March 2025

Remedial Environmental Impact Assessment Report ('rEIAR') Volume 2

Substitute Consent Application, Murrens Quarry

JJ Flood & Sons Manufacturing Limited

Murrens Quarry, Oldcastle, Co. Meath

MALONE O'REGAN ENVIRONMENTAL

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Title: Remedial Environmental Impact Assessment Report ('rEIAR') Volume 2, Substitute Consent Application, Murrens Quarry, JJ Flood & Sons Manufacturing Limited, Murrens Quarry, Oldcastle, Co. Meath

Job Number: E2343

Prepared By: Niamh Tester **Signed**: _____

Checked By: Laura McGrath **Signed**: _____

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

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Remedial Environmental Impact Assessment Report ('rEIAR') Volume 2
Substitute Consent Application, Murrens Quarry
Murrens Quarry, Oldcastle, Co. Meath

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1 GENERAL

This remedial Environmental Impact Assessment ('rEIAR') has been prepared by Malone O'Regan Environmental Services ('MOR Environmental') on behalf of our client JJ Flood & Sons Manufacturing Ltd ('the Applicant') for the Murrens Quarry, Oldcastle, Co. Meath ('the Site') as part of a substitute consent application to An Bord Pleanála.

A rEIAR is a report prepared to retrospectively address the environmental effects of a development that was carried out without the required Environmental Impact Assessment ('EIA'). This report includes an assessment of the environmental effects of the development, measures to mitigate any adverse environmental impacts and a timeframe for the implementation of these measures. Developers can apply for Substitute Consent under Section 177E of the Planning and Development Act, 2000, as amended [1]. As part of the process, the developer must prepare a rEIAR.

The Site is required to be brought into compliance with EU legislation, including the EIA Directive in relation to historic development; in Irish law, this is done through the provisions of the Substitute Consent process. The Substitute Consent process allows developers to apply to An Bord Pleanála ('ABP') seeking permission to bring into compliance developments that are deemed to have required EIA or Appropriate Assessment ('AA') for their development but which was not done due to exceptional circumstances. The provision was introduced under Section 177 of the Planning and Development Act 2000 [1]. A corresponding AA has also been completed by MOR Environmental as part of this substitute consent application.

1.1 Introduction

The Applicant operates a gravel pit and soft rock quarry, known as Murrens Quarry, south of Oldcastle in County Meath. The quarry is recognised as having pre-1963 origins. MOR Environmental have been commissioned to prepare the necessary environmental assessments and project management for the submission of this application to seek retrospective consent for the historic activities at the Site with regards to an rEIAR and rAA.

Substitute Consent is being sought under Section 177E of the Planning and Development Act, 2000, as amended to bring into compliance a 39-hectare ('ha') area of land within the Applicant's landholding, which has been subject to gravel and soft rock extraction and processing ('the Development'). This rEIAR has been prepared to support the application for substitute consent to An Bord Pleanála.

In 2005, the quarry was registered under Section 261 of the Planning and Development Act ('PDA') 2000, and Meath County Council ('MCC') imposed conditions to its future operations pursuant to Section 261(6) of the PDA 2000.

In 2012, in accordance with its obligation under Section 261A of the amended legislation, MCC conducted a review and directed the quarry to apply for substitute consent. The Applicant maintained that this direction was invalid for a number of reasons, the most fundamental of which was the Applicant's claim that a quarry which stays within its pre-1964 user is not subject to the Directives because it does not require development consent; this being, it maintained, a condition of the non-applicability of the Directives.

An Bord Pleanála ('ABP') upheld MCC's decision. The Applicant maintained that ABP's decision was also invalid. They also maintained that Section 261A of the PDA 2000 was unconstitutional in failing to provide for adequate procedures in a process which, they said, wrongly and unfairly removed rights which were "vested" in it pre-1964.

The Applicant sought the following reliefs:

- An order of certiorari quashing the decision of ABP, dated 27th June 2013, wherein ABP purported to make a determination pursuant to Section 261A, confirming the earlier determination of MCC on 20th July 2012;

- An order of certiorari quashing the decision of MCC made pursuant to Section 261A on 20th July 2012; and,
- A declaration that Section 261A is unconstitutional.

In summary, the applicant fundamentally disagreed with the findings of ABP and sought to judicially review the decision primarily on the basis that the decision failed to vindicate the established and constitutionally protected property rights.

On 20th April 2020 the judgement of Ms. Justice Ní Raifeartaigh rejected the submission that a quarry that commenced operations prior to 1964, even one which stays within its pre-1964 user, is automatically by virtue of that user rendered immune from the Directives. She rejected the submission that MCC was not entitled to issue a direction to the Applicant to apply for substitute consent in circumstances where it had previously imposed conditions which envisaged further quarrying for 20 years following the quarry's registration under Section 261. She also found that the legislation was not unconstitutional for the reasons put forward by the Applicant.

Following the judgement, MOR Environmental were contracted in Q4 2024 to prepare a rEIAR and rAA to support a substitute consent planning application for the Site[1].

This rEIAR is structured as follows:

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

1.2 Applicant

David Flood is the director of J.J. Flood & Sons Manufacturing Limited, a company based in Oldcastle, County Meath. Under his leadership, the company has continued to thrive in the manufacturing sector.

J.J. Flood & Sons Manufacturing Limited was established on October 4, 1994. The company operates out of Carnaross, Kells, in County Meath, and has maintained a strong presence in the industry for over three decades. The company is known for its commitment to quality and innovation in manufacturing, which has helped it build a solid reputation in the market.

J.J. Flood & Sons Manufacturing Limited continues to be a key player in the manufacturing sector locally and regionally.

They specialise in the manufacture of concrete products for construction purposes, which broadly includes:

- Concrete Blocks: Used in various construction projects for building walls and foundations;
- Paving Products: Includes concrete paving stones and slabs for outdoor spaces; and,
- Aggregates: Sand, gravel, and other aggregates used in construction and landscaping.

[1] Sourced from V|Lex on 28/01/2025 at website: https://ie.vlex.com/vid/flood-sons-manufacturing-ltd-844293465

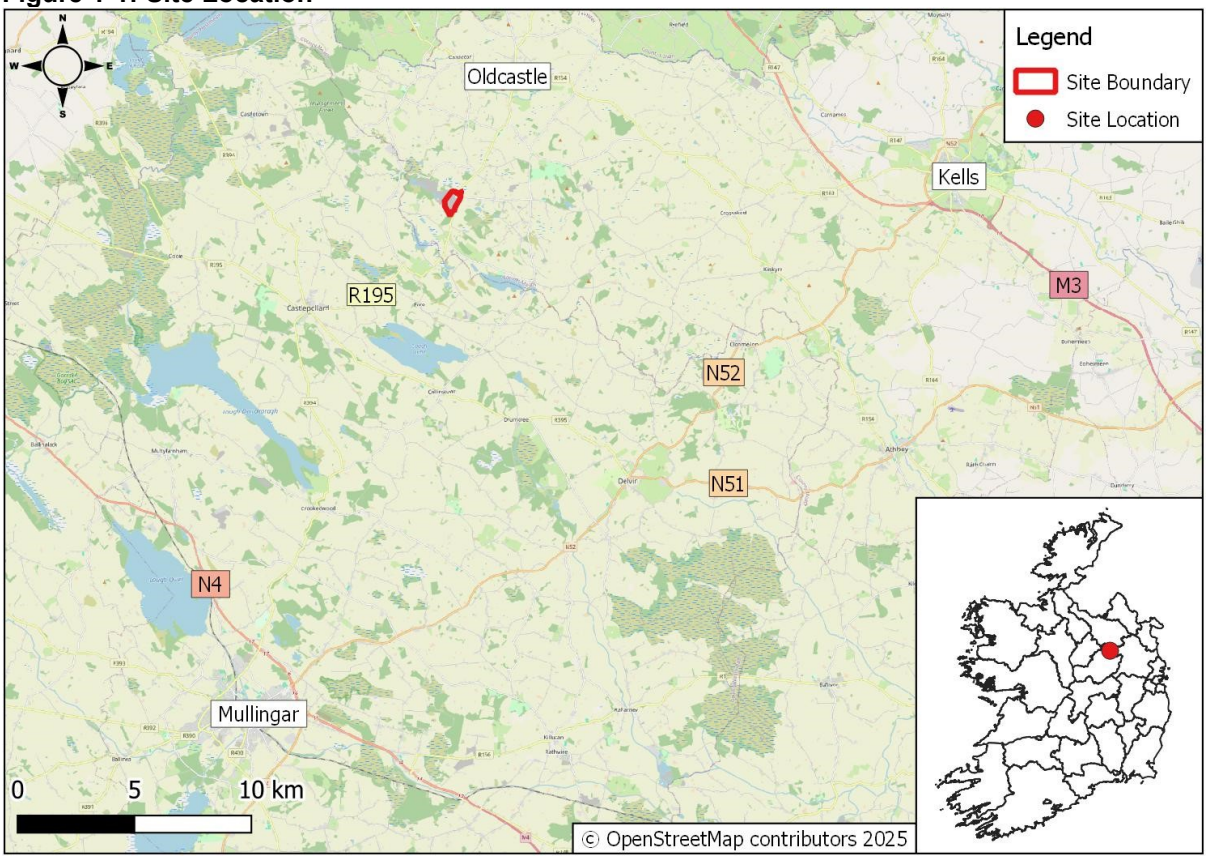
The quarry has been a significant part of the company's operations, primarily involved in the extraction of sand and gravel by mechanical means. Activities at the Site involve the extraction of aggregates, its processing, grading, washing, and short-term storage.

1.3 The Development

The Site lies in the townland of Murrens, Oldcastle, Co Meath (ITM 652523 774771), covering an area of 39ha. Refer to Figure 1-1 below.

This assessment relates to the land used for excavations and processing of aggregate, along with adjoining lands integral to the operations within the Site.

Figure 1-1: Site Location



1.4 Site Description and Setting

The Site has been used to extract and process gravel and soft rock by mechanical means, with origins prior to 1963. The Site entrance is located in the northernmost corner, onto regional road R195. The Murrens Quarry includes the following:

- Extraction area (ca. 37.5ha);
- Dry mobile screening plant;
- Wet semi-mobile screening plant;
- Semi-mobile crushing plant;
- Settlement canal system;
- Associated settlement ponds;
- Stockpiles of aggregate;
- Site access road;

- On-site haulage routes;
- Site office and toilets (ca. 77m^2);
- Wastewater treatment and percolation;
- Storage shed (ca. 375m^2)
- Maintenance Shed (ca. 164m^2);
- Two fuel tanks (ca. 153m^3)
- Vehicle parking;
- Weighbridge; and,
- Aggregate additives for making 'arena footing'.

The Site covers the majority of the land holding. The Site is primarily comprised of exposed gravel deposits and exposed bedrock, with the main processing area located centrally, along with the settlement canal. Refer to Figure 1-2 below.

The Site is situated ca. 5.5km south of the town centre of Oldcastle and ca. 7.3km northeast of the town centre of Castlepollard, which are connected by the regional road R195 which passes along the eastern boundary of the Site.

The R195 runs in a north-to-south direction and connects to the R194 west of Virgina town, ca. 14.5km to the north of the Site. The R195 immediately to the east of the Site provides the primary transport route for Heavy Goods Vehicles ('HGVs') accessing and egressing the Site.

The lands around the Site are primarily agricultural with scattered single-dwelling developments along the regional road and the access road into the Site. The western boundary of the Site is shared with an adjoining quarry development, with an embankment of untouched ground separating the two developments. To the south is a forested area.

The planning history of the Site is presented in Chapter 2. The current Site boundary and its setting are shown in Figure 1-2 below.

Figure 1-2: Site Boundaries

1.5 Environmental Impact Assessment Report ('EIAR')

This rEIAR 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];
- Environmental Protection Agency ('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 2018 [10];

- The Office of the Planning Regulator ('OPR') EIAR Screening Guidelines 2021 [11];
- Department of Environment Heritage and Local Government ('DEHLG'): Guidelines for Planning Authorities, 2004 [12]; and,
- European Commission 'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions', 1999 [13].

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[2] 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:

- Preparation of an environmental impact assessment report by the developer;
- Carrying out of a consultation;
- 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;
- 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,
- Integration of the competent authority's reasoned conclusion into its decision.

Substitute consent is a process that allows for the regularisation of developments that require retrospective environmental impact assessments ('EIA') or appropriate assessments ('AA'). Applications for substitute consent are made directly to An Bord Pleanála under section 177E of the Planning and Development Acts. Recent amendments have streamlined the procedures, introducing a single-stage application process and extending the timeline for submissions.

A remedial EIAR is required for developments that have been carried out without the necessary EIA. It includes a statement of the significant effects on the environment, details of remedial measures undertaken or proposed, and the time period for these measures. The remedial EIAR accompanies the application for substitute consent.

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

A remedial Environmental Impact Assessment Report ('rEIAR') must provide a comprehensive description of several key elements to ensure that the environmental impacts of the development are thoroughly assessed and addressed. The main components included are:

- Description of the Project: Detailed information about the unauthorized development, including its nature, purpose, and scale;
- Environmental Baseline: A description of the existing environmental conditions before the development took place;
- Significant Environmental Effects: Identification and assessment of the significant effects the development has had on the environment;
- Remedial Measures: Details of the measures that have been or will be undertaken to mitigate the adverse environmental impacts;
- Alternatives Considered: An analysis of alternative approaches or designs that were considered to avoid or reduce environmental impacts; and,
- Monitoring Plan: A plan for monitoring the effectiveness of the remedial measures and the ongoing environmental impacts.

These components ensure that the remedial EIAR provides a thorough assessment and proposes effective solutions to mitigate the environmental impacts of the development.

1.6 Scope of the rEIAR

The specific legislation pertaining to the issue of a rEIAR states:

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

- 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;
- 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; and,
    - (ii) The period of time within which any proposed remedial measures shall be carried out by or on behalf of the Applicant.
- 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 EIA in non-technical language.
Volume 2: Main EIAR Report	
Chapter 1- 4	Chapters 1-4 provide an introduction to the Site, describe the Proposed Works, the need for the Proposed Works and the alternatives considered.
Chapters 5-14	Chapters 5-14 comprise the assessment of environmental impacts, together with an evaluation of their significance and a description of any mitigation measures proposed to minimise impacts. It also takes into account the interactions between the various attributes. Chapters 5-14 will generally follow this structure: 1. A brief introduction to the chapter; 2. An outline of the methodology employed; 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"; 4. A description of the characteristics and predicted impacts of the Development on the receiving environment; 5. A description of the reductive or mitigation measures that were employed; 6. A description of the cumulative and in-combination impacts which have occurred with the Development. 7. A description of the interactions with other environmental attributes; 8. A description of the indirect and residual impacts of the Development; 9. Details of any monitoring conducted; and, 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 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. Although these guidelines pertain to the EIA process and to proposed developments, the approach is followed within this remedial assessment looking at the historic and existing effects of the Development.

