructure, the Site, Permitted Area and all other quarrying-related activities, remain out of sight. The magnitude of change is therefore considered to be Low.

### Significance of Visual Effect

The significance of the visual effect is **Slight.** The quality of the effect is considered adverse and of a long-term duration.

**Figure 12-19: VP2 - Scotshouse Village**

### Existing View

This location is within the village of Scotshouse. For a settlement of its size, there has been notable development along the western side of the village in the last quarter century. This location aligns the small Scotshouse Close housing development, which experiences views similar to this, towards the south/southeast. In this scene, there is a rolling patchwork of pasture, with mature hedgerows aligning the fields, as well as numerous linear residential developments along the local roads ascending into the distance. The low hill range on which the site is set has a tree-dotted skyline and is a source of very moderate visual amenity relating to views of rolling agricultural pasture. Notably, no views, partial or otherwise, of the Site or the Permitted Area are visible from this viewpoint location.

### Magnitude of Change

As no views, partial or otherwise, of the Site are visible from this viewpoint location, the magnitude of site-associated visual change at this location as a result of the Development is negligible.

### Significance of Visual Effect

The significance of the visual effect is **Imperceptible** The quality of the effect is considered to be neutral and of a long-term duration.

**Figure 12-20: VP3 - Local Road northeast of Registered Area**

### Existing View

This location is on a quiet country road approx. 1km to the northeast of the Site. This area is the one locale of the study area where relatively open views of the quarry can be attained from the public sphere, albeit at approx.1km distance. The scene is one of a rolling pastoral patchwork of small or medium-sized fields, with a reed-infested marshy hollow, and small (semi-visible) loch within the mid-distance depression in this much-modified landscape.

In this view, the dark, open faces and industrial infrastructure of the Registered Area is noticeable, not because of its scale or proximity but because it is such an apparent change of land use, tone and landscape fabric, in comparison to elsewhere in this view. Be that as it may, the Site does not transcend or obscure the primary ridgeline (i.e., the skyline) in the distance, thereby maintaining a moderate visual presence in this location.

### Magnitude of Change

The Site is not discernible from this location. Given the presence of the Permitted Area, the Site presents in this view as a slight increase in scale, but a continuation of land use, tone and landscape fabric that was previously established. The Site presents as a singular, homogenous landform, blending into the Permitted Area despite being a twofold expansion toward the south. As this view is located to the northeast of the Site, and more than 1km away, the additional southward expansion of the quarry has been largely visually absorbed through the depth of field and resulting atmospheric perspective, while the pre-existing ridgeline/skyline has remained intact. The magnitude of change is therefore considered to be Medium-low.

### Significance of Visual Effect

The significance of the visual effect is **Slight.** The quality of the effect is considered adverse and of a long-term duration.

<u>Summary of Visual Effects</u>

The visual change generated by the Development has been assessed relative to the likely visual impact of the Pre-Development landscape which included the Permitted Area as part of the baseline using three viewpoints from the surrounding area. Two of the three selected viewpoints were afforded views of some aspect of the Registered Area.

These viewpoints were VP1 & VP3, both located within 1km of the site. Between them, they represented the most open and accessible views of the Registered Area that can be attained from receptors within the study area. Of these two, only VP3 was afforded views of the Site.

Notably, neither had a magnitude of visual impact higher than 'Medium-low,' and with a likely visual impact significance of no higher than 'Slight.' In the remaining viewpoint, no views of the Site could be attained, resulting in an 'Imperceptible' visual impact magnitude.

It is worth reiterating that these viewpoints were selected, in part, having first generated an in-house Zone of Theoretical Visibility (ZTV) map (see Figure 12.17 above) to determine areas with potential for visibility of the Site. Notably, a ZTV will only generate the potential for visibility within the study area based on terrain-only, bare-ground scenario (i.e., not accounting for any vegetation, buildings, walls, embankments etc). However, this aids in ruling out the areas within the study are where there is no potential for visibility of the Site.

In summary, the Site is not considered to be an apparent or even widely visible feature in this highly modified, utilitarian landscape, within which there is already a permitted quarry present. Despite being the most intensive land use present in the study area, the Development does not obstruct or unduly impact on views from the local community.

Effects which are occurring

Typically with such quarries, effects which are occurring are often the continuing operations at the quarry including blasting, crushing and washing and grading of the stone, all of which involves movement of machinery.

As of 2021, work at the quarry has been restricted to the Permitted Area. Thus, the historic activities of blasting, processing and aggregate production have continued within the Permitted Area at a reduced scale. This represents a continuation of activities which are already ongoing. No quarrying activities (e.g. stripping, blasting, crushing or screening) have occurred within the Site which is the subject of this rLVIA since the Applicant was informed of the need for regularisation.

Given that the Site is screened from view from most locations within the study area, it is envisaged that continuing the quarrying activities within the Site will not have a material impact on the surrounding visual amenity.