Figure 1-3: Description of Environmental Impacts

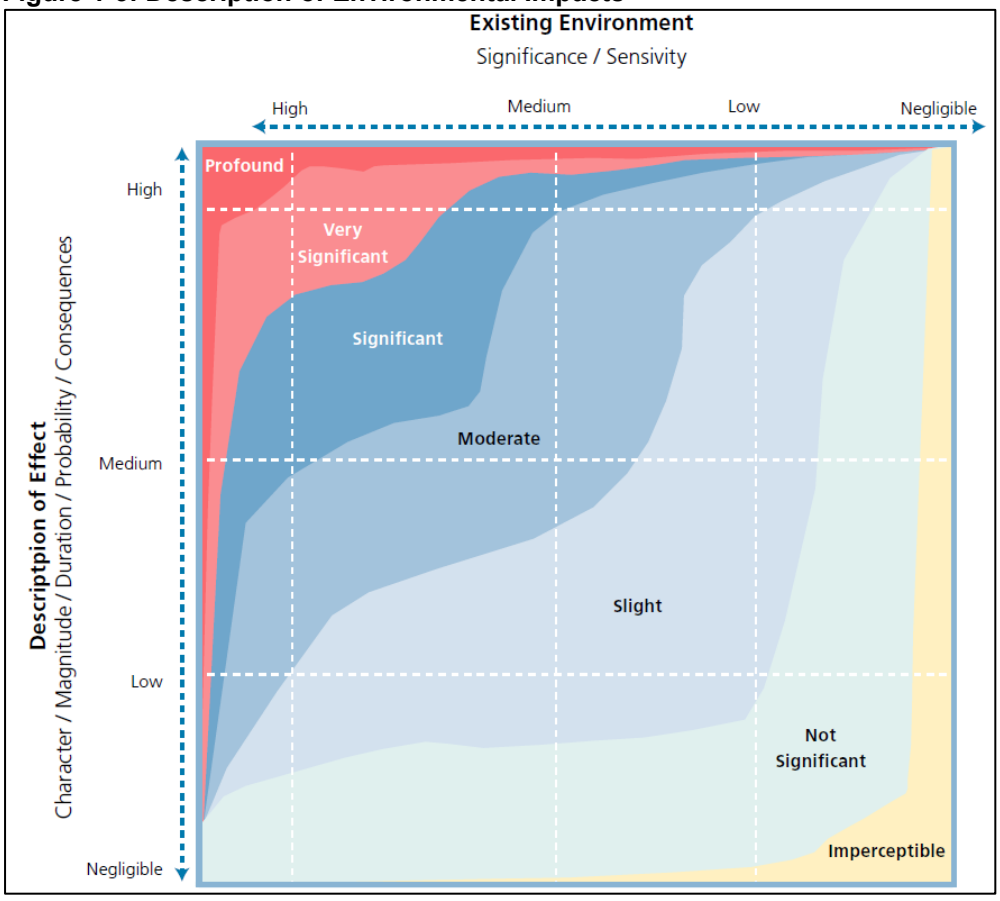


Table 1-2 defines the quality of effect of a development on the environment ranging from positive to negative.

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 the significance of an effect of a 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 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 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 MOR Environmental project team included the following:

Table 1-8: MOR Environmental In-House Project Team

Name	Role	Relevant Qualifications	Chapter(s)
Kenneth Goodwin	Associate Director, Acoustics. Project Director.	BSc, PgD & DI Acoustics, Full Member IOA, IEMA Practitioner, 18+ years' experience	All chapters
Klara Kovacic	Associate Director, Air, Climate and Sustainability	MEng, MSc, MIEMA, CEnv, 17+ years' experience	Chapter 9 – Air and Climate
Laura McGrath	Senior Consultant Hydrogeologist	P.Geo, MSc, BSc, 10 years' experience	Chapter 7 – Land. Soils & Geology Chapter 8 – Water
Niamh Tester	Author Environmental Consultant	BSc, 2 years' experience	All MOR Environmental chapters
Alexandra Allen	Environmental Consultant	MSc, 2 years' experience	Chapter 7 – Land. Soils & Geology Chapter 8 – Water
Margaret Gleeson	Environmental Consultant	BA Mod., MSc, IEMA member, 4 years' experience	Chapter 9 &10– Air Quality & Climate Change

Name	Role	Relevant Qualifications	Chapter(s)
Patricia Redondo	Environmental Consultant	BEng, MSc Acoustics. Associate Member IOA	Chapter 10 – Noise and Vibration

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

Table 1-9: External Environmental Consultants

Primary Author	Company	Relevant Qualifications	Chapter
SixWest	SixWest	N/A	Engineering Drawings and Restoration Plan
Cian Doughan	Macro-works	N/A	Chapter 12 – Landscape & Visual
Dr Charles Mount	N/A	MA and PhD in Archaeology, MBA, Dip EIA & SEA Management Member of Institute of Archeologists of Ireland.	Chapter 13 – Cultural Heritage
RoadPlan	RoadPlan	N/A	Chapter 14 – Traffic & Transport

2 PLANNING AND POLICY CONTEXT

2.1 Introduction

This chapter sets out the context for the Site through an analysis of its history and most recent development plans, planning guidelines, policy frameworks, and reports issued by 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 Site has a substantial history of quarry activities, with accepted pre-1963 origins. It is important to note that this 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.

2.2.1 Relevant Planning Applications History

Previous relevant planning application cases for the Site are listed in Table 2-1 below.

Table 2-1: Relevant Planning Application History

Planning Reference	Applicant	Development	Decision	Grant Year
971223	J.J. Flood	New entrance	Granted (Conditional)	1997
98967	J.J. Flood & Sons Ltd.	To construct an MV E.S.B. sub-station in the existing quarry	Granted (Conditional)	1999

2.2.2 Section 261 Registration

Section 261 of the Planning and Development Act, 2000, introduced a new system of once-off registration for all quarries. At the time of its introduction, many of the quarries in operation had a history of operation that predated the introduction of the Local Government (Planning and Development) Act, 1963 which came into force on 1st October 1964.

The purpose of Section 261 was to give local authorities an idea of the scale of quarrying activity in their area as well as basic information about a quarry's operation. It also allowed, where necessary, for local authorities to impose new or modified controls on quarry operations.

Murrens Quarry was registered under Section 261 in 2005 and was given the reference QY35, with Meath County Council issuing 23 conditions for its operation in 2007. These conditions were imposed under S261(6)(a)(i), which is restricted to pre-1963 developments that, when greater than 5ha, are unlikely to cause significant environmental impact.

2.3 Section 261A

In 2012, in accordance with its obligation under Section 261A of the amended legislation, MCC conducted a review of registered quarry QY35 and directed the quarry to apply for Substitute Consent following a decision in respect of this development made under section 261A(3)(a) of the Planning and Development Act 2000, as amended. This determination was appealed to the Bord, who, in 2013, upheld the Council's decision (ABP Ref. QV17.0015).

In respect of the need for AA, ABP specifically noted in their Determination:

> *(c) the potential cumulative impact on these European sites of quarrying operations at this site and an adjoining location (planning authority register reference number QY24); and,*

(d) the uncertainty regarding the hydrological linkages between this quarry and the European sites.

Within the Bord Inspector's report, it was also noted that the effects from noise, dust and disturbance were improbable given the distance between the two Natura 2000 sites and the Site. The Applicant maintained that this direction was invalid for a number of reasons, the most fundamental of which was the Applicant's claim that a quarry which stays within its pre-1964 user is not subject to the Directives because it does not require development consent; this being, it maintained, a condition of the applicability of the Directives.

An Bord Pleanála ('ABP') upheld MCC's decision. The applicants maintained that ABP's decision was also invalid. They also maintained that section 261A of the PDA 2000 was unconstitutional in failing to provide for adequate procedures in a process which, they said, wrongly and unfairly removed rights which were "vested" in it pre-1964.

The applicants sought the following reliefs:

(i) an order of certiorari quashing the decision of ABP, dated 27th June 2013, wherein ABP purported to make a determination pursuant to section 261A, confirming the earlier determination of MCC on 20th July 2012;

(ii) an order of certiorari quashing the decision of MCC made pursuant to section 261A on 20th July 2012; and,

(iii) a declaration that section 261A is unconstitutional.

On 20th April 2020, the judgement of Ms. Justice Ní Raifeartaigh[3] rejected the submission that a quarry which commenced operations prior to 1964, even one which stays within its pre-1964 user, is automatically by virtue of that user, rendered immune from the Directives. She rejected the submission that MCC was not entitled to issue a direction to the applicants to apply for substitute consent in circumstances where it had previously imposed conditions which envisaged further quarrying for 20 years following the quarry's registration under Section 261. She also found that the legislation was not unconstitutional for the reasons put forward by the applicants.

Following the judgement, MOR Environmental were contracted in Q4 2024 to prepare a rEIAR and rAA to support a substitute consent planning application for the Site.

2.4 Policy Context

The Development has been reviewed considering national, regional and industrial policies within this section.

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') [14]; and,
- The National Development Plan 2021-2030 ('NDP') [15].

[3] Source: https://ie.vlex.com/vid/flood-sons-manufacturing-ltd-844293465

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.

2.4.2 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"* [16]. 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 to fulfil the national 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."*

2.4.3 Regional Policy

County Meath lies within the Eastern and Midland Region Assembly ('EMRA'), which is also inclusive of the following counties: Louth, Kildare, Wicklow, Westmeath, Longford, Offaly, and Laois. The EMRA is one of three regional assemblies in the Republic of Ireland. The total population of the EMRA in 2022 was 981,200, according to the census of that year [17]. County Meath is part of the Regional Spatial and Economic Strategy 2019-2031 ('RSES'), which acts as a strategic link for frameworks between the NPF and the Meath County Development Plan [18].

MCC has a statutory obligation to secure the implementation of the objectives of the Plan, inclusive of:

The Eastern and Midland Assembly produced the current RSES 2019-2031 [19], which:

> *"Builds on the foundations of Government policy in Project Ireland 2040, which combines spatial planning with capital investment, and has been prepared from an extensive bottom up consultation process."*

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

> *"The RSES is tasked with the development of planning and economic development policy for future needs in the Region based upon consideration of the availability of land, resources, environment and infrastructure capacity.";*

and that:

> *We depend on our natural resources to protect public health, the environment, amenities and to sustain employment in sectors such as agri-food and tourism, particularly in rural Ireland.*

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 6.7 is to:

> *"Support local authorities to develop sustainable and economically efficient rural economies through initiatives to enhance sectors such as agricultural and food, forestry, fishing and aquaculture, energy and extractive industries…"*

The RSES outlines the need for various infrastructure projects. These include infrastructure relating to housing and population needs within sectors such as renewable energy, tourism, and transport. The RSES acknowledges the importance of sustainable rural economy and states that:

> *"The rejuvenation of rural towns and villages requires that appropriate job creation can be supported in rural areas. Traditional sectors such as agriculture, tourism, extractive industries and forestry are complemented by diversification in sectors such as food, renewable energy and opportunities provided from improved digital connectivity."*

2.4.4 Local Policy – Meath County Development Plan

The Meath County Development Plan 2021-2027 ('CDP') was adopted by MCC on the 22nd September 2021 and was superseded with an updated version which was adopted on the 13th

May 2024. The CDP serves as a plan for guiding the future development and growth of the county. Its primary purpose is to set out objectives and policies that will shape decisions on various aspects of development within the county.

2.4.4.1 Local Population Policy

The CDP [20] predicts a population growth within the county up to 227,500 in 2026. The difference between the projected 2026 population for the county and the projected 2031 population is 4,000, with a population of 231,500 predicted for 2031.

Oldcastle, the nearest town to the Site (ca. 5.5km north of the Site), is designated as a 'Strong Rural Area' in the Kells Municipal District. The CDP contains specific development objectives for Strong Rural Areas. The Site falls within the developmental envelope of Oldcastle and, therefore, is subject to such objectives as:

> *"To consolidate and sustain the stability of the rural population and to strive to achieve a balance between development activity in urban areas and villages and the wider rural area"*; and,
>
> *"To facilitate the housing requirements of the rural community as identified while directing urban generated housing to areas zoned for new housing development in towns and villages in the area of the development plan."*

2.4.4.2 Local Infrastructure Policy

The NPF and RSES, at a strategic level, recognise the importance of high-quality infrastructure and recognises the role of Meath in providing essential functions and services that support societal, economic and environmental systems at local, regional and national levels [19]. A Local Area Plan ('LAP') has been prepared for the town of Oldcastle within the CDP. MCC aim to provide, maintain and enhance road infrastructure to ensure the sustainable economic development of the County. The CDP outlines a number of road infrastructure projects aimed at enhancing the existing road network and connectivity of the county.

According to the CDP:

> *"The County is very reliant on its road infrastructure for intra and inter county movement and access."*

The CDP includes the following policies for road infrastructure are relevant to the Development:

MOV POL 24 *To safeguard the capacity and safety of the National road network by applying the provisions of the Department of Environment Community and Local Governments – 'Spatial Planning and National Roads-Guidelines for Planning Authorities, 2012' to avoid the creation of any additional development access to national roads and intensification of existing access to national roads to which speed limits greater than 60kph apply, save in accordance with agreed 'exceptional circumstances' included in MOV POL 33.*

MOV POL 24 *To provide for and carry out improvements to sections of national, regional and county roads that are deficient in terms of alignment, structural condition or capacity, where resources permit, and to seek to maintain that standard thereafter. To ensure that, where possible, any maintenance and improvement strategies have regard to future climates.*

The CDP includes the following objectives for road infrastructure are relevant to the Development:

MOV OBJ 39 *To facilitate the delivery of all of the roads projects outlined in the National Development Plan 2018-2027 and National Transport Authority's Transport Strategy for the GDA 2016-2035, in conjunction with the NTA, TII, Department*

of Transport and other stakeholders. Development of these road projects will be subject to the outcome of the Appropriate Assessment process.

MOV OBJ 45 *To work in conjunction with Cavan County Council in the planning and delivery of the N3 Virginia Bypass Scheme located within the administrative area of Meath County Council. This project will be subject to the outcome of the Appropriate Assessment process.*

MOV OBJ 48 *To implement maintenance and improvement of roads in the County as set out in the Schedule of Municipal District Works and the Council's Annual Roadwork's Programme funded from the Council's own resources and State Agency grants.*

MOV OBJ 49 *To support essential public road infrastructure including, bypasses of local towns and villages and proposed national road schemes and where necessary reserve the corridors of any such proposed routes free of development, which would interfere with the provision of such proposals. Such road schemes include those specified in the non-exhaustive list in Table 5.1: Each of these projects will subject to the outcome of the Appropriate Assessment process.*

MOV OBJ 50 *To continue to deliver targeted capacity road upgrades within the County to eliminate congestion blackspots.*

MOV OBJ 52 *To continue to support the delivery of key strategic roads within Dunboyne to include an eastern distributor road to facilitate rail-focused development, new bus routes and reduce traffic levels in the town.*

MOV OBJ 53 *To promote the delivery of key strategic roads in the Key Town of Navan to include but not limited to: 1) link road from Dublin road to Trim road, 2) distributor road from R153 at Farganstown and future bridge across the River Boyne to N51 and North Navan 3) link road from Rathaldron road to R147 inclusive of bridge across the Blackwater 4)Trim Road to N3 Kilcarn Road, 5) Commons Road to N51 Athboy Road, (6) N51 Athboy Road to Rathaldron Road. Each of these projects will subject to the outcome of the Appropriate Assessment process.*

MOV OBJ 54 *To work in conjunction with Kildare County Council to deliver the section of the Maynooth Outer Relief Road located within the administrative area of Meath County Council.*

MOV OBJ 54 *To promote the delivery of the following key strategic roads included but not limited to: Ratoath Outer Relief Road, Bryanstown Link Road (Drogheda), Navan Road – Dublin Road Link, Trim, M3 Junction 6/R125 to R147 distributor road. Each of these projects will subject to the outcome of the Appropriate Assessment process.*

MCC aim to provide, maintain and enhance road infrastructure to ensure the sustainable economic development of the County

2.4.4.3 Local Extractive Industry Policy

The CDP acknowledges the importance of the extractive industry within Co. Meath and its potential for environmental impacts:

> *"Meath County Council acknowledges the need for extractive industries in terms of supply of aggregate materials for the construction sector, delivering transport infrastructure projects, and for the export market. However, the potential for conflict in the operation of these industries with wider environmental issues needs careful consideration. By their nature, aggregates can only be worked where they occur. The cost of haulage affects economic competitiveness in this sector. This inevitably leads*

> *to conflicts and environmental concerns. Extractive industries by their nature can give rise to detrimental environmental and residential amenity effects including traffic generation, vibration, dust, noise, water pollution, visual intrusion and loss of ground water supplies. The impact on the road network of the County is significant."*

It is the goal of MCC:

> "*To facilitate adequate supplies of aggregate resources to meet the future growth needs of the County and the wider region while addressing key environmental, traffic and social impacts and details of rehabilitation"*

The CDP includes the following policies for the extraction industry:

RD POL 21 *To ensure that projects associated with the extractive industry carry out screening for Appropriate Assessment in accordance with Article 6(3) of the E.C. Habitats Directive, where required.*

RD POL 22 *To facilitate the exploitation of the county's natural resources and to exercise appropriate control over the types of development taking place in areas containing proven deposits, whilst also ensuring that such developments are carried out in a manner which would not unduly impinge on the visual amenity or environmental quality in the area.*

RD POL 23 *To support the extractive industry where it would not unduly compromise the environmental quality of the county and where detailed rehabilitation proposals are provided.*

RD POL 24 *To seek to ensure that the extraction of minerals and aggregates minimise the detraction from the visual quality of the landscape and do not adversely affect the environment or adjoining existing land uses.*

RD POL 25 *To ensure that the extractive industry and associated development minimises adverse impacts on the road network in the area and that the full cost of road improvements, including during operations and at time of closure, which are necessary to facilitate those industries are borne by the industry itself.*

RD POL 26 *To ensure that all existing workings shall be rehabilitated to suitable land uses and that all future extraction activities will allow for the rehabilitation of pits and proper land use management. The biodiversity value of the site should be considered in the first instance when preparing restoration plans. Where landfilling is proposed, inert material is the preferred method. Each planning application shall be considered on a case by case basis and where relevant will be dealt with under the relevant regional Waste Management Plan.*

RD POL 27 *To ensure that development for aggregates / mineral extraction, processing and associated processes does not significantly impact in the following areas:*

i. *Existing & Proposed Special Areas of Conservation (SACs)*
ii. *Special Protection Areas (SPAs)*
iii. *Natural Heritage Areas and Proposed Natural Heritage Areas*
iv. *Other areas of importance for the conservation of flora and fauna*
v. *Areas of significant archaeological potential;*
vi. *In the vicinity of a recorded monument, and: Sensitive landscape*
vii. *World Heritage Sites.*

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

2.5 Need For Development

Due to Ireland's infrastructural deficit and dispersed pattern of settlement and large road network, the current demand in Ireland for aggregates-based product consumption (aggregates, concrete, asphalt) is greater than 12 tonnes per capita, over twice the EU average [16]. The NPF 2040 sets out a target of sustainable growth of Ireland's rural communities, with approximately 50% of the projected population growth to 2040 intended to occur 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 occur within the existing built-up footprint of current settlements. The projected growth requires new infrastructure, including housing, schools, public services and transport networks. 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. From a local sense, ambitious goals set by MCC with respect to housing and public infrastructure, in particular road infrastructure, will not be attainable without a sufficient source of suitably situated quality aggregates and construction products. The Development has historically positively contributed to aggregate production in Ireland, which has given rise to the trend observed today of an increased aggregate demand.

Even within the context of a circular economic model, projected growth will require substantial quantities of materials, including aggregates, and the intended rural growth means that the market for building materials will have a strong regional and local element, which has historically been the case for the Development. The potential scarcity in the midland and eastern region (as highlighted in the ICF report [16]) increases the importance of supplies from other regions, such as the Development in question.

The Site and its associated development would continue to facilitate County Meath's future development by providing high-quality sand and gravel products to the construction industry. Thus, they would reduce the need for importing material and construction products from outside the county, which would potentially reduce pressure on regional and national supplies.

The Site and associated development have facilitated the local area's economy through direct local employment. If the Site cannot be brought into compliance, the long-term future of the Site and associated jobs are at risk.

The policies and objectives of the local and strategic plans for the Eastern and Midlands Region, as outlined in Section 2.4 above, target the economic and infrastructural development of the region. These plans will require the supply of good quality aggregate material from a selection of competitive quarry operators and quarry sites. It is considered that the Development is and was aligned with the objectives/policies of the NPF, NDP, RSES, and CDP.

3 DESCRIPTION OF THE DEVELOPMENT

3.1 Introduction

This Chapter describes the operational activities which occur and have occurred within the Site. See Figure 1-2 above for the boundaries of the Site. Figure 3-1 below shows the Site infrastructure.

3.2 The Site and Associated Activities

The Site has a total area of 39ha, and there is a long history of quarrying associated with the Site. The Site has evidence of pre-1963 origins. The Site has been in possession of the Applicant since the commencement of works and continues to be in regular use.

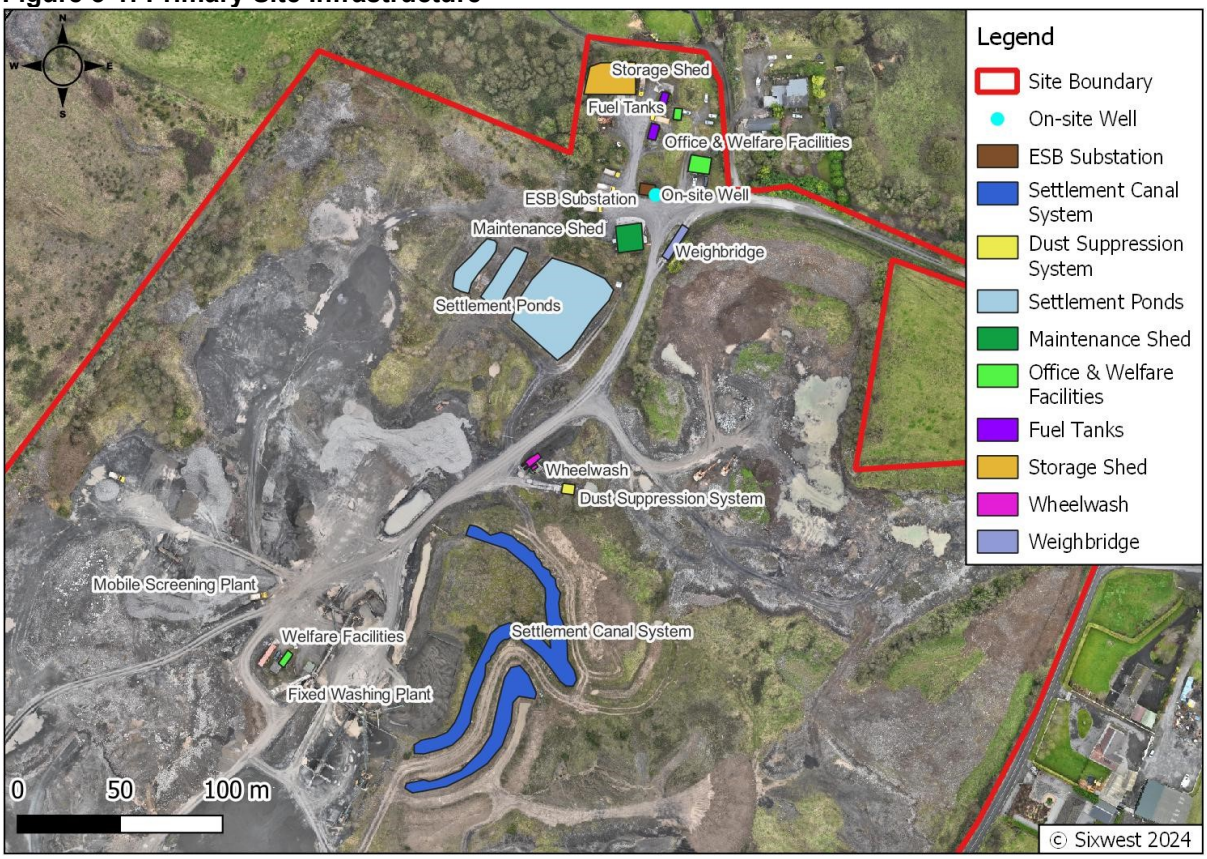
The entrance gate to the Site is off the R195 regional road on the east boundary. The Site office and welfare facilities, storage shed, maintenance shed, fuel tanks and vehicle parking are located in the northern portion of the Site. The Site is comprised of the following infrastructure:

- Extraction area (ca. 37.5ha);
- Dry mobile screening plant;
- Wet semi-mobile screening plant;
- Semi-mobile crushing plant;
- Settlement canal system;
- Associated settlement ponds;
- Stockpiles of aggregate;
- Site access road;
- On-site haulage routes;
- Site office and toilets (ca. 77m^2);
- Wastewater treatment and percolation;
- Storage shed (ca. 375m^2)
- Maintenance Shed (ca. 164m^2);
- Two fuel tanks (ca. 153m^3)
- Vehicle parking;
- Weighbridge; and,
- Aggregate additives for making 'arena footing'.

The extraction area (ca. 37.5ha)comprises most of the Site. Stockpiles are present throughout the quarry floor, and the settlement canal system is located in the centre of the Site.

The Site generally comprises an extensive quarry floor with haul routes extending to the aforementioned screening plant and equipment. Figure 3-1 below details the primary site infrastructure.

Figure 3-1: Primary Site Infrastructure



3.2.1 Historic Activities

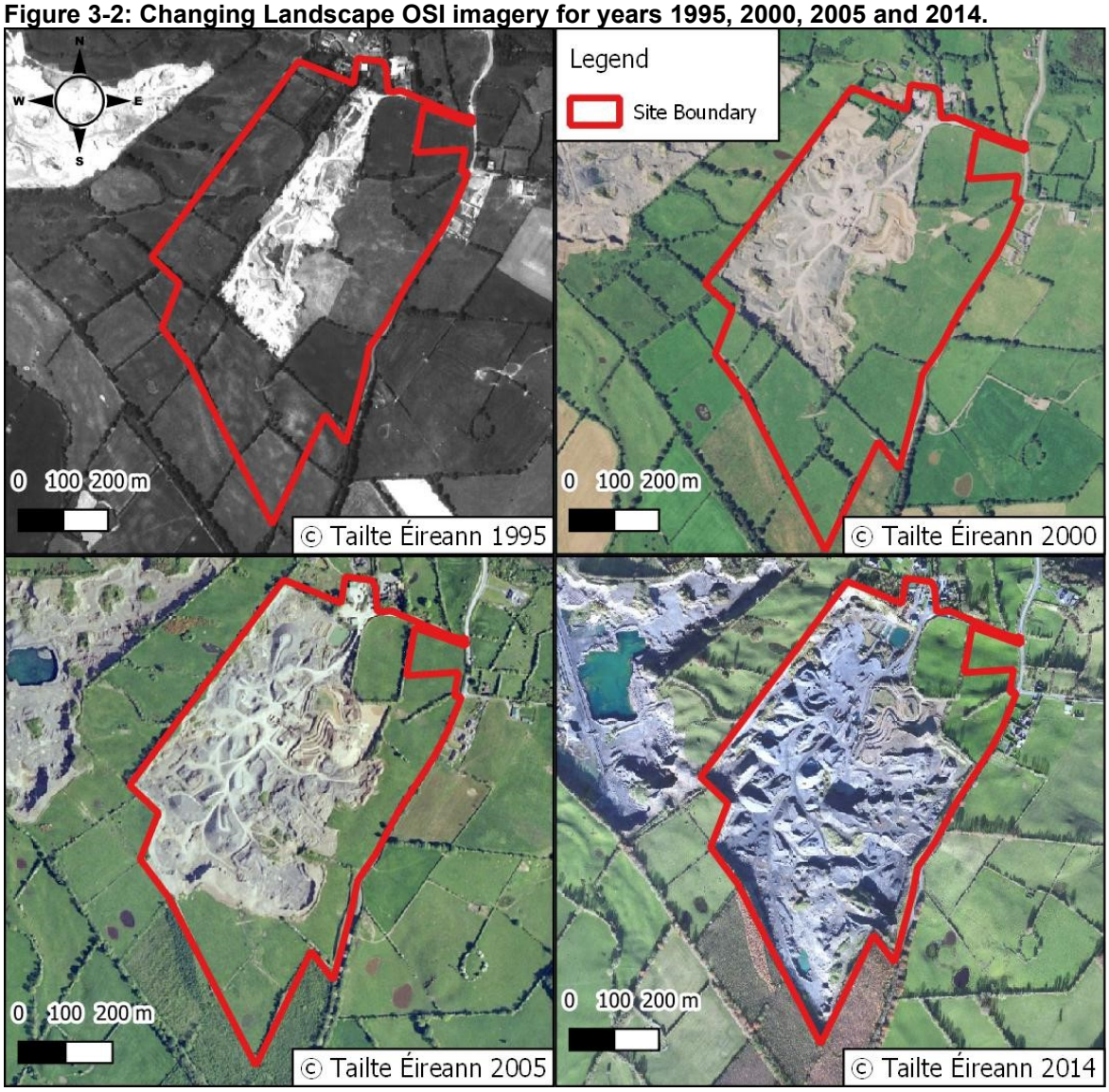
The quarry is a recognised pre-1963 development, with a fixed plant erected on the Site and current crushing and processing arrangement dating back to the early 1970s. Aggregates were extracted using conventional excavator and shovelling methods which fragmented the rock to manageable sizes. Plant and machinery, which operated at the quarry, consisted of tracked excavators and dumps trucks which transported material. Ancillary plant such as a tractor and bowser were deployed when required.

OSI aerial photography was observed for the years 1995, 2000, 2005 and 2014. Figure 3-2 below shows an aerial image from each of these years. There is an increase in exposed land from 1995 to 2014, with the exposed ground area increasing approximately three-fold.

Based on the 1995 imagery, the exposed ground area was ca. 8.0ha. By the imagery shown in 2000, the exposed area is ca. 15.2ha, increasing to ca. 24.0ha in 2005 and ca. 32.5ha in 2014.

The aerial photography from 2014 shows the Development much in the way that it is now, though further depths of extraction have since arisen. Figure 3-2 below shows the development redline boundary overlain on the OSI imagery.

Figure 3-2: Changing Landscape OSI imagery for years 1995, 2000, 2005 and 2014.



Processing consists of the breaking of the excavated 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.

3.2.2 Current Activities

Work at the Site has been restricted until this application for substitute consent is brought into compliance and further authorised for prospective development, with existing open areas of partial development being worked above the water table only, as well as substantial historical stockpiles

The current active sand and gravel pit is currently being processed but at a reduced scale compared to historic production levels. Currently, aggregates are being sourced from extensive onsite stockpiles until substitute consent is brought into compliance and further authorised for prospective development.

3.2.3 Screening

The eastern boundary consists of a high bank, separating the Site from the road. To the north, the L68185 local road climbs and the Site is partially visible. To the south, the land use is largely agricultural and forestry, and natural undulating topography screens the Site. To the

west of the Site, an adjacent quarry and associated works owned by BD Flood is separated by a ridge of land left at its original ground level with fencing and hedgerows on the top. Further details on visual impact assessment are presented in Chapter 12.

3.2.4 Drainage

Surface water run-off is collected in the onsite canal settlement system and settlement lagoons located in the centre and the northern section of the Site. Water is pumped from the settlement pond system at the north of the quarry floor to the screening plant in the centre of the Site, which is then collected at the settlement canal and pumped back to the northern settlement pond. 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.

3.2.5 Fuel and Oil Storage

Fuel is stored at the northern section of the Site and dispensed directly into the plant and vehicles or transported by mobile bowsers to plant onsite. The Applicant uses regulated suppliers to transport fuel to the Site, who either dispense directly into plant or into fuel storage tanks.

Fuel is stored within two purpose-built bunded tanks adjacent to a garage / maintenance shed building. 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 kits.

Oils and other maintenance liquids are stored in the main site garage close to the northern Site 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. HGVs and other non-site vehicles are re-fuelled off-site. Site fuel storage is, thus, principally for fuelling operational plant, excavators and loading shovels.

3.2.6 Wheel wash

The wheel wash is comprised of a concrete-lined depression and overhead sprinkler system which is located north of the canal settlement system. Water is pumped from the northern settlement system to the wheel wash and washings are filtrated back to the settlement system. The wheel wash is routinely maintained.

3.2.7 Water Supply

Wastewater for onsite amenities (kitchen, toilets, sinks, etc.) is treated privately onsite. The wastewater is collected through a wastewater pipeline network and directed toward a septic tank and percolation area in the north of the Site.

Potable water used for office facilities including faucets and toilet facilities is obtained from a small onsite well in the northern section of the Site. The water used for site processes is obtained from the recycled water settlement system onsite described in Section 8 below.

3.2.8 Landscape Screening

The boundary of the Site consists of a high bank with fencing and or hedging on top, separating the quarry from the local road network and neighbouring fields. To the north and south, the land-use is largely agricultural and forestry. The north quarry is partially visual from the R195 along the eastern boundary when approaching from the north and south.

Another quarry and processing plant is located at the western boundary of the quarry, run by BD Flood which is 'substantially comprised of lands which were once part of the Flood family lands from which both quarries originated.

The northern, western and southern boundaries consist of hedging and field boundaries at the original ground level, with aggregate faces on the quarry side. The eastern boundary which is adjacent to the R195 consists of fencing and hedgerow. Quarry operations are visible on the road that goes through the northern section of the Site.

Further details on visual impact assessment are presented in Chapter 12.

3.2.9 Safety and Security

Stockproof posts and wire fencing are in place around the perimeter of the Site. On the access road, a warning sign has been erected to warn people about the potential health and safety risks associated with quarries. There are gates at the access point to the quarry on the local L68185 road. The Site includes internal lighting and monitored security.

3.2.10 Staffing Numbers

Peak employment at the Site totalled to ca. 26 persons from 2007-2008. The Site currently employs ca. 9 full-time onsite employees, reflecting the subsistence operations pending regularisation and prospective permission.

3.2.11 Working Hours

Operational hours associated with the Site are:

- Monday to Friday 07:00 – 19:00;
- Saturday 07:00 – 14:00; and,
- Sunday & Public Holidays closed.

3.3 Utilities

The quarry has existing telecommunications, an ESB substation (MCC planning reference 98967) and an existing potable water supply that serves office facilities. Foul water for the office is collected and treated in a septic tank before it goes to a soakaway.

There is an ESB sub-station located in the northern section of the Site that provides mains electricity for site operations.

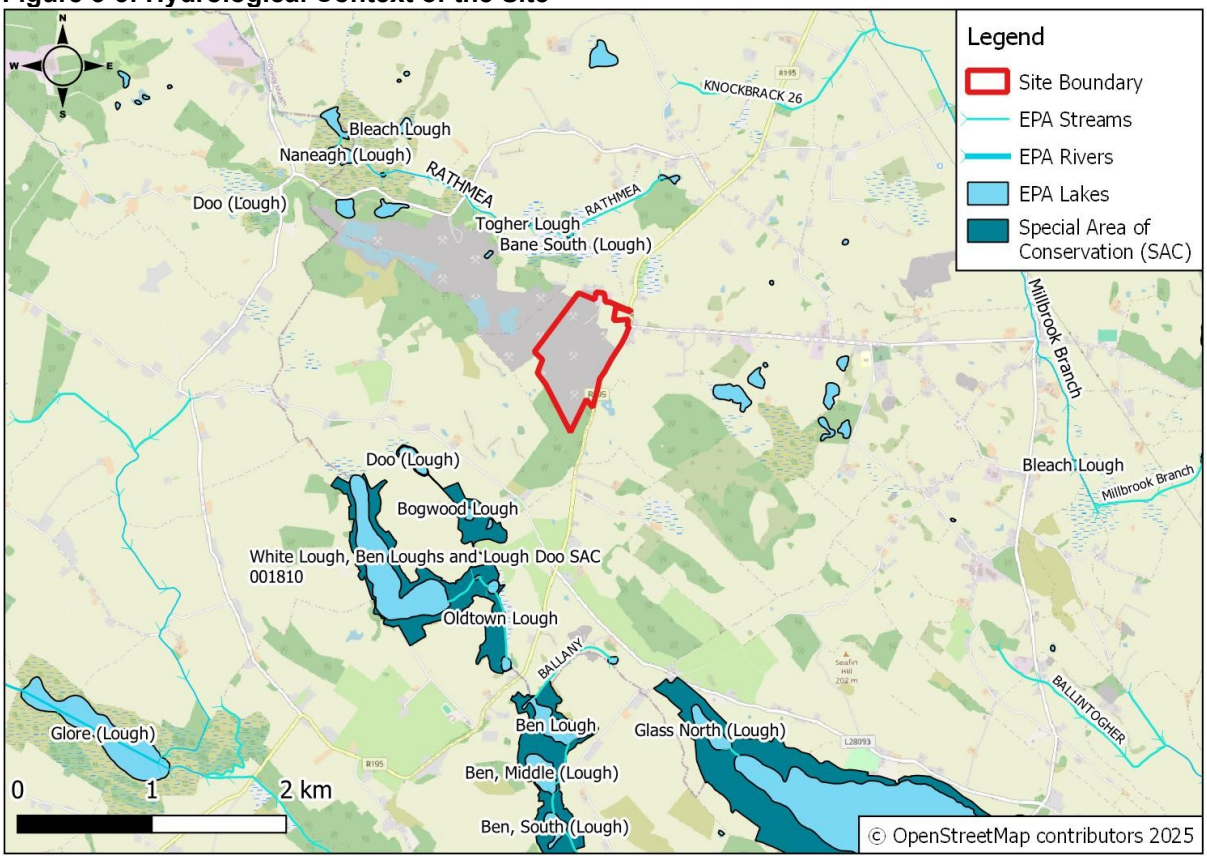
3.4 Receiving Waters

There are no receiving waters for the Development. There is a closed loop water system onsite which consists of a series of pumped pipe networks and settlement lagoon and canal system.

No water monitoring is carried out at the Site and the Development does not require any form of water discharge licence.

There are several streams, rivers and lakes present within the vicinity of the Site. The Rathmea River flows ca. 560m north of the Site, and the Bane South Lough is the closest lake to the Site, ca. 360m north of the Site. See Figure 3-4 below for the hydrological context of the Site, which is discussed in Chapter 8 below.

Figure 3-3: Hydrological Context of the Site



3.5 Remediation Measures

At the time of writing, the Site does not have a managed restoration plan.

As part of this application, an ecological enhancement / remediation measure plan has been developed. The remediation plan targets:

- Removal of all plant and equipment from the pit floor;
- Maintenance of the northern administration buildings, access road, security, and sheds for future use;
- Removal of product stockpiles across the pit floor;
- Creation of a proposed new wet grassland and native woodland area;
- The creation of two new ponds and the restoration of existing quarry habitat to a low nutrient landscape; and,
- All existing ponds and areas of scrub will be retained.

The plan will be implemented to offset for the loss of any habitats as a result of historic activities at the Site. The ecological enhancements within this remediation plan have been developed, taking into consideration the species that use or have the potential to utilise the area following the implementation of the plan. The proposed restoration and enhancement plan is expanded upon in Section 6.8 below.

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,
- Do Nothing Scenario.

This Chapter, although it is a rEIAR, which is retrospective in nature, considers potential alternatives from the perspective of the Applicant when deciding to progress with the Development.

4.2 Alternative Location

The Site was actively rock quarried prior to the 1960s and registered with Meath County Council as such in 2005. As an established quarry and associated processing development area, the selection of alternative locations, particularly green field development, was rated lower, as the knowledge of the quality of the available aggregate resource at this location was well established, along with all necessary infrastructure on the Site to meet market requirements. As such, the process of screening a greenfield or alternative location development elsewhere was not a reasonable alternative.

An alternative location for the Site was not considered.

The Site has a proven record as a supplier of nationally important resources of sand and gravel 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. The Site and surrounding lands have been in the Flood family for many generations and have formed the basis for family businesses for much of the twentieth century and beyond. The adjacent BD Flood was also born out of the same family holdings.

4.3 Alternative Layout

Due to the nature of the rEIAR, an alternative layout for the Site was not considered, as the current layout was developed through its design for efficient extraction, movement and production of material / aggregate within the Site and established water settlement canal system.

The established interconnection of various activities within the Site and the storage of raw and processed aggregate are key elements of the on-site layout. Although there are options to reorganise this layout, the environmental effects do not show clear long-term improvement over the existing layout.

Additionally, the environmental and financial costs of reorganising are higher than maintaining the status quo.

4.4 Alternative Options for the Site

4.4.1 Site Restoration and flooding of the quarry floor

Complete Site restoration was not considered as the Site remains a viable source of aggregates, which positively contribute to national supply and demand. This option would lead to a loss of important aggregates from the Site and would negatively affect the economy of the local area. See section 3.5 above for further information.

Flooding of the quarry floor was not considered at the Site for the same reasons described above.

4.4.2 Do Nothing Option

A 'Do Nothing' option would bring no economic or environmental benefit to the Site or the local and regional area. This scenario would mean leaving the Site in its current state with stockpiles across the Site and plant unused. It would also mean that viable and in-demand aggregates are not extracted. This would negatively affect the local economy of both the area and the Site operator / the Applicant, as local employment would cease at the Site, and the supply of in-demand aggregates would cease. There would be no environmental benefit from the 'Do Nothing' option, as stockpiles would be left onsite, and no action would be taken to offset potential effects from historical activities. The 'Do Nothing' scenario also means there would be no potential for future use of land at the Site.

The Site and associated development have facilitated the local area's economy through direct employment of ca. 9 members of staff. If the Site cannot be brought into compliance, the long-term future of the Site and associated jobs are at risk.

Effects, if they arise, will be left in situ, and future works must await historic legalisation and future planning consent. Additionally, the loss of this established quarry could lead to a greenfield site elsewhere in the region being opened to provide the needed quality aggregate products, leading to the potential for environmental effects elsewhere.

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 [21];
- Institute of Environmental Management and Assessment ('IEMA') Health Impact Assessment in Planning, Impact Assessment Outlook Journal, Vol 8: October 2020 [22];
- IEMA: Health in Environmental Impact Assessment, A Primer for Proportionate Approach (2017) [23];
- IEMA: Effective Scoping of Human Health in Environmental Impact Assessment (2022) [24];
- IEMA: Determining Significance for Human Health in Environmental Impact Assessment (2022) [25];
- International Association for Impact Assessment ('IAIA') and European Public Health Association ('EPHA'): Human Health – Ensuring a High Level of Protection (2020) [26]; and,
- EPA: Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022) [27].

5.2.1 Health Sensitivity

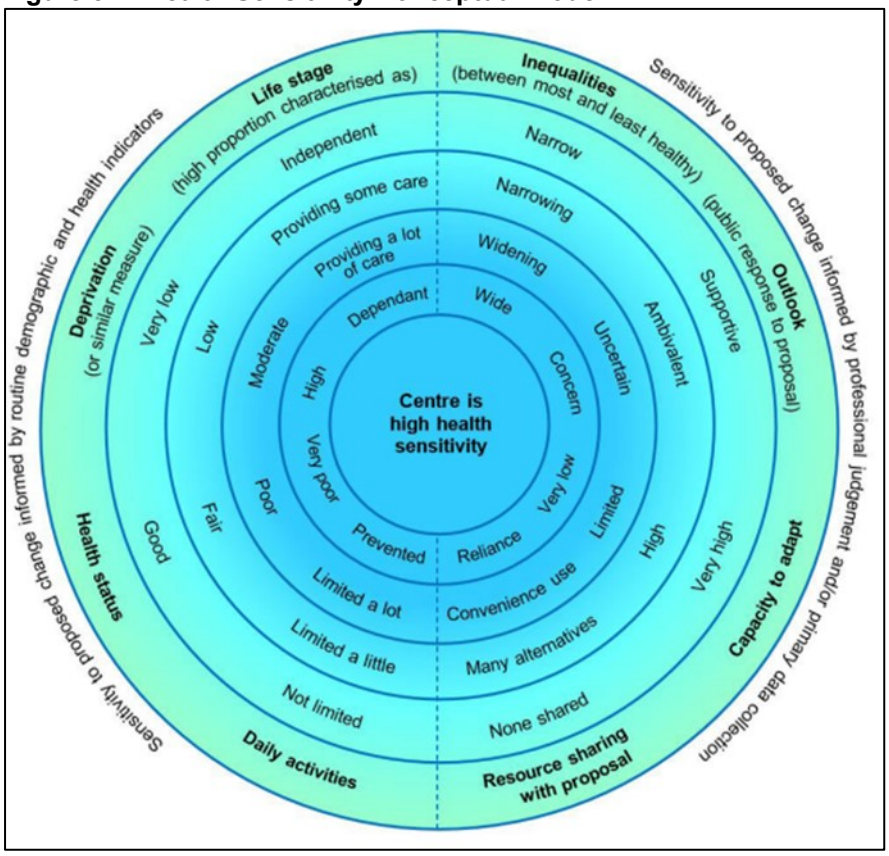
The IPH Guidance sets out (*Part 4 – Analysis: tools and resources*) a methodology for the determination of the health sensitivity of the local population. This methodology is summarised in Figure 5-1 below. The sensitivity of each factor was considered to determine the overall sensitivity of the local population in both the immediate area and the nearest population centre. The following sources were consulted in determining the sensitivity of the local population and the potential effects upon that population:

- Central Statistics Office ('CSO') Census Data for 2011, 2016 and 2022 [28];
- CSO Census Mapping Small Area Population Maps [29]; and,
- Pobal Deprivation Maps [30].

The results are set out below.

All subsequent chapters of the EIAR have addressed specific direct and indirect effects that have the potential to affect human health.

Figure 5-1: Health Sensitivity Conceptual Model



5.3 The Receiving Environment

The CSO provides data on population and certain socio-economic aspects of the population at different levels, including:

- Province;
- County;
- Local Electoral Areas ('LEAs');
- Electoral Division ('EDs');
- Towns / Settlements / Built-Up Areas ('BUAs'); and,
- Small Population Areas ('SAs').

SAs were created at the time of the 2011 Census to give greater clarity and context to population trends. As of the 2022 Census, BUAs have replaced Towns / Settlements. BUAs are made up of entire SAs.

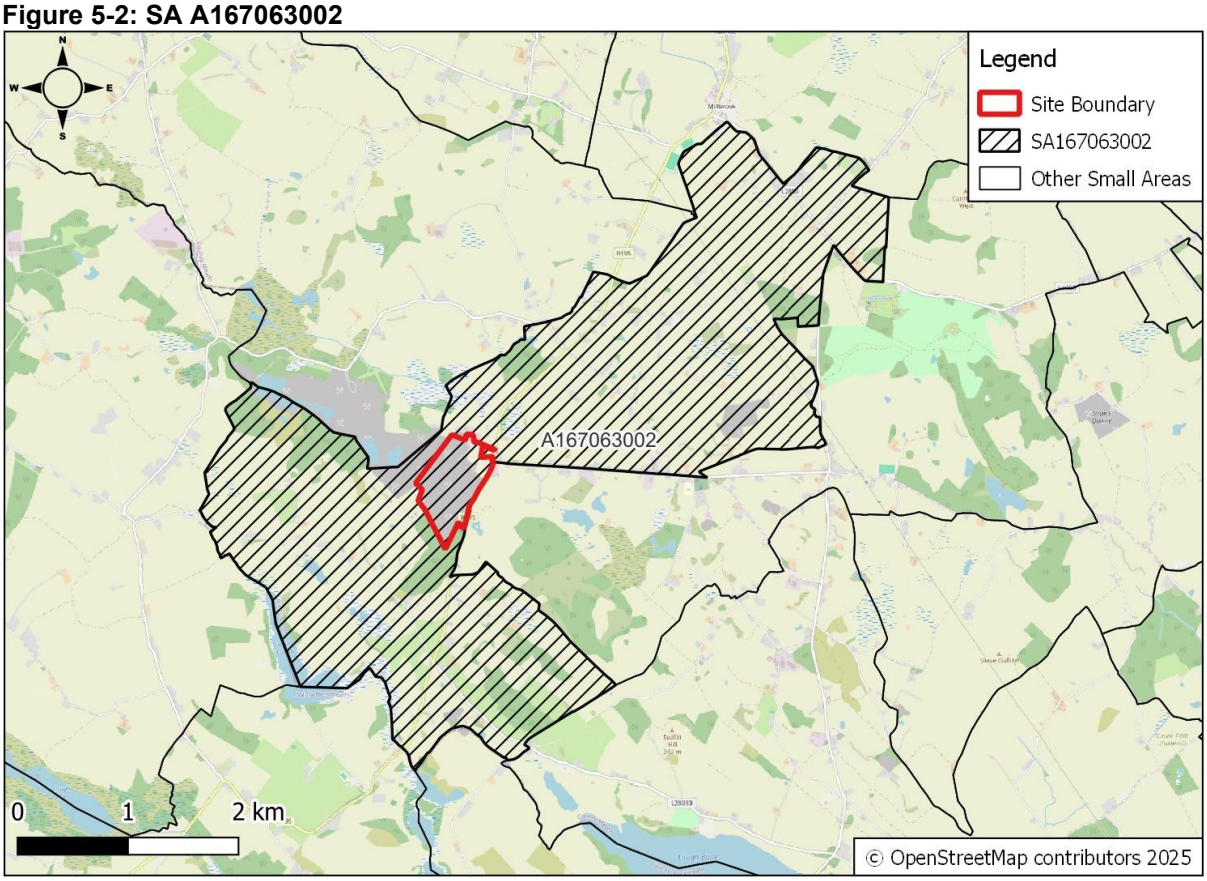
The borders of areas below County level may change from one Census to another, meaning direct comparisons between sets of Census data may not always be possible.