### 12.4.3 Cumulative Effects

Cumulative landscape effects can be defined as those which:

> *"…result from additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated with or separate to it) or actions that occurred in the past, present or are likely to occur in the foreseeable future." (Landscape Institute and IEMA, 200 quoted in GLVIA 2013).*

However, it should be noted that the Development has already occurred, as opposed to a newly Proposed Development. Be that as it may, the same process for cumulative assessment is required. Since the Development, there have been no material changes to the landscape associated with or similar to the quarry. Indeed, there are no known other quarries within the study area at present, or at any stage since its origins. Thus, it is not considered that quarrying activities and the resulting change of land use within the Site has had any capacity to generate cumulative landscape or visual impacts.

## 12.5 Reinstatement

A restoration plan is proposed as part of the application, which outlines the proposed restoration of the Site to its previous state of agricultural grassland once it is decommissioned. As such, most of the Site will be grass-seeded with all existing boundary hedges which border the Site to be bolstered with under-planting and inter-planting using a Native Woodland Screening Mix. In addition, it is proposed to plant new hedging within the site, along the Development quarry face. The planting within the Site will also comprise a Native Woodland Screening Mix.

Retention of existing hedgerow boundaries around the site will maintain the existing field pattern and aid visual screening of the quarry from visual receptors in the surrounding area. The implementation of additional restoration planting will ensure dense and consistent screening of the quarry in perpetuity. Whilst the Permitted Area will still be visible from the lands to the north, the consolidated and newly proposed hedgerows will further aid in softening the quarry into the surrounding landscape.

Overall, once implemented, the restoration measures will greatly reduce the visual impact of the Site as well as improving the appearance of the Permitted Area.

On consideration of the above, it is envisaged that, once implemented, the restoration measures will have an overall positive, long term visual impact on the Site and Permitted Area.

## 12.6 Difficulties Encountered

A common difficulty encountered throughout the rEIAR was the issue of attempting to identify potential historic impacts which may have once existed, but which are now absent or which may have reduced over time. Similar difficulties arose regarding the establishment of any historic periods when certain impacts may have become apparent only to subsequently abate. The rEIAR has been limited by the availability, completeness and accessibility of publicly available data from the period of time applicable to the Development subject to the substitute consent.

Where relevant, this rEIAR therefore utilises best practice in risk assessment and prediction to characterise likely impacts, based on the information known regarding the Development.

# 13 CULTURAL HERITAGE

## 13.1 Introduction

This Chapter of the Remedial Environmental Impact Assessment Report (rEIAR), commissioned by Malone O'Regan Environmental on behalf of Scotshouse Quarries Ltd., has been undertaken to assess the significant effects, if any, on the cultural, archaeological and architectural heritage, which may have occurred, are occurring or can reasonably be expected to occur because of quarrying carried out by the Applicant on land in the townland of Aghnaskew, Scotshouse, County Monaghan.

## 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 project on the environment, taking into account current knowledge and methods of assessment. It consists of a collation of existing written and graphic information to identify the likely context, character, significance and sensitivity of the known or potential cultural, archaeological and architectural heritage using an appropriate methodology (refer to Chapter 1 EIA methodology). It consists of the following study stages:

- Baseline Studies; and,
- Assessment of the substitute consent area.

The criteria and definitions for describing effects is as laid out in section 1.7 above.

### 13.2.1 Baseline Study

The baseline study research has been undertaken in two phases, the paper study phase and subsequently the field inspection phase.

#### 13.2.1.1 Paper Study

The first phase comprised of a paper survey of all historical and cartographic sources. This involved the following:

- Collation of existing written and graphical information to identify the likely context, character, significance and sensitivity of the known or potential cultural, archaeological and architectural heritage resource using appropriate methodology.
- A detailed investigation of the archaeological and historical background of the Site, the landholding and the surrounding area extending 1 km from the Site boundary. This area was examined using information from the:
- Record of Monuments and Places (RMP) of 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. The record is 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 Sites and Monuments Record. 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.
- The Monaghan County Development Plan, 2019-2025 (CDP). This is the statutory plan detailing the development objectives/policies of MCC. The plan includes objectives and policies relevant to this assessment, i.e., regarding cultural, archaeological and architectural heritage.

- The National Inventory of Architectural Heritage (NIAH) is a state initiative under the administration of the Department of Housing, Local Government and Heritage, 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 planning authorities for the inclusion of structures in their record of protected structures (RPS).
- Aerial photographs – these can record cropmarks, soil marks and earthworks that may not have been previously detected.
- Excavation reports
- Cartographic sources – this includes seventeenth-century mapping as well as the 1st and 2nd editions of the Ordnance Survey six-inch maps.
- Documentary sources – these may provide more general historical and archaeological background information.

The second phase involved a field inspection and assessment of the Development area.

#### 13.2.1.2 Field Inspection

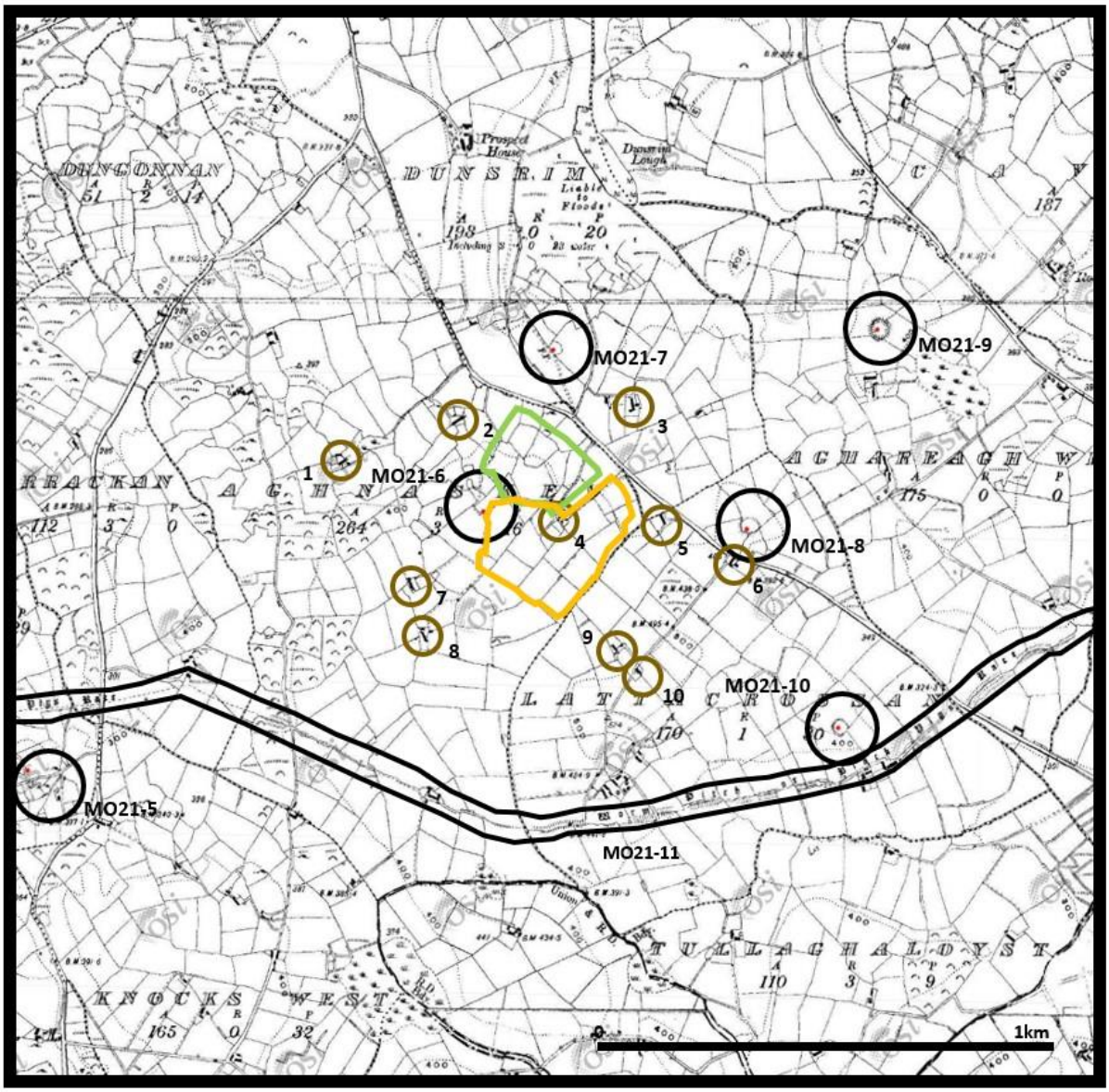
A field inspection was carried out on 17th November 2022 to identify and assess any known archaeological sites and previously unrecorded features and portable finds within the application area.

### 13.2.2 Assessment of the Development

An impact assessment and mitigation strategy have been prepared. An impact assessment was undertaken to outline the significant effects, if any, on the cultural, archaeological and architectural heritage which may have occurred, are occurring or can reasonably be expected to occur because of quarrying carried out in the substitute consent area, 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 [158] are presented on a map of the local area around the Site in Figure 13-1 below. RMP sites included on the Records of Monuments and Places statutory mapping are identified by black circles. The Development area is shown with a yellow line. The Permitted Area is shown in green. The undesignated buildings in the vicinity of the Registered Area are highlighted in brown (see section 13.4.4 for information on individual buildings).

**Figure 13-1: Assessment Study Area**




### 13.2.2.1 Guidelines

The report format and some of the descriptions of effects are based on the EPA Guidelines published in May 2022 [7].

## 13.3 Review and Findings

### 13.3.1 The Landscape

The Site is located in the townland of Aghnaskew Co. Monaghan, on OS Six Inch sheets No. 21, c.0.85km to the south of the village 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 [58]. The lands were mostly recently in use for quarrying.

### 13.3.2 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 Site 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 of this chapter.

#### 13.3.2.1 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 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 310 cal. BC[8] to cal. AD 140. A cairn (MO021-005) in Skerrick West townland may also be prehistoric in date.

#### 13.3.2.2 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 [159]. 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 that indicate settlement during the Early Medieval Period, in:

- Lisnalee (RMP Lisnalee),
- Aghnaskew (RMP MO021-006),
- Dunsrim (RMP MO021-007),
- Lattacrossan (RMP MO021-008 and MO021-010) and
- Aghareagh West (RMP MO021-009) townlands

#### 13.3.2.3 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 [160]. 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 of the Site.