The Site lies within SA A167063002, the ED of Moylagh, and the LEA of Kells.

The CSO population figures from the 2022 Census Data are set out in Table 5-1 below. The corresponding figures for the ED, LEA, County and State are provided for context. Please note that there were changes to the SA, ED and LEA boundaries between the 2016 and 2022 Census. Therefore, the population change figures should be regarded as a guide rather than an absolute.

The Site is in County Meath, population 220,826. The population of Moylagh ED and Kells LEA are 423 and 34,575 respectively.

Figure 5-2: SA A167063002



5.3.1 Population

The CSO population statistics relevant to this EIAR are set out in Table 5-1 below.

5.3.2 Small Area Population Statistics

The 2011 census introduced the concept of 'Small Areas', which was established to give greater clarity and context to population trends. The small areas have been updated based on the 2022 census. Figure 5-2 above shows the site in the context of SA A167063002.

Various key statistics on the locality from the 2022 census are presented in Table 5-1 below. Please note that the 2021 Census was delayed until 2022 due to the COVID-19 pandemic.

Table 5-1: Population Statistics (2011-2022)

Area	Number of Persons			Change	
	2011	2016	2022	2011-2016	2016 - 2022
Small Area A167063002	228	205	210	-23	5
Moylagh ED	416	395	423	-21	28
Kells LEA*	28,608	32,398	34,575	3790	2177
County Meath	184,135	195,044	220,826	10909	25782

Area	Number of Persons			Change	
	2011	2016	2022	2011-2016	2016 - 2022
Ireland	4,588,252	4,761,865	5,149,139	174,613	387,274

*LEA area changed between 2011 and 2016.

5.3.3 Local Population

The nearest population centre to the Site is Oldcastle town. Table 5-2 below shows key statistics in relation to the population of SA A167063002 and Oldcastle town, taken from the CSO 2022 Census Mapping Small Area Population map [31]. County Meath and Ireland figures are given for comparison.

Table 5-2: Local Population Statistics for SA A167063002

Data Set	SA A167063002	Moylagh ED	County Meath	Ireland
Permanent Private Households	210	423	220,826	1,841,152
Unoccupied Buildings (%)	22%	17%	8%	13%
Total Population (Male%/Female%)	48.57%/51.43%	49.88%/50.12%	49.81%/50.19%	49.42%/50.58%
Age Breakdown (%)				
Aged 0 – 9	13.81%	13.24%	14.14%	12.39%
Aged 10 – 14	4.29%	4.26%	8.61%	7.27%
Aged 15 – 19	3.81%	4.26%	7.22%	6.56%
Aged 20 – 24	7.14%	5.20%	5.56%	5.96%
Aged 25 – 64	51.90%	52.96%	52.22%	52.74%
Aged 65 – 79	20.00%	16.55%	9.69%	11.56%
Aged 80+	3.81%	3.55%	2.56%	3.52%
Age Dependency Ratio*	59.09%	60.23%	53.85%	53.22%
% with Irish/UK Nationality	94.06%	92.05%	86.26%	84.52%
% identifying as White Irish	93.07%	92.05%	78.73%	75.61%
% identifying as Irish Traveller	0.00%	0.00%	0.45%	0.64%
% of 1 person households	32.53%	31.93%	17.31%	23.14%
% of Single-parent households	7.23%	6.02%	11.08%	11.38%
% Owner/occupiers	84.34%	82.42%	75.15%	65.77%
% Renting	7.23%	9.70%	19.60%	27.48%

Data Set	SA A167063002	Moylagh ED	County Meath	Ireland
Renting (Private Landlord)	4.82%	8.48%	12.51%	17.96%
(Local Authority/Housing Body)	2.41%	1.21%	7.09%	9.52%
% with Stated Central Heating	95.18%	96.36%	96.28%	93.85%
(Oil-Fired)	68.35%	71.70%	43.72%	38.79%
(Coal-Fired)	2.53%	2.52%	2.27%	3.45%
(Wood-Fired)	12.66%	7.55%	1.58%	1.73%
(Electric-Fired)	5.06%	5.03%	9.98%	11.74%
(Gas-Fired)	0.00%	0.00%	35.57%	32.66%
% with confirmed Water Supply	98.80%	98.18%	98.46%	97.72%
(Mains Water Supply)	30.49%	37.65%	76.53%	79.90%
(Private Water Supply)	63.41%	53.09%	20.32%	9.90%
(Group Water Supply)	4.88%	11.11%	4.44%	7.69%
% with Stated Sewerage	98.80%	98.18%	98.30%	94.95%
(Mains)	0.00%	0.00%	65.98%	63.30%
(Septic Tank)	87.80%	89.51%	27.81%	24.78%
% with a Disability (all ages)	16.67%	19.39%	19.56%	21.55%
% Caring for Disabled Person	5.24%	5.44%	5.39%	5.81%
% Working Age Unable to Work (Illness/Disability)	1.65%	3.72%	2.86%	4.58%
Health:				
Very Good / Good	89.52%	90.31%	86.71%	82.89%
Fair	7.62%	7.33%	7.56%	8.64%
Bad / Very Bad	0.00%	0.47%	1.44%	1.74%

*The age dependency radio is the number of dependents (aged 0-15 and 65+) per hundred people of working age (i.e. 15-64). A higher ratio indicates more pressure on the working population.

5.3.3.1 Pobal Information for SA167063002, Moylagh ED and County Meath

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 [32]. Deprivation is categorised into eight bands, ranging from 'extremely affluent' to 'extremely deprived'.

The 2016 and 2022 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. Table 5-3 below sets out the relevant factors, which together indicate that the SA for the local area

has a "Marginally Below Average" deprivation level, Moylagh ED has a "Marginally Below Average" deprivation level and Co. Meath has a "Marginally Above Average" deprivation level for 2022.

Table 5-3: Deprivation Indices for SA167063002, Moylagh ED and County Meath, 2022

Data Set	SA A167063002	Moylagh ED	County Meath
Pobal HP Index	-3.90	-1.13	1.56
Pobal HP Description	Marginally Below Average	Marginally Below Average	Marginally Above Average
Primary Education only (%)	17.50%	15.95%	9.30%
Third Level Education (%)	30.00%	34.22%	4.26%
Male Unemployment Rate	4.76	6.30	7.16
Female Unemployment Rate	11.63	6.90	7.76

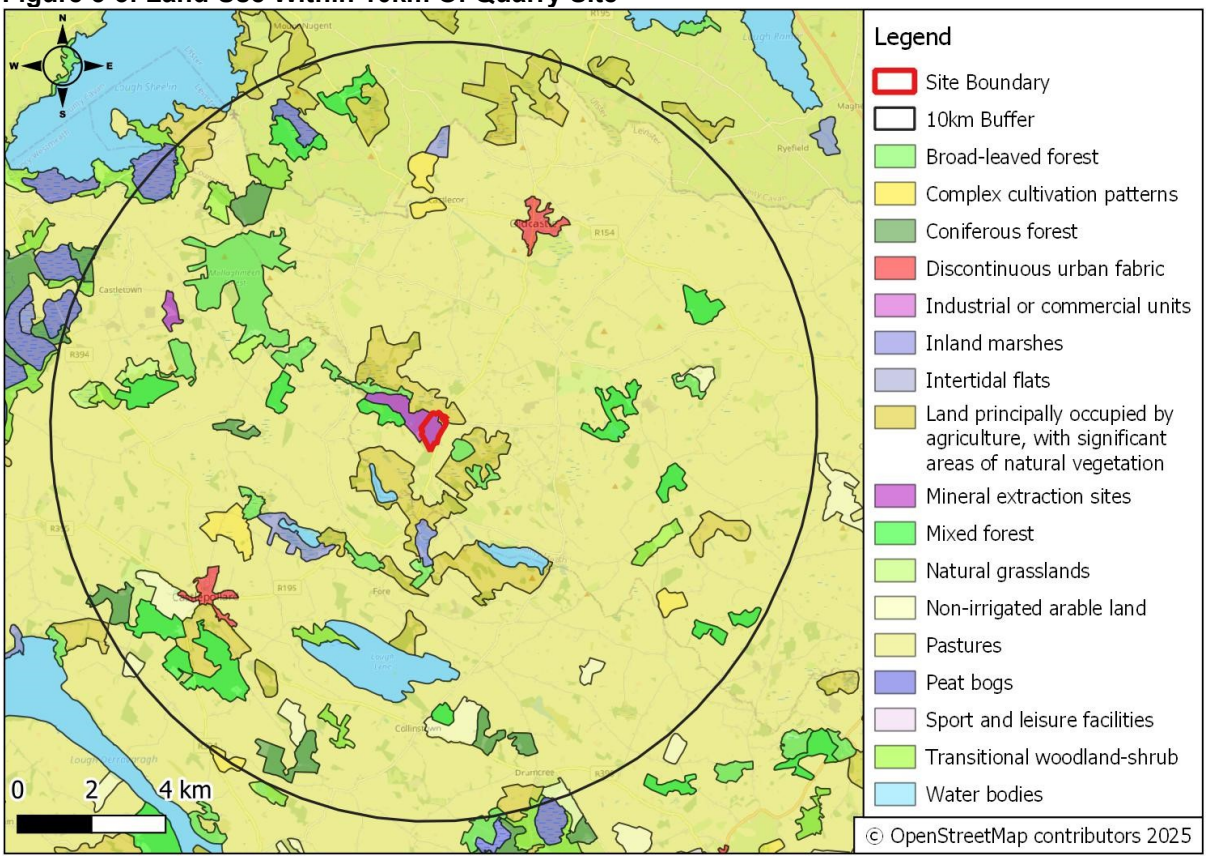
The 2022 national unemployment rate was 8.6% for males and 8.0% for females [28].

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 is a quarry adjacent to the western portion of the Site, owned by BD Flood. A precast concrete facility called Flood Precast is located ca. 3km northwest of the Site. There are also scattered individual dwellings, agricultural businesses, individual rural businesses, as well as industrial businesses.

There is a more urban land use closer to towns such as Oldcastle and Castlepollard. Figure 5-3 below illustrate land use in the vicinity of the Site, sourced from the EPA.

Figure 5-3: Land Use Within 10km Of Quarry Site

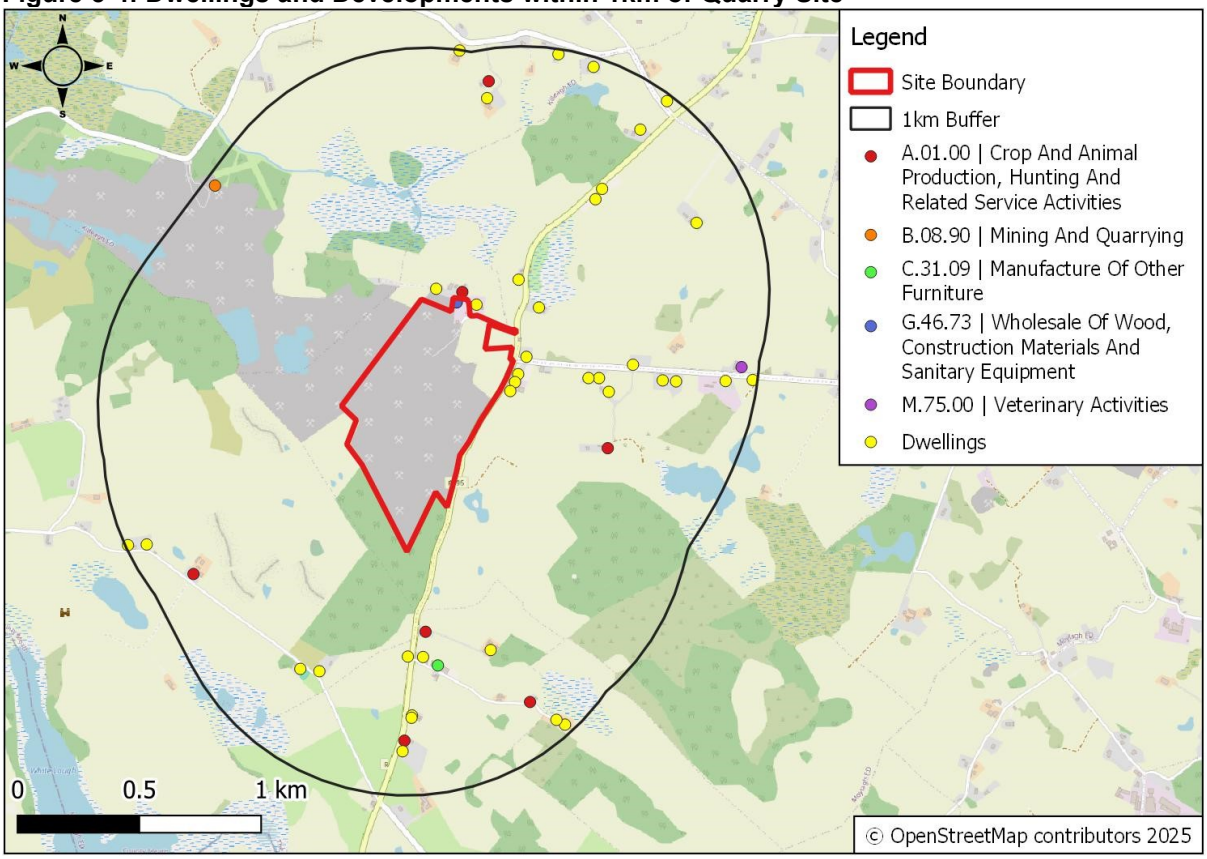


The nearest towns to the Site are:

- Oldacstle town (ca. 8km to the North);
- Castlepollard town (ca. 10km to the Southwest);
- Clonmellon (ca. 13.5km to the Southeast);
- Virginia town (ca. 15.2km to the Northeast);
- Ballyjamesduff village/town (ca. 16km to the North);
- Kilnaleck town (ca. 17.4km to the Northwest);
- Kells town (ca. 21km to the East);
- Athboy town (ca. 21.7km Southeast);
- Delvin village/town (ca. 11km to the West);
- Mullingar town (ca. 23km to the Southwest); and,
- Monaghan town (ca. 29km to the Northeast).

The closest settlement is the Oldcastle town. The town is ca. 8km to the north of the Site. Oldcastle has many industrial developments and businesses, schools, and recreational amenities such as Oldcastle GAA club. Figure 5-4 below shows residential dwellings and industrial developments within the immediate vicinity of the Site.