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 - the closest example is at Nook (RMP MO012-019), 11.5km to the north-east of the Site.

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 McMahons wrested control of Monaghan from the Pippards.

[8] Calibrated date

#### 13.3.2.4 The Post-Medieval Period

The Down Survey records that in 1641 Aghnaskew was held by Andrew McMahon but in 1670 was in the hands of John Viscount Massereene Clotworthy [161]. Griffiths Primary Valuation of Ireland 1847-64 records that in the mid-nineteenth century, the Site was held by the representatives of John Ronaldson and leased to several tenants [162].

### 13.3.3 Monaghan County Development Plan 2019-2025

Chapter 6 of the Monaghan Co. Development Plan 2019-25 sets out the policies on cultural heritage within the County.

#### 13.3.3.1 Architecture and Protected Structures

There are several policy objectives outlined in Section 6.17 of the plan in respect of Architectural Heritage which state:

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.

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).

### 13.3.3.2 Archaeological Heritage

There are several policy objectives outlined in Section 6.18 of the plan 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 substitute consent 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.
d. Revisions to the application 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.

PMP 7 To consult with the National Monuments Service in relation to proposed developments adjoining archaeological sites.

### 13.3.4 Buildings

#### 13.3.4.1 Designated Structures

The Monaghan County Development Plan 2019-2025 and the Cavan County Development Plan 2022-2028 were reviewed as part of the baseline study for this rEIAR chapter. The review established that there are no structures within the Site listed in the Records of Protected Structures. There are also no structures in the study area listed in the Records of Protected Structures.

#### 13.3.4.2 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 as part of the baseline study for this section of the EIAR on the 10th of November 2022 [163]. The review established that there are no structures within the Site listed in the NIAH. There are also no structures in the study area listed in the NIAH.

#### 13.3.4.3 Field Inspection

On the 17th of November 2022 fieldwork was carried out to identify any additional non-designated upstanding structures in the vicinity of the Site. 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 Site (see Fig. 13-1 above). There are 10 structures in this area, none of which have any special architectural interest (see Table 13-1 below and individual Figures listed).

**Table 13-1: Buildings Near the Substitute Consent Area**

| Categories | Details |
|---|---|
| **Building 1** | |
| Structure Type | House |
| Townland | Aghnaskew |
| Designation | None |
| Data Source | 1908 edition of 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, no access possible. |

| Categories | Details |
|---|---|
| Mitigation Proposal | None required |
| Figure | Not possible – see description |
| **Building 2** | |
| Structure Type | House |
| Townland | Aghnaskew |
| Designation | None |
| Data Source | 1908 edition of 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, no access possible. |
| Mitigation Proposal | None required |
| Figure | Not possible – see description |
| **Building 3** | |
| Structure Type | Cottage |
| Townland | Dunsrim |
| Designation | None |
| Data Source | 1908 edition of six-inch Ordnance Survey map |
| Perceived Significance | None |
| Type of Impact | None |
| Significance & Quality of Impact | None |
| Description | Three bay cottage with slate roof & two brick chimneys. No special architectural interest. |
| Mitigation Proposal | None required |
| Figure | Figure 13-2 |
| **Building 4** | |
| Structure Type | House |
| Townland | Aghnaskew |
| Designation | None |

| Categories | Details |
|---|---|
| Data Source | 1908 edition of six-inch Ordnance Survey map |
| Perceived Significance | None |
| Type of Impact | None |
| Significance & Quality of Impact | None |
| Description | Structure levelled |
| Mitigation Proposal | None required |
| Figure | Not possible – see description |
| **Building 5** | |
| Structure Type | House |
| Townland | Lattacrossan |
| Designation | None |
| Data Source | 1908 edition of six-inch Ordnance Survey map |
| Perceived Significance | None |
| Type of Impact | None |
| Significance & Quality of Impact | None |
| Description | Two bay, one-storey house with corrugated roof and 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 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 roof. Rebuilt shed at east. No special architectural interest. |

| Categories | Details |
|---|---|
| Mitigation Proposal | None required |
| Figure | Figure 13-4 |
| **Building 7** | |
| Structure Type | House |
| Townland | Aghnaskew |
| Designation | None |
| Data Source | 1908 edition of six-inch Ordnance Survey map |
| Perceived Significance | None |
| Type of Impact | None |
| Significance & Quality of Impact | None |
| Description | Structure demolished except for north gable incorporated into field boundary. No special architectural significance. |
| Mitigation Proposal | None required |
| Figure | Figure 13-5 |
| **Building 8** | |
| Structure Type | House |
| Townland | Aghnaskew |
| Designation | None |
| Data Source | 1908 edition of six-inch Ordnance Survey map |
| Perceived Significance | None |
| Type of Impact | None |
| Significance & Quality of Impact | None |
| Description | Structures mostly demolished and overgrown with remains of low stone wall and gables. There are ruined outhouses to the south and east. No special architectural interest. |
| Mitigation Proposal | None required |
| Figure | Figure 13-6 to Figure 13-8 |
| **Building 9** | |
| Structure Type | House |
| Townland | Lattacrossan |

| Categories | Details |
|---|---|
| Designation | None |
| Data Source | 1908 edition of 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 six-inch Ordnance Survey map |
| Perceived Significance | None |
| Type of Impact | None |
| Significance & Quality of Impact | None |
| Description | Structure demolished except for part of south gable |
| Mitigation Proposal | None required |
| Figure | Figure 13-10 |