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



5.3.5 Economic Activity and Employment

The economic activity / employment figures from the 2022 census for the immediate SA and Moylagh ED against the wider region are outlined in Table 5-4 below:

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

Area	In work	Student	Retired	Caring for home/family	Unemployed*	Unable to work (health)
SA A167063002	53.85%	7.14%	18.13%	14.84%	4.40%	1.65%
Moylagh ED	57.31%	6.88%	15.76%	12.32%	4.01%	3.72%
County Meath	59.32%	11.25%	13.15%	7.18%	4.76%	3.71%
Ireland	56.09%	11.10%	15.90%	6.58%	5.10%	4.58%

*Includes those looking for their first job

Table 5-5 below provides details on the occupations of those of working age (including the former occupation for those not currently employed).

Table 5-5: Occupations of Working-Age Population

Area	SA A167063002	Moylagh ED	County Meath	Ireland
Administrative/Secretarial Occupations	7.62%	8.45%	10.54%	9.20%
Associate Professional/Technical Occupations	11.43%	11.27%	12.25%	11.71%
Caring, Leisure, Service Occupations	6.67%	7.51%	7.36%	7.35%
Elementary Occupations	14.29%	9.86%	7.77%	8.15%
Manager/Director/Senior Officials	5.71%	9.39%	9.18%	7.72%
Process, Plant and Machine Operatives	17.14%	14.55%	7.61%	6.91%
Professional Occupations	10.48%	14.08%	18.36%	20.31%
Sales and Customer Service Occupations	2.86%	3.76%	6.01%	6.18%
Skilled Trade/Occupations	20.95%	19.25%	14.17%	12.57%
Not Stated	2.86%	1.88%	6.76%	9.90%

Of those of working age (15-64 years), the breakdown by occupation for SA167063002 and Moylagh ED is shown in Table 5-5 above against the overall figures for County Meath and Ireland. The high percentage of process / plant / machine operatives and skilled tradespersons, both in the local population and wider ED relative to the County and national figures, reflects the importance of the construction and extraction industries in the area.

Table 5-6 below shows the percentage of working adults working within various industries, according to the 2022 Census, both in the immediate area (the SAs) and the near vicinity of the Site (the EDs). The County and National figures are provided for context.

Table 5-6: Industry of Employment of Adults in Paid Employment (2022)

Area	SA A167063002	Moylagh ED	County Meath	Ireland
Agriculture, Forestry & Fisheries	10.20%	8.00%	3.56%	3.54%
Building and Construction	9.18%	8.50%	8.25%	5.80%
Manufacturing	24.49%	21.00%	11.28%	11.77%
Commerce/Trade	24.49%	26.00%	25.01%	23.82%
Transport/Communications	7.14%	6.00%	10.05%	9.15%
Public Administration	2.04%	2.50%	6.12%	5.67%
Professional Services	15.31%	19.50%	22.95%	24.48%
Other	7.14%	8.50%	12.78%	15.76%

5.3.5.1 Employment Opportunities in the Surrounding Area

Opportunities for employment exist within the vicinity of the Site in Oldcaslte town (5.5km to the north), Castlepollard town (7.3km to the southwest), Kells town (21km to the east), and Virginia town (15.2km 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 are daily commuter bus services which links the nearby towns and smaller villages). This increases the relative importance of local employment in rural settings such as these.

According to the MCC CDP:

> *"Oldcastle is an important employment and service centre in north-west Meath with the highest jobs ratio in the County"*

5.3.5.2 Site Employment

The Development employs ca. 9 full-time persons at the Site.

5.3.6 Human Health

This section sets out the existing situation with regard to human health.

5.3.6.1 Sensitivity

The population of the immediate Small Area was considered in terms of the categories set out in Figure 5-1 above. The results of this consideration are set out in Table 5-7 below. The overall sensitivity of the population of the Small Area to any resulting impact is considered to be "Low".

Table 5-7: Consideration of Health Sensitivities in the Local Population (SA A167063002)

Criteria	Classification	Basis
SA A167063002		
Life Stage	Providing a lot of care	The age dependency ratio is above the national figure and the % of the population caring for someone with a disability is slightly below the national figure, representing an increase in the over-all care burden.
Deprivation	Limited a little	The Pobal HP Description is "marginally below average".
Health Status	Good	The % of the population unable to work due to health/disability is below the national figure. The % of the population reporting 'very good/good' health is above the national figure and the % of the population reporting 'bad/very bad' health is below the national figure.
Daily Activities	Good	The % of the population caring for someone with a disability is below the national figure and the % of the population with a disability is below the national average.
Inequalities	Narrowing	The % of the population with education only to primary level is above the regional/county figure, and the % of the population with education to third-level and above is much higher than the regional figure. The male unemployment rate is well below the regional figure; however the female unemployment rate is higher. The rate of home ownership is well above the regional figure and the % of households renting from Local Authority or Housing Bodies is well below the regional figure.
Outlook Towards Proposal	Supportive/Ambivalent	The Quarry has existed for approximately 150 years. The Development will not increase the Quarry's impact on the local environment.
Capacity of Health Services to adapt	Very High	The Development is not a health-related project and will have no impact on the local health infrastructure.
Resource Sharing with Proposal	None Shared	The Proposed will not have a large increase in power or water requirements, and these requirements do not represent an increase in current requirements.
Over-all Sensitivity Score	**Low**	

5.4 Characteristics and Potential Impact of Development

This section examines the potential effects on population and human health that may arise from the Development during all phases of the Development. This includes the potential for unplanned events and their possible outcome.

The potential effects that may arise if the Development does not take place are also examined.

5.4.1 Population

This section examines the potential effects on population and human health that may arise from the Development and during all phases of the Development. This includes the potential for unplanned events and their possible outcome.

The potential effects that may arise if the Development does not take place are also examined.

5.4.2 Human Health

The potential effects on human health, particularly potential impacts on residents in the immediate locality of the Site, are addressed in detail in the following specialist chapters of this EIAR. 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 (Hydrology and Hydrogeology);
- Chapter 9: Air Quality;
- Chapter 10: Climate;
- Chapter 11: Noise and Vibration;
- Chapter 12: Landscape and Visual;
- Chapter 13: Cultural Heritage; and,
- Chapter 14: Material Assets – Traffic and Transport.

5.4.2.1 Safety

The Health and Safety Authority ('HAS') views the quarrying industry as a high-risk sector [33]. All safety measures outlined within the Safe Quarry - Guidelines to the Safety, Health and Welfare at Work (Quarry) Regulations 2008, [34] along with the guidelines outlined within the Safe Quarry A Guide for Quarry Workers, 2019 [35] will be followed.

Due to the nature of the Site and the work undertaken, there is a potential for workplace health and safety risks in relation to the extraction of material and the movement of onsite plant machinery. A site-specific health and safety plan will be in place during the Site preparation and the operational lifetime of the Development. Current Site security procedures will be continued to ensure the safety of the public.

The Applicant will also operate a strict health and safety management system for all works carried out for the Development.

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)* 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 Site.

5.4.2.2 Unplanned Events

As with all similar developments, there is some risk that accidents or disasters outside the operator's control could result in a risk to the environment and the local population. Such incidents could theoretically include fire, flood, explosions and oil / fuel spills arising from vehicle accidents.

Relevant potential unplanned events have been covered in the following chapters:

- Chapter 7: Land, Soils and Geology;
- Chapter 8: Water (Hydrogeology & Hydrology);
- Chapter 9: Air Quality; and,
- Chapter 11: Acoustics (Noise & Vibration).

5.5 Do-Nothing' Scenario

A 'Do-Nothing' Scenario would restrict the Application to their existing permission for the active sand and gravel pit, which is currently being processed at a reduced scale compared to historic production levels. Site works will be restricted until the Site, the subject of this application for substitute consent, is brought into compliance and further authorised for prospective development. Aggregates are currently being sourced from extensive onsite stockpiles until substitute consent is brought into compliance and further authorised for prospective development.

A 'Do-Nothing' Scenario would result in a shorter lifespan for the quarry and, subsequently, a shorter employment period for the staff locally.

5.6 Proposed Mitigation Measures and/or Factors

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

- Chapter 3: Description of the Development;
- Chapter 7: Land, Soils and Geology, provides an assessment of 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;
- Chapter 8: Water, provides an assessment of the likely impact of the Development on the receiving hydrology (surface waters) and hydrogeology (groundwater) with measures to avoid any potential contamination of water will be in place;
- Chapter 9: Air Quality, provides an assessment of the potential impacts of the Development on air quality in the vicinity of the Site;
- Chapter 10: Climate Change provides an assessment of the likely effects of the Development on climate change in the context of national greenhouse gas ('GHG') emissions and relevant sectoral targets. This chapter also assesses the potential effects of the Development from climate change;
- Chapter 11: Acoustics (Noise and Vibration), provides a description and assessment of the likely impact of the Development on noise and vibration;
- Chapter 12: Landscape and Visual, prepared by Macro Works and comprises a Landscape and Visual Impact Assessment ('LVIA') to review the existing landscape setting of the Site and to assess the likely potential landscape and visual impacts arising from the Development. It also describes any applicable proposed mitigation

measures to reduce any likely adverse potential visual impacts on the receiving environment; and,

- Chapter 14: Material Assets –Traffic and Transport prepared by Roadplan. The findings of the transport assessment carried out for the Development. The existing transport features and surrounding road network is described, the likely impacts on the road network are assessed and mitigation measures are proposed where required.

5.7 Cumulative and In-combination Effects

In combination with other businesses/enterprises in the area, the Site 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.

The distance between the Site and the neighbouring BD Flood quarry negates the risk of cumulative and in-combination effects on human health arising from the extractive industry – see Chapters 9 (Air Quality) for a cumulative mineral dust risk assessment.

There is one EPA Industrial Emissions ('IE') licenced site within 5km of the Development. The potential for cumulative and in-combination effects between the Development and the IE licenced sites is not likely, primarily due to the distance between the majority of these licensed sites and the Development.

5.8 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 5.4.2 above.

5.9 Indirect Effects

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

The Development will continue to have a neutral-to-slight, positive, long-term effect regarding indirect local and regional employment such as:

- Operational staff;
- Machinery maintenance and facility upkeep; and,
- Health and safety specialists.

5.10 Residual Effects

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

The residual effect will be a positive long-term impact on the local economy and employment as well as the wider economy. The residual effect with regard to human health and safety will be not significant given all of the control measures that will be put in place, the low sensitivity of the local population and the lack of impact on health services.

5.11 Monitoring

Monitoring requirements are discussed within the individual chapters below.

5.12 Reinstatement

Following on from S261 registration, an after-care plan was created for the Site. A further after-care plan has been created for the Substitute Consent area. See section 3.5 above for further details.

5.13 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 of historic operational works of the Site. Where likely significant effects are identified, appropriate remedial measures to reduce / avoid these effects are outlined.

A separate Appropriate Assessment Screening Report ('AA') has been produced, which evaluates the likely significant effects of historic operations on the Natura 2000 sites with potential connectivity to the Site and accompanies this application as a separate document.

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

6.2 Study Assessment and Methodology

6.2.1 Relevant Guidance and Legislation

The following standards and guidance documents were utilised to characterise the historic and current baseline conditions of the Site, the assessment of potential impacts on biodiversity and the appropriate mitigation measures required:

- Chartered Institute of Ecology and Environmental Management ('CIEEM'), Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (2018 and revisions) [36];
- National Roads Authority ('NRA'), 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' [37]
- Guidelines for the Protection of Biodiversity within the Extractive Industry [38]
- Fossitt's 'A Guide to Habitats in Ireland' [39];
- Heritage Council's 'Best Practice Guidance for Habitat Survey & Mapping' [40];
- NRA, 'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes,' [41];
- Scottish Badgers, 'Surveying for Badgers: Good Practice Guidelines,' [42];
- The Mammal Society, 'Surveying Badgers,' [43];
- Bat Conservation Trust ('BCT'), 'Bat Surveys for Professional Ecologists Good Practice Guidelines' [44].
- Construction Industry Research and Information Association ('CIRIA'), C811-Environmental Good Practice on Site (5th edition) [45];
- NRA 'Guidance for the Treatment of Bats Prior to the Construction of National Road Schemes' [46];
- NRA 'Guidance for the Treatment of Badgers Prior to the Construction of National Road Schemes' [47]; and,
- NRA, 'Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads [48].

6.2.2 Desk Study

The desk study focused on identifying European-designated sites within a 15km radius of the Site, nationally designated sites within a 5km radius of the Site and records of legally protected and notable species within 2km of the Site. This included ascertaining when these European Sites were designated.

The area for which biological data was collected was based on an assessment of the ecological zone of influence of the Site (i.e. the area that could be affected by the scheme within which there is the potential for significant ecological effects) (henceforth referred to as the 'Zol').

The following literature sources were consulted in January 2025 as part of the desktop study:

- The National Parks and Wildlife Service ('NPWS') website was consulted with regard to the most up to date detail on conservation objectives of European sites (i.e. Natura 2000 sites) relevant to this assessment [14];
- The Meath County Council ('MCC') Planning Portal to obtain details about existing / proposed developments in the vicinity of the Site [15];
- Meath County Development Plan 2021-2027 [16];
- The National Biodiversity Data Centre ('NBDC') website was consulted on 20th January 2025 with regard to species distributions, [17];
- The EPA Maps website was consulted to obtain details about watercourses in the vicinity of the Site [18]; and,
- BirdWatch Ireland – The Irish Wetland Bird Survey ('I-WeBS') data, which is coordinated by BirdWatch Ireland and under contract to the NPWS, was reviewed with regard to wintering waterbird population within the vicinity of the Site [13].

The Desk study also included a comprehensive examination and comparison of historic aerial imagery as a means of evaluating the expansion of the Site and the habitats that were previously present within the area, using the following sources:

- The Tailte Eireann website was consulted to obtain historical maps of the Site [19].

The information gathered from these resources has been used as baseline data within this report where appropriate. This information has been presented in combination with the field survey results (methodology described below) in Section 6.4.3.

6.2.2.1 I-WeBS Data Request

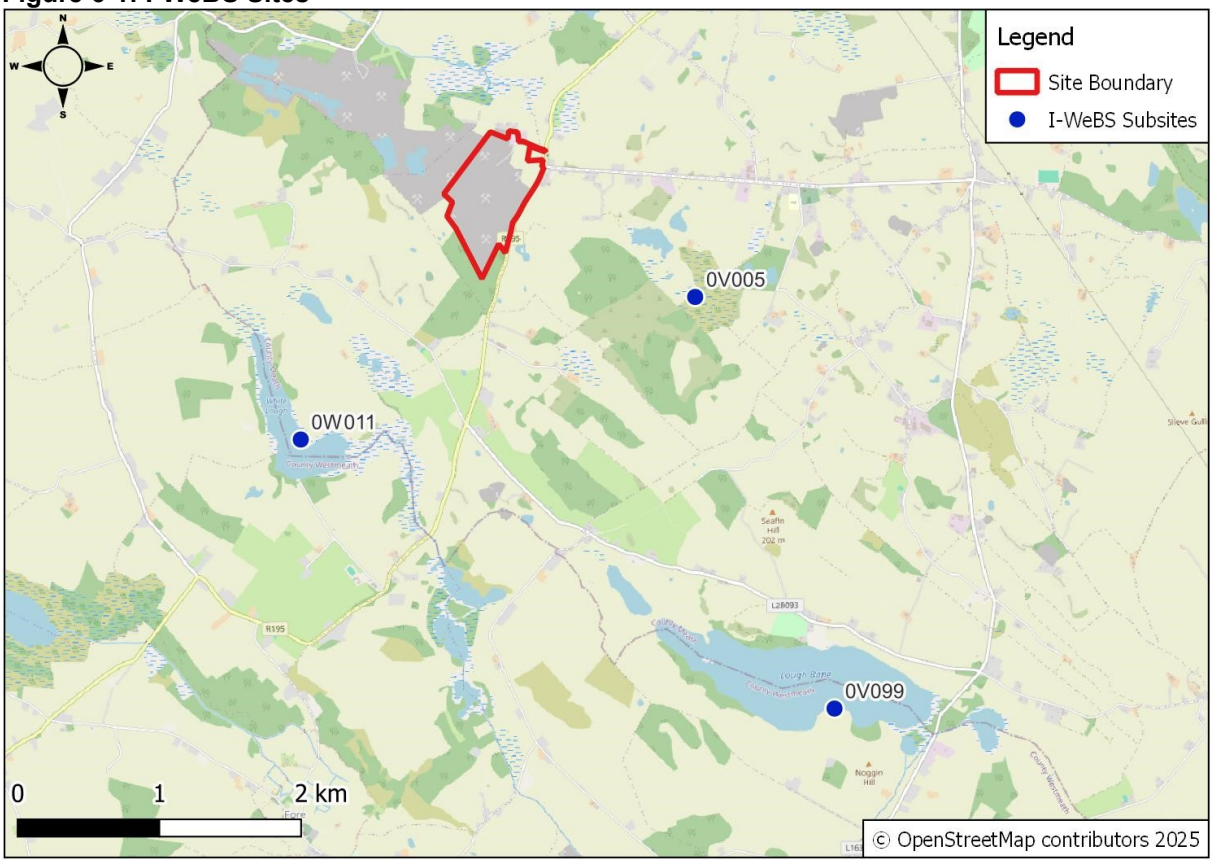
As mentioned above, I-WeBS data was reviewed in order to understand the potential assemblages of wintering bird populations that tend to occur within the vicinity of the Site.