**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)**

## 13.3.5 Archaeological Assessment

### 13.3.5.1 Recorded Monuments

Examination of the Record of Monuments and Places indicated that there are no Recorded Monument in the Site (see Fig. 13-1)

The area of notification of one Recorded Monument (MO021-006) extends into the Site. The monument is external but contiguous to the Site on its eastern side. This monument 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 not indicated on any edition of the Ordnance Survey mapping. On the ground the interior is uneven and does not present as the type of level, circular to oval area usually associated with a Ringfort. The site may have been identified as a monument in error. (see Figures 13-11 to 13-13).

**Figure 13-11: View of Interior of MO021-006 (looking south)**

**Figure 13-12: View of Drystone wall Enclosing MO021-006 (looking south)**

**Figure 13-13: External View of MO021-006 (looking north)**

The 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, which is located c.0.25km east of the Site, has not, is not and will not be directly or indirectly impacted by the quarrying at the Site.

The remaining Recorded Monuments listed in the study area are all considered to be too far distant to have been directly or indirectly impacted by quarrying at the Site historically, now or in the future.

Appendix 13-1 provides a list of Recorded Monuments in the study area.

#### 13.3.5.2 The Sites and Monuments Record

An examination of the Sites and Monuments Record (SMR) which is maintained by the Dept. of Housing, Local Government and Heritage on the 10th of November 2022 [163] indicated that there are no SMRs in the Substitute Consent site. There are also no SMRs in the study area.

### 13.3.6 Cartographic Sources

The Ordnance Survey 1st and 2nd edition six-inch maps and the first edition 25-inch maps of the Site were examined. This analysis did not indicate any previously unrecorded archaeological sites or cultural heritage materials in the Site.

### 13.3.7 Place Name Evidence

The place names were extracted from the cartography 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 at Logainm.ie [164] and the results are displayed in Table 13-2 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.

**Table 13-2: Townland Names in the Study Area**

| Townland Name | English 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 | Shepherds hill |
| Drumbure | Ridge of the water |
| Dongonnan | Gannon's Fort |
| Dunsrim | Fort of the circle or rim |
| Knocks East and West | 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 |
| Tullyaghaloyst | Hill of the kneading trough |
| Tullyalt | Hill of the Glen |

### 13.3.8 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 were reviewed. There were no additional archaeological sites visible in the imagery in the Site.

### 13.3.9 Other Sources

Examination of archaeological corpus works on prehistoric artefacts [165], [166], [167], [168], [169], [170], did not reveal any additional material from the study area.

### 13.3.10 Previous Archaeological Investigations

Examination of the Excavations Bulletin at Excavations.ie [171] indicated that there have been no licensed excavations carried out within the Site. There have been two investigations carried out in the study area (see below).

#### 13.3.10.1 Aghareagh West Linear earthwork

In 1982, an investigation of a NE-SW portion of the Black Pig's Dyke was carried out in Aghareagh West townland [172]. 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.

#### 13.3.10.2 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 on excavations by Aidan Walsh on the Black Pig's Dyke further to the north in Aghareagh West townland (1987, 7).

When the owner of the house 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.

### 13.3.11 Field Inspection

A Field inspection was carried out on the 17th of November 2022. This involved an inspection of all the lands in the Substitute Consent area (see Figure 13-1 above and Figure 13-14 below). The Substitute Consent area shown in Figure 13-14 is outlined in yellow (the Permitted Area is outlined in green).

**Figure 13-14: Google Earth Aerial Photo (2021)**

The Site has been excavated to geological levels (see Figure 13-15). There is no cultural, archaeological or architectural heritage material present.

**Figure 13-15: View of Site (looking South)**

## 13.4 Characteristics and Potential Impacts of the Development

### 13.4.1 Construction and Operational Phases

#### 13.4.1.1 Direct Impacts

Recorded Monument MO021-006 – a Ringfort rath – has not been damaged by quarrying, but quarrying has been carried out in proximity to it externally. This has resulted in a permanent, significant, negative/adverse impact on the setting of the ringfort rath.

#### 13.4.1.2 'Do Nothing' Impact

If the substitute consent were not to be granted, there would be a negative impact on the cultural heritage as the proposed mitigation of the impact on the setting of Recorded Monument MO021-006 – a Ringfort rath – would not proceed.

#### 13.4.1.3 'Worst Case' Impact

There is no remaining topsoil or subsoil in the Site and 'worst-case' scenario is irrelevant.

#### 13.4.1.4 Major Accidents/Unplanned Events

No impacts on any known items of cultural heritage in the Site or the vicinity arising from unplanned events associated with quarrying in the Site have been identified by the assessment.

### 13.4.2 Closure Phase

#### 13.4.2.1 Direct Impacts

There will be no direct impacts on any known items of cultural, archaeological, or architectural heritage in the Site or the vicinity during the closure phase of the proposal.

#### 13.4.2.2 'Worst Case' Impact

No 'worst case' scenario has been identified at the closure phase.

## 13.5 Recommended Mitigation Measures/Factors

The impact on the setting of the Recorded Monument MO021-006 (a Ringfort – rath) should be mitigated by the construction of a 3m high landscaped screening mound on the western side of the Site where it is contiguous to the monument.

## 13.6 Cumulative and In-combination Impacts

No interactions with other impact have been identified.

## 13.7 Interaction with other Environmental Attributes

No interaction with other environmental attributes has been identified.

## 13.8 Indirect Impacts

There are no indirect impacts on any known items of cultural, archaeological or architectural heritage in the Site or the vicinity in any phase of the Development.

## 13.9 Residual Impacts

After the proposed mitigation measures have been implemented, there will no residual impacts on cultural heritage present within the Site or the vicinity.

## 13.10 Monitoring

No additional monitoring will be required.

## 13.11 Reinstatement

See section 13.5.2 above.

## 13.12 Difficulties Encountered

No difficulties were encountered during the desktop study, field survey or in the preparation of this report.

# 14 MATERIAL ASSETS - TRAFFIC & TRANSPORT

## 14.1 Introduction

This chapter reports the findings of a retrospective assessment on the likely significant effects on traffic and transportation as a result of quarrying/ extraction activities at Scotshouse Quarry within the Site and the overall Registered Area during the operational phase.

Chapter 3 (Description of Development) provides a full description of the Development and describes an overview of operational activities within the Registered Area from its origin (pre-1963) up to 2023.

## 14.2 Assessment Methodology

### 14.2.1 Background

The Permitted Area consists of a quarry covering ca.3.3ha. There has been a long history of quarrying associated with the Permitted Area, with evidence of pre-1963 origins. The Permitted Area along with the overall Registered Area has been in the possession of the Applicant since 2006 and has continued to be in regular use since this purchase.

The Permitted Area has been used to extract and process greywacke stone, with origins prior to 1963. When the Registered Area was fully operational (prior to enforcement proceedings) the excavated and processed volumes of aggregates have been up to 350,000 tonnes per annum.

Quarry activities from Scotshouse Quarry has evidence of pre-1963 and has continued to be in regular use since the Registered Area has been in possession of the Applicant since 2006. The excavated and processed volumes have been up to 350,000 tonnes per annum, in addition to importation supplies (bitumen, asphalt sand, burner fuel, road fuel) to the quarry which results in approximately 500 HGVs per annum.

During the years of full production, the Registered Area employed 15-20 persons for on-site operations and 5-6 persons for the off-site crew.

Following identification and confirmation of planning issues at the site, work within the Registered Area has been restricted to the Permitted Area, until the Site (the subject of this application for substitute consent) is regularised and further authorised for prospective development. The historic activities of blasting, processing and aggregate production have continued, but at a reduced scale.

Due to the retrospective nature of the assessment, this chapter will focus on existing or pre-existing measures used in order to mitigate the likely significant effects of historic quarry activities. Any residual effects are also assessed.

#### 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 [7];
- Traffic and Transport Assessment Guidelines, by Traffic Infrastructure Ireland (formerly the National Roads Authority (NRA)), 2004 [173],
- Transport Infrastructure Ireland Publications (Standards and Technical) documents;
- Guidelines for the Environmental Assessment of Road Traffic, by the Institute of Environmental Management and Assessment, 1994 [174] and.
- Monaghan County Development Plan 2019-2025 [22].

A summary of the relevant traffic and transport related policy context in relation to the Site is outlined below.

#### 14.2.1.2 Monaghan County Development Plan 2019-2025

In accordance with the Monaghan County Development Plan 2019-2025, the following objective is applicable to quarries:

*Section 10.8.1 – A key objective of this plan is to relieve traffic congestion and divert through traffic, particularly commercial traffic and heavy goods vehicles, from residential areas and the town centre by providing alternative routes around the town.*

### 14.2.2 Study Area

The study area comprises the local road L6280 during operation. The Site is situated in a rural area with one-off houses and farmsteads located in the vicinity.

In order to determine the magnitude of the existing traffic flows, the results of a manual classified junction turning counts at L6280/ the Registered Area access point 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.

### 14.2.3 Scoping

In order to ensure the scope of this report was to the satisfaction of Monaghan County Council (MCC), a scoping document was issued on the 18th of November 2022 to MCC Roads Department (see Appendix 14-1).

### 14.2.4 Impact Assessment Methodology

In order to assess the traffic and transportation impacts associated with the Development, the following approach was adopted:

- Data Collection:
- Establish the baseline traffic flows (2022) of the existing adjoining roads;
- Estimate the traffic volumes generated by the operation of the Development. As outlined in Section 14.4. the number of traffic movements was prepared in conjunction with the works location;
- Assessment of Effects:
- Determination of Significance of Effects on surrounding road network in accordance with EPA guidelines; and
- Assessment of effects on other road issues such as safety, vulnerable road users and public transport;
- Identification of Mitigation and Monitoring Measures; and
- Confirmation of residual effects.

## 14.3 Receiving Environment

### 14.3.1 Desktop Review

A desktop study was undertaken in order to collate and review background information of the project during the assessment. The information obtained is referenced in Table 14-1 below.