As part of this review, a data request was submitted to the I-WeBS on 22nd January 2025. The data request was made for all available data from the nearest I-WeBS sites in relation to the Site; see Table 6-1 and Figure 6-1 below.

Table 6-1: I-WeBS Sites - Data Request

Site Name	Site Code	Distance to the Site	Direction to the Site
Wetlands at Greenan / Garrynabolile	0V005	ca. 1.3km	E
White / Annagh Lough	0W011	ca. 1.7km	SW
Lough Bane	0V099	ca. 2.1km	SE

Figure 6-1: I-WeBS Sites



6.2.3 Field Survey

6.2.3.1 Habitat Survey

A habitat survey was undertaken on 16th January 2025 by two suitably qualified MOR Environmental Ecologists. These surveys aimed to assess the extent and quality of habitats present on the Site and to identify any potential ecological receptors. All the surveys were undertaken using Fossitt's '*Guide to Habitats in Ireland'* [39] and were conducted in line with the Heritage Council's '*Best Practice Guidance for Habitat Survey & Mapping'* [40].

The assessment was also extended to identify the potential for these habitats to support other features of nature conservation importance, such as species afforded legal protection under either Irish or European legislation.

6.2.3.2 Protected / Notable Species

The methodologies used to establish the presence / potential presence of faunal species are summarised below. These relate to those species / biological taxa that the desk study and identified habits indicated could occur on the Site.

Flora

The Site was assessed for the presence of notable / protected flora species in accordance with the following:

- Flora (Protection) Order 2022 (S.I. No. 235/2022); and,
- Ireland Red List No. 10: Vascular Plants [49].

Amphibians

The initial habitat survey undertaken at the Site the identified the presence of suitable terrestrial habitat and 13 waterbodies on Site that have the potential to support amphibians (See figure 6-2 below). Therefore, targeted amphibian surveys were undertaken at the Site to confirm the presence / absence of amphibians within these water bodies.

Habitat Suitability Index

The amphibian survey was conducted an hour before sunset on 20th March 2025 to allow the calculation of the Habitat Suitability Index (HSI).

The Habitat Suitability Index (HSI) establishes the suitability of a water body to support the great crested newt and was developed [50]. The HSI incorporates ten suitability indices, all of which are factors known to affect this species, such as pond location, size of pond, years when pond dries out, water quality, suitability of terrestrial habitat, connectivity to other ponds and presence of waterfowl and fish. [51]

The great crested newt HSI was used in this report as no equivalent index currently exists for the smooth newt. However, both species have the same habitat requirements.

The HSI is a numerical index, between 0 and 1. Values close to 0 indicate unsuitable habitat and 1 represents optimal habitat. Refer to Table 6-2, Categorisation of HSI Score.

Table 6-2: Categorisation of HSI Score

HSI Score	Pond Suitability
< 0.50	Poor
0.50 - 0.59	Below average
0.60 - 0.69	Average
0.70 - 0.79	Good
> 0.80	Excellent

Presence / Absence Survey

Presence / absence surveys were undertaken at the 13 identified ponds (Pond 9 was inaccessible), which were considered suitable for amphibians following the habitat survey on 16th January 2025.

The following survey methodologies were utilised, and survey visits were undertaken on 20th March 2025

- Refugia Search:

This will take place in daylight. A refugia search is carried out on the terrestrial area near the pond being surveyed. This includes searching amongst old debris, logs, under rocks and through vegetated areas.

- Egg Search:

This is conducted before dusk. Systematic search through submerged vegetation for egg wraps. The inspection takes place in daylight hours. If smooth newt egg wrap is found, the search ends to avoid further disturbance.

- Netting:

This is conducted during daylight. Surveyors, using a long-handled dip net walk the perimeter of the water body (where accessible). If a newt is caught, netting is ceased immediately due to the disruptive nature of netting.

- Torching:

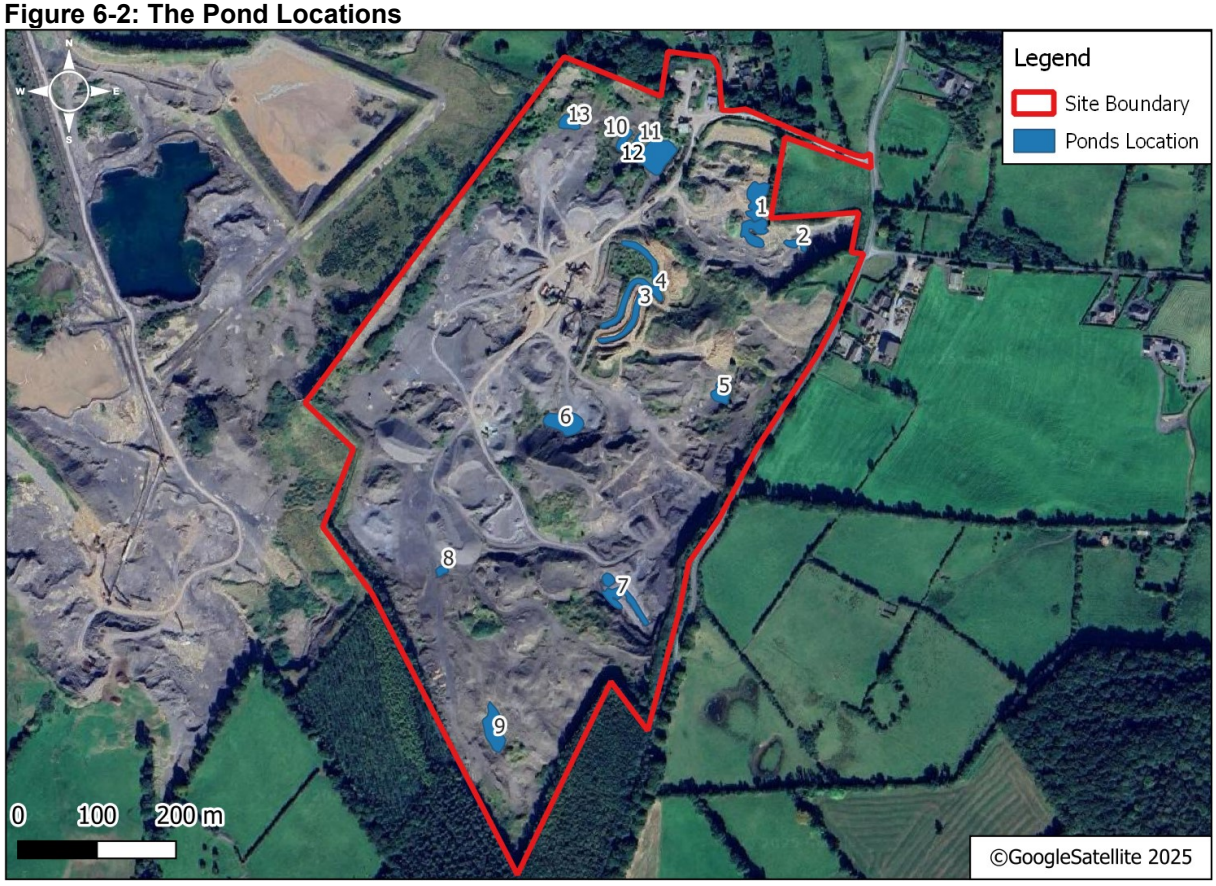
This is conducted after dusk as newts are most active. Torching is used to determine presence or absence of newts and an estimate the population. A high-powered torch (1 million candle power) is used around the margins of the waterbody to detect newt activity.

These methodologies are in line with the following guidance:

- NRA, now TII, '*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*,' [41];
- Joint Nature Conservation Committee ('JNCC'), '*Common Standards Monitoring Guidance*,' [52];
- JNCC '*Herpetofauna Worker's Manual*' [53]; and,
- Froglife, '*Surveying for Amphibians*' [54].

The location of the surveyed ponds is shown in Figure 6-2.

Figure 6-2: The Pond Locations



Badger

The survey aimed to identify and examine areas where badgers (Meles meles) might occur by noting any evidence of badger activity. This included:

- Mammal paths;

- Badger hairs caught in sett entrances / fences / vegetation;
- Paw prints;
- Evidence of foraging (usually in the form of 'snuffle holes');
- Badger Scat (isolated badger droppings);
- Latrines (shallow pits/holes occurring together comprised of exposed badger droppings); and,
- Badger setts.

A mammal path was assumed to be used by badgers if the character of the path (in terms of size) was appropriate and / or if any other signs were in close vicinity (e.g., a badger sett).

The field survey of the Site was conducted in line with the following relevant guidance for badger:

- Scottish Badgers, '*Surveying for Badgers: Good Practice Guidelines,*' [42];
- The Mammal Society, 'Surveying Badgers,' [43]; and,
- NRA, now TII, '*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*,' [41].

Bats

An initial assessment was carried out during the habitat survey for the suitability of the habitats within the Site to provide bat roosting, foraging and flight path habitats. Bat habitats and commuting routes identified were considered in relation to the wider landscape to determine connectivity for local bat populations, and through the examination of aerial mapping.

The following criteria were used to assess the mature trees onsite:

- Presence of natural cavities, splits, cracks, loose bark and rot holes in the trunk or boughs of the tree;
- Presence of dense and woody ivy (Hedera helix) growth that could be used by bats for roosting;
- Evidence of bat droppings, which may also be seen as a black streak beneath holes, cracks, branches, etc;
- Presence of smooth edges with dark marks and urine stains at potential entrances to roosts;
- Adjoining habitat which are likely to be important to bats, including the river corridor and hedge / treelines within the survey area that offer a variety of potential foraging, roosting and commuting opportunities for bats; and,
- Adjoining potential roosts / known roosts identified. This raises the likelihood of a tree being of benefit as bats may move roosts if the roost becomes too hot or cold during roosting, and a nearby alternative roost is highly desirable.

Assessment criteria were used for evaluating the potential suitability of the Site for bats in line with '*Bat Surveys for Professional Ecologists: Good Practice Guidelines'* [44].

Table 6-3: Guidelines for assessing the potential suitability of development sites for bats, based on the presence of habitat features within the landscape, to be applied using professional judgement [44]

Potential Suitability	Description of Roosting habitats in structures	Description of Potential flight paths and foraging habitats
None	No habitat features on site likely to be used by any roosting bats at any time of the year (i.e. a complete absence of crevice / suitable shelter at all ground/underground levels).	No habitat features on site likely to be used by any commuting or forging bats at any time of the year (i.e. no habitats that provide continuous lines of shade / protection for flight-lines or generate / shelter insect populations available to foraging bats).
Negligible[4]	No obvious habitat features on site likely to be used by roosting bats; however, a small element of uncertainty remains as bats can use small and apparently unsuitable features on occasion.	No obvious habitat features on site likely to be used as flight paths or by foraging bats; however, a small element of uncertainty remains in order to account for non-standard bat behaviour.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically at any time of the year. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[5] 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 and not a classic cool/stable hibernation site, but could be used by individual site, but could be used by individual hibernating bats[6]).	Habitat that could be used by small numbers of bats as flight paths such as a gappy hedgerow or unvegetated stream, but isolated, i.e., not very well connected to the surrounding landscape by another habitat. 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 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, such as maternity and hibernation – the categorisation described in this table is made irrespective of species conservation status, which is established after presence is confirmed).	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by bats for flight-paths such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.
High	A structure 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,	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.

[4] Negligible is defined as 'so small or unimportant as to be not worth considering, insignificant'. This category may be used where there are places that a bat could roost or forage (due to one attribute) but it is unlikely that they actually would (due to another attribute).

[5] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

[6] Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten *et al.,* 2016 and Jansen *et al.,* 2022). Common pipistrelle swarming has been observed in the UK (Bell, 2022 and Tomlinson, 2020) and winter hibernation of numbers of this species has been detected at Seaton Delaval Hall in Northumberland (National Trust, 2018). This phenomenon requires some research in the UK, but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in prominent buildings in the landscape, urban or otherwise.

Potential Suitability	Description of Roosting habitats in structures	Description of Potential flight paths and foraging habitats
	conditions and surrounding habitat. These structures have the potential to support high conservation status roost, e.g. maternity or classic cool/stable hibernation site.	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. Site is close to and connected to known roosts.

Birds

The Site was assessed for its potential to support important assemblages of birds of rare or notable species, as well as designated bird species. The survey aimed to identify and examine the suitability of the Site for potential wintering and breeding birds. Any bird activity onsite and potential nesting habitats were noted.

Peregrine Falcon

Combined peregrine falcon *(Falco peregrinus)* and sand martin *(Riparia riparia)* surveys were conducted by a suitable, qualified, and experienced MOR Environmental Ecologist on the 19th March 2025.

Given the court-regulated submission deadline, it should be noted that only a single sand martin and peregrine falcon survey could be completed for the Site.

These surveys aimed to establish whether any nest sites are located within close proximity to the Site, determine whether the Development had any potential impacts on these species, and ensure appropriate remedial mitigation is included as required.

The peregrine falcon survey was conducted over a three-hour period and utilised a designated Vantage Point ('VP'), which provided appropriate views of the quarry wall that was noted as having a potential nesting habitat for the peregrine falcon (see Figure 6-2). The VP was selected to ensure that no potential disturbance to these species, should they be present, occurred during the survey works. After the vantage point survey, a walkover of the Site was undertaken to confirm the presence or absence of sand martin nest holes.

The peregrine falcon was conducted in line with the guidelines described in *Raptors: A Field Guide for Surveys and Monitoring* [55]. Survey dates, times and weather conditions are described in Table 6-4.

The breeding status of peregrine falcon was characterised using the following criteria:

- Non-breeding – peregrine that were foraging, flying over the survey area or loafing;
- Possible breeding – peregrine falcon that were observed in suitable nesting habitats and displaying either territorial and / or courtship behaviours, nest building behaviours or observed visiting a possible nest; and,
- Confirmed breeding – peregrine observed either on / in a nest, carrying a faecal sac / food and/or sighting of a nest with eggs / chicks, used nests, eggshells or recently fledged young.

Table 6-4 describes survey dates, times, and weather conditions.

Table 6-4: Peregrine Falcon and Sand Martin Survey Metadata

Date	Survey Times (Start – End)	Temperature (°C) (Start – End)	Wind (Beaufort Wind Scale)	Rain	Cloud Cover
19/03/2025	10:00-13:00	8-11°C	3	None	Clear

Figure 6-3: Vantage Point used for the Peregrine Falcon Survey and Sand Martin Nest Holes locations

Sand Martin

As part of the peregrine falcon survey conducted onsite, sand martin activity within the Development was also recorded. The survey aimed to determine whether sand martins use the site for breeding and to assess any potential impacts from onsite activities. A walkover of the Site was conducted to confirm the presence or absence of sand martin nest holes.