**Table 14-1: Data Sources**

| Source | Data | Date |
|---|---|---|
| TII | Traffic Counter Data Website | Assessed January 2023 |
| Scotshouse Quarries Ltd | Historical Staff Volumes | Assessed January 2023 |

| Source | Data | Date |
|---|---|---|
| Scotshouse Quarries Ltd | Historical Tonnage of aggregate extracted | Assessed January 2023 |

#### 14.3.1.1 Staff Volumes

The Registered Area employed 15-20 persons for on-site operations and 5-6 persons for the off-site crew.

#### 14.3.1.2 Working Hours

Operational hours associated with the Registered Area were updated following Planning comments:

- Monday to Friday 08:00 to 18:00;
- Saturday 08:00 to 14:00, and
- Sunday & Public Holidays closed.

## 14.4 Remedial Impact Assessment

### 14.4.1 Operational Phase

The preparation of the Permitted Area involved the removal of topsoil and overburden, the planting of the treeline along the L6280 and the initial opening of the ground. The Permitted Area has been and is excavated by blasting.

As of 2021, work within the Registered Area has been restricted to the Permitted Area, until the Site under this application for substitute consent is determined. The historic activities of blasting, processing and roadstone production have continued, but at a reduced scale.

The quarry produced circa of 350,000 tonnes per annum, which was transported via 80% rigid truck and 20% artic truck. An additional 500 artic trucks per annum to transport quarry's supplies (i.e., bitumen, asphalt sand, burner fuel, road fuel). The volume of light vehicles and HGVs per day involved in the operational phase are summarised in Table 14.2 below.

**Table 14-2: Traffic Volume**

| Type of Vehicle | No of vehicles per day |
|---|---|
| LVs (staff car) | 15-20 |
| Rigid Truck | 54 |
| Artic Truck | 11 |
| ∑ | 85 vehicles per day |

An impact analysis was carried out, utilising a junction count at the existing access, which was undertaken on Wednesday 30th November 2022 between the hours 07:00 and 19:00.

This survey distinguished between light good vehicles and heavy good vehicles. The traffic count data is included in Appendix 14-2 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.

The impact on the existing access have been analysed using the Transport Research Laboratory (TRL) computer program JUNCTION 10 - PICADY, a widely accepted tool used for the analysis of priority junctions.

The key parameters examined in the results of the analysis are the Ratio of Flow to Capacity Value (RFC value – desirable value for PICADY should be no greater than 0.85 – values over 1.00 indicate the approach arm is over capacity), the maximum queue length on any approach to the junctions and the average delay for each vehicle passing through the junction during the modelled period.

The JUNCTION 10 (PICADY) assessment of the quarry access onto L6280 are shown below in Table 14-3 below. A complete set of outputs from JUNCTION 10 are included as Appendix 14-3 of this report.

The quarry access operates below the desired 0.85 RFC up to and including the current year 2023, with the inclusion of quarry-generated traffic.

Sufficient car parking spaces are provided within the quarry for current staff levels. This ensures that parking associated with the quarry does not occur along the public road network.

### 14.4.2 Cumulative and Indirect Impacts

No relevant planning application (in the last 5 years) within the project boundary was found in the nearby areas. Therefore, there are no cumulative impacts in the area.

## 14.5 Mitigation and Monitoring Measures

### 14.5.1 Operational Phase

The following mitigation measures have been implemented to minimise the impacts of the quarry:

- Sufficient car parking spaces are provided within the quarry for 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;
- 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.

## 14.6 Residual Impacts

As outlined above, the traffic generated due to historic quarry activities had a negligible impact on road users.

**Table 14-3: Junction 1: Existing T-Junction L6280**

| | AM SURVEY | | | | PM SURVEY | | | |
|---|---|---|---|---|---|---|---|---|
| | **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 | 0.0 | 0.0 | A |
| Stream B-A | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | |
| Stream C-AB | 0.0 | 8.41 | 0.01 | | 0.0 | 0.0 | 0.0 | |
| **2023 Do Something** | | | | | | | | |
| Stream B-C | 0.0 | 12.83 | 0.02 | A | 0.0 | 0.0 | 0.0 | A |
| Stream B-A | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | |
| Stream C-AB | 0.0 | 8.47 | 0.01 | | 0.0 | 0.0 | 0.0 | |
| **2023 Do Something** | | | | | | | | |
| Stream B-C | 0.1 | 13.29 | 0.05 | A | 0.1 | 9.98 | 0.06 | A |
| Stream B-A | 0.0 | 0.0 | 0.0 | | 0.0 | 8.53 | 0.03 | |
| Stream C-AB | 0.0 | 8.83 | 0.04 | | 0.0 | 12.58 | 0.02 | |

# 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 demonstrates a matrix to summarise the interactions between impacts on the various topic areas.

**Table 15-1: Interactions Between Impacts Presented in the EIAR**

| Description | Population & Human Health | Biodiversity | Land, Soils & Geology | Water | Air Quality | Climate | Acoustics (Noise & Vibration) | Landscape and Visual | Cultural Heritage | Material Assets – Traffic & Transport |
|---|---|---|---|---|---|---|---|---|---|---|
| **Population & Human Health** | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Biodiversity** | X | | ✓ | ✓ | ✓ | ✓ | ✓ | X | X | X |
| **Land, Soils & Geology** | X | ✓ | | ✓ | ✓ | X | X | X | X | X |
| **Water** | ✓ | ✓ | ✓ | | X | X | X | X | X | X |
| **Air Quality** | ✓ | ✓ | X | X | | X | X | X | X | ✓ |

| Description | Population & Human Health | Biodiversity | Land, Soils & Geology | Water | Air Quality | Climate | Acoustics (Noise & Vibration) | Landscape and Visual | Cultural Heritage | Material Assets – Traffic & Transport |
|---|---|---|---|---|---|---|---|---|---|---|
| **Climate** | ✓ | ✓ | X | ✓ | X | | X | X | X | ✓ |
| **Acoustics (Noise & Vibration)** | ✓ | ✓ | X | X | X | X | | X | X | X |
| **Landscape & Visual** | X | X | X | X | X | X | X | | X | X |
| **Cultural Heritage** | X | X | X | X | X | X | X | X | | X |
| **Material Assets – Traffic & Transport** | X | X | X | X | X | X | X | X | X | |

| | |
|---|---|
| X | No Interaction |
| ✓ | Interaction |

# 16 SCHEDULE OF COMMITMENTS

Table 16-1 outlines the environmental commitment which will be undertaken as part of the Restoration Phase of the Development.

**Table 16-1:Schedule of Commitments**

| **Commitment** |
|---|
| **General** |
| Quarrying activities were completed in general accordance with all relevant legislation and documented best practice to reduce any potential environmental impacts;<br><br>Any future restoration will be carried out in accordance with then-current best practice guidelines and in compliance with relevant legislation |
| **Biodiversity** |
| The following mitigation measures will be put in place as part of the proposed Restoration Plan;<br>• Seeding of c. 4 ha of grassland and planting of c. 11000m2 of hedgerow and treelines to provide thickening of the existing hedgerows and woodland screening.<br>• Seeding of native flora species in accordance with the national pollinator plan.<br>• The Site will be graded to bring to a uniform and even grade to remove all minor hollows and ridges, allowing for a similar state (grazing grassland) to that prior to works being undertaken. |
| **Land, Soils and Geology and Water** |
| The following mitigation measures will be put in place as part of the proposed Restoration Plan;<br>• All plant and HGVs used will be refuelled at the Permitted Area in accordance with existing procedures by trained personnel;<br>• Items of plant unsuitable for travelling to the refuelling area (dry screening plant), will be refuelled utilising adequately sized and positioned drip trays;<br>• Fuel (diesel) will be stored in a double skinned tank in the Permitted Area in accordance with existing procedures;<br>• Spill kits will available adjacent to all refuelling and fuel storage operations;<br>• Unauthorised access will be prevented in so far as possible; and<br>• Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the Registered Area for disposal or recycling.<br>• Soils will be re-used as part of the Restoration Plan, respread and seeded. |
| **Air Quality** |
| The following mitigation measures will be put in place as part of the proposed Restoration Plan;<br>• Record all dust and air quality complaints, identify cause(s), take appropriate action; |

| **Commitment** |
|---|
| • Provide training to Site personnel on dust mitigation measures to be implemented at the Site;<br>• Complete regular inspections of Site works to ensure compliance with the DMP. The frequency of these inspections should be increased to coincide with activities where the risk of impact is higher during dry and/or windy conditions;<br>• Public roads outside of the Site, should be regularly inspected;<br>• During dry and/or windy conditions, dampening of appropriate surfaces (i.e. roads, routes, berms, stockpiles if necessary) should be completed as required; and<br>• All vehicles used during the Proposed Development, should be maintained to a high standard to allowing optimum operation conditions. |
| **Climate** |
| The following mitigation measures will be put in place as part of the proposed Restoration Plan to reduce the potential GHG emissions;<br>• Reducing the idle times;<br>• Turning off vehicle engines when not in use for more then 5-minutes;<br>• Preventative/regular maintenance of plant and equipment; |
| **Noise and Vibration** |
| The following mitigation measures will be in place as part of the Restoration Plan for the Development:<br>• All plant (fixed and mobile) is maintained to a high standard to reduce any tonal or impulsive sounds;<br>• All plant is throttled down or switched off when not in use; and<br>• Internal routes are reduced in gradients and routed to minimise noise emissions from vehicles on-site. |
| **Landscape & Visual** |
| The following mitigation measures will be put in place as part of the proposed Restoration Plan to restore the Site to its previous state of agricultural grassland;<br>• The Site will be grass-seeded with all existing boundary hedges which border the Site to be bolstered with under-planting and inter-planting using a Native Woodland Screening Mix;<br>• The planting of new hedging within the site, along the Development boundary;<br>• The planting within the Site will also comprise of a Native Woodland Screening Mix;<br>• Additional restoration planting will ensure dense and consistent screening of the quarry in perpetuity; |
| **Cultural Heritage** |
| The impact on the setting of the Recorded Monument MO021-006 (a Ringfort – rath) should be mitigated by the construction of a 3m high landscaped screening mound on the western side of the Site where it is contiguous to the monument. |

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