Invasive Species

The Site was visually assessed for the presence of any noxious / invasive species that are regulated under the European Union (Invasive Alien Species) Regulations 2024 (S.I. No. 374/2024) [56] such as Japanese knotweed (*Reynoutria japonica*) and Himalayan balsam (*Impatiens glandulifera*).

The Site was also assessed for the presence of non-regulated invasive species that have the potential to impact local biodiversity.

Other Species

In addition, an assessment was carried out of the potential for the Site to support any other species considered to be of value for biodiversity, including those that were identified as occurring locally based on the findings of the desktop study and professional judgment.

6.2.3.3 Survey Limitations

As with all 'rEIAR's, the key limitation of these assessments is that they are based on the availability, completeness, and accessibility of publicly available data from the period applicable to the Development subject to the substitute consent. This application seeks to assess the works onsite from 1990 to the present day. However, OSI aerial imagery is only available from 1995 onwards. Therefore, there is an information gap from 1990-1995.

It should also be noted that the retrospective identification of certain ecological impacts is not possible based on historical mapping information alone. Therefore, there is a reliance on professional judgment required.

The field survey was undertaken on the 16th of January 2025, which is outside of the optimal season for botanical surveys. It should be noted that a Survey within the optimum survey season is not possible for this application, given the court-regulated submission deadline.

The standard methodology for amphibians surveys would include 4 survey to confirm presence / absence. However, given the court-regulated submission deadline, it should be noted that only a single amphibians survey could be completed for the Site.

As noted above, given the court-regulated submission deadline, only a single sand martin and peregrine falcon survey could be completed for the Site.

6.2.4 Assessment Methodology

The starting point for the assessment was to undertake a scoping exercise for those ecological receptors that would require further consideration as part of the assessment. This involved differentiating the biodiversity receptors (i.e., designated sites, habitats, and species populations) that could be significantly affected by the Development.

The approach that was used for determining which receptors could or have the potential to have been or could be significantly affected by the Development involved using baseline data collected through the desk study and field surveys for the Site. Based on professional judgement data from the following radii was collected: 2km away for protected species, 15km for European Designated sites and 5km away from Natural Heritage Areas ('NHAs'). The desk and field-based data was used to determine:

- Which, if any, of the species or habitat that have been recorded are legally protected or controlled (see Box 1); and,
- Which, if any, sites, areas of habitat and species that have been recorded are of importance for biodiversity conservation.

The next stage of the assessment was to determine whether the identified receptors are of sufficient biodiversity value that an impact upon them would be of potential significance in terms of this 'rEIAR'. In this regard:

- Biodiversity conservation value relates to the quality and / or size of sites or habitats, or the size of species' populations; and,
- Potential significance means that the effect could be of sufficient concern or, for positive effects, of such substantial benefit that it could be material to influencing the decision on planning.

Receptors that have been identified as having sufficient value and that an impact upon them could be of potential significance have been taken forward for further consideration. Legally protected species were also considered further (refer to Box 1 below). This involved:

- Identifying, for each receptor, any significant impact that is likely to be caused by the Development, which has the potential to lead to a significant effect and / or to contravene relevant legislation;
- Determining the area within which the likely impacts would cause a potentially significant impact on the identified receptor and / or could contravene relevant legislation. Henceforth referred to as the ZoI; and,
- If the receptor occurs or is likely to occur within the ZoI and concluding that the receptor could be significantly affected and / or the relevant legislation contravened, the receptor would be subject to further assessment.

6.2.5 Evaluation of the Conservation Importance of the Site

In terms of biodiversity conservation value, The Site was evaluated using the ecological evaluation guidance in the TII, formerly known as NRA, guidance on the assessment of ecological impacts of National Road Schemes [37], using the following scale:

- International importance;
- National importance;
- County importance (or vice-county in the case of plant or insect species);
- Local importance (higher value); and,
- Local importance (lower value).

6.3 Planning Context

6.3.1 Legislation / Policy Context

Within Ireland, a number of sites of international or national importance to nature conservation, as well as many species of animal and plants are afforded some degree of legal protection, for details see Box 1 below.

Box 1 Designated Wildlife Sites and Protected and Otherwise Notable Habitats and Species

The National Park and Wildlife Service ('NPWS') notifies sites in Ireland that are of international or national importance for nature conservation (although some sites that are of national importance for certain species have not been so designated).

Internationally important sites may also be designated as:

- Special Areas of Conservation ('SACs') and Candidate Special Area of Conservation ('cSACs'): the legal requirements relating to the designation and management of SACs in Ireland are set out in the European Communities (Birds and Natural Habitats) Regulations 2011-2021 (S.I. No. 477/2011);
- Special Protection Areas ('SPAs') and candidate Special Protected Areas ('cSPAs'): strictly protected sites classified in accordance with Article 4 of the EC Directive on the Conservation of Wild Birds (2009/147/EC), also known as the Birds Directive; and,
- Ramsar sites: wetlands of international importance designated under the Ramsar Convention, to which Ireland is a signatory.

Other statutory site designations relating to nature conservation are:

- National Heritage Areas ('NHA'): these represent examples of some of the most important natural and semi-natural terrestrial and coastal habitats in the country and are afforded protection under the Wildlife (Amendment) Act 2000. NHAs are legally protected from damage and receive protection from the date they are formally proposed for designation; and,
- Proposed Natural Heritage Areas ('pNHAs'): these sites are not afforded the same protection as NHAs. These sites are proposed by the NPWS but are not statutorily proposed or designated. Prior to statutory designation these are subject to a very limited legal protection. They are, however, sites of significance for wildlife and habitats and are important for the purposes of this Biodiversity Chapter.

Legally protected species

Many species of animal and plant receive some degree of legal protection. For the purposes of this study, legal protection refers to:

- Species included in the Wildlife (Amendment) Act 2000, excluding species that are only protected in relation to their sale, reflecting the fact that the site disposal will not include any proposals relating to the sale of species; and,
- Species afforded protection under the Flora (Protection) Order 2022 (S.I.No.235/2022).

Other notable habitat/species categories

- Biodiversity Action Plan ('BAP') species: those targeted in local or national BAPs as being of particular conservation concern (priority species).
- Red and Amber List birds: those listed as being of high or medium conservation concern as listed by Birdwatch Ireland on the Birds of Conservation Concern in Ireland ('BoCCI') 2020-2026 [57].
- Other Irish Red Data Book species [58] and Nationally / Regionally / Locally Notable species where appropriate.

6.3.2 National Planning Context

A study of biodiversity-related planning policy at the national and local level has been undertaken for the Site and locality to highlight any potential conflicts with the relevant legislation and guidance documents as outlined in Box 1.

6.3.2.1 Project Ireland 2040 National Planning Framework

Project Ireland 2040 was launched by the Government in February 2018 [15] and incorporates two policy documents - the National Planning Framework ('NPF') and the National Development Plan ('NDP').

National Planning Framework

Under the biodiversity section in the NPF, National Policy Objective 59 aims to:

> *'Enhance the conservation status and improve the management of protected areas and protected species by:*
>
> *a) Implementing relevant EU Directives to protect Ireland's environment and wildlife;*
>
> *b) Integrating policies and objectives for the protection and restoration of biodiversity in statutory development plans;*
>
> *c) Developing and utilising licensing and consent systems to facilitate sustainable activities within Natura 2000 sites; and,*
>
> *d) Continued research, survey programmes and monitoring of habitats and species.'*

National Policy Objective 60 in the NPF aims to:

> *'Conserve and enhance the rich qualities of natural and cultural heritage of Ireland in a manner appropriate to their significance.'*

Updated Draft Revised National Planning Framework (November 2024)

Following a decision of the Government in June 2023, the preparation of a revised NPF [35] commenced to take account of changes that have occurred since it was published (in 2018) and to build on the existing framework. Public consultation took place from 10th July 2024 to 12th September 2024, following which the Government agreed to progress and publish a draft schedule of amendments to the First Revision to the NPF, in November 2024. Finalisation will be subject to environmental assessments.

Objectives under the 'Strategic Planning for Biodiversity' section of this draft framework, include the following relevant national policy objectives:

National Policy Objective 84:

> *'In line with the National Biodiversity Action Plan and European Union Nature Restoration Law, and best available scientific information, regional and local planning authorities shall support the preparation and implementation of the National Restoration Plan.'*

National Policy Objective 85:

> *'In line with the National Biodiversity Action Plan; the conservation, enhancement, mitigation and restoration of biodiversity is to be supported by:*
>
> - *Integrating policies and objectives for the protection and restoration of biodiversity, including the principles of the mitigation hierarchy of - avoid, minimise, restore and offset - of potential biodiversity impacts, in statutory land-use plan.*

- *Retention of existing habitats which are currently important for maintaining biodiversity (at local/regional/national/international levels), in the first instance, is preferable to replacement/restoration of habitats, in the interests of ensuring continuity of habitat provision and reduction of associated risks and costs.'*

National Policy Objective 86:

'In line with the objectives of the National Biodiversity Action Plan, planning authorities should seek to address no net loss of biodiversity within their plan making functions.'

National Policy Objective 87:

'Enhance the conservation status and improve the management of protected areas and protected species by:

- *Implementing relevant EU Directives to protect Ireland's environment and wildlife and support the objectives of the National Biodiversity Action Plan;*
- *Developing and utilising licensing and consent systems to facilitate sustainable activities within Natura 2000 sites;*
- *Continued research, survey programmes and monitoring of habitats and species.'*

The National Development Plan

The 'NPF' and the 'NDP' will continue to align and form a single vision for Ireland under Project Ireland 2040.

The 'NDP' also lists the following items as strategic investment priorities in relation to National Heritage and biodiversity:

- *'Implementation of the current and future National Biodiversity Action Plan, delivery of National Parks and Wildlife Service Farm Plans and LIFE projects, enhanced wildlife crime investigation capacity and identification and delivery conservation measures at designated sites as identified in the Prioritised Action Framework for Ireland (2021-2027).'*
- *'Investment in nature and biodiversity, to improve the quality of natural habitats and support native plants and animals, including those under threat, and to bolster broader societal wellness and sustainability goals.'*
- *'Future-proofing obligations under the Biodiversity Strategy 2030, including potential national designations and the preparation and delivery of a National Restoration Plan.'*

6.3.2.2 Ireland's 4th National Biodiversity Action Plan 2023-2030

The 4th National Biodiversity Action Plan ('NBAP') 2023-2030 sets out a number of strategic objectives that lay out a clear framework for Irelands approach to biodiversity and demonstrates Ireland's commitment to protect our biodiversity and also halt decline [35].

'This National Biodiversity Action Plan 2023-2030 builds upon the achievements of the previous Plan. It will continue to implement actions within the framework of five strategic objectives, while addressing new and emerging issues.' The five objectives are as follows:

- **Objective 1**: Adopt a Whole of Government, Whole of Society Approach to Biodiversity;
- **Objective 2**: Meet Urgent Conservation and Restoration Needs;
- **Objective 3**: Secure Nature's Contribution to People;
- **Objective 4**: Enhance the Evidence Base for Action on Biodiversity; and,

- **Objective 5**: Strengthen Ireland's Contribution to International Biodiversity Initiatives.

The following Objective Outcomes were considered relevant to the Development and this report:

Outcome 2A:

> *'The protection of existing designated areas and protected species is strengthened and conservation and restoration within the existing protected area network are enhanced.'*

Outcome 2D:

> *'Biodiversity and ecosystem services in the marine and freshwater environment are conserved and restored.'*

Outcome 2H:

> *'Invasive alien species ('IAS') are controlled and managed on an all-island basis to reduce the harmful impact they have on biodiversity and measures are undertaken to tackle the introduction and spread of new IAS to the environment.'*

Outcome 3B:

> *'The role of biodiversity in supporting wellbeing, livelihoods, enterprise and employment is recognised and enhanced.'*

Outcome 3C:

> *'Planning and development will facilitate and secure biodiversity's contributions to people.'*

6.3.3 Regional Planning Context

6.3.3.1 Eastern and Midland Regional Spatial and Economic Strategy 2019-2031

The Eastern & Midland Regional Spatial and Economic Strategy 2019-2031 ('RSES') [59] recognises the need to conserve and enhance biodiversity through coordinated spatial planning in the eastern and midland region.

Under the biodiversity section, the following regional policy objectives relative to the Development are listed:

Regional Policy Objective 7.16:

> 'Support the implementation of the Habitats Directives in achieving an improvement in the conservation status of protected species and habitats in the Region and to ensure alignment between the core objectives of the EU Birds and Habitats Directives and local authority development plans.'

Regional Policy Objective 7.17:

> 'Facilitate cross boundary co-ordination between local authorities and the relevant agencies in the Region to provide clear governance arrangements and *coordination mechanisms to support the development of ecological networks and enhanced connectivity between protected sites whilst also addressing the need* for management of alien invasive species and the conservation of native species.'

Regional Policy Objective 10.6:

> 'Delivery and phasing of services shall be subject to the required appraisal, planning and environmental assessment processes and shall avoid adverse impacts on the integrity of the Natura 2000 network.'

6.3.4 Local Planning Context

6.3.4.1 Meath County Development Plan (as varied) 2021-2027)

The Meath County Development ('CDP') 2021-2027 [60] contains a number of policies and objectives that relate directly to the protection of biodiversity and natural heritage in the context of the Development At the core of these policies and objectives is the belief that:

> *'Protecting and enhancing our biodiversity and landscapes is vital to the health, well-being and quality of life of our communities and assists societal adaption to the challenges of climate change'*

The policies and objectives of the CDP regarding the natural environment that are relevant to the Development are as follows:

HER POL 27

> *'To protect, conserve and enhance the County's biodiversity where appropriate.'*

HER POL 28

> *'To integrate in the development management, process the protection and enhancement of biodiversity and landscape features wherever possible, by minimising adverse impacts on existing habitats (whether designated or not) and by including mitigation and/or compensation measures, as appropriate.'*

HER POL 31

> *'To ensure that the ecological impact of all development proposals on habitats and species are appropriately assessed by suitably qualified professional(s) in accordance with best practice guidelines – e.g. the preparation of an Ecological Impact Assessment (EcIA), Screening Statement for Appropriate Assessment, Environmental Impact Assessment, Natura Impact Statement (NIS), species surveys etc. (as appropriate).*'

HER POL 32

> *'To permit development on or adjacent to designated Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas, Statutory Nature Reserves or those proposed to be designated over the period of the Plan, only where the development has been subject to the outcome of the Appropriate Assessment process and has been carried out to the satisfaction of the Planning Authority, in consultation with National Parks and Wildlife.'*

HER POL 33

> *'To have regard to the views and guidance of the National Parks and Wildlife Service in respect of proposed development where there is a possibility that such development may have an impact on a designated European or National site or a site proposed for such designation.'*

HER POL 34

> *'To undertake appropriate surveys and collect data to provide an evidence-base to assist the Council in meeting its obligations under Article 6 of the Habitats Directives (92/43/EEC) as transposed into Irish Law, subject to available resources.'*

HER OBJ 33:

> *'To ensure an Appropriate Assessment in accordance with Article 6(3) and Article 6(4) of the Habitats Directives (92/43/EEC) and in accordance with the Department of Environment, Heritage and Local Government Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 2009 and relevant EPA and*

European Commission guidance documents, is carried out in respect of any plan or project not directly connected with or necessary for the management of the site but likely to have a significant effect on a Natura 2000 site(s), either individually or in-combination with other plans or projects, in view of the site's conservation objectives.'

HER OBJ 34

'To protect and conserve the conservation value of candidate Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas and proposed Natural Heritage Areas as identified by the Minister for the Department of Culture, Heritage and the Gaeltacht and any other sites that may be proposed for designation during the lifetime of this Plan in accordance with the provisions of the Habitats and Birds Directives and to permit development in or affecting same only in accordance with the provisions of those Directives as transposed into Irish Law.'

HER POL 35

'To ensure, where appropriate, the protection and conservation of areas, sites, species and ecological/networks of biodiversity value outside designated sites and to require an appropriate level of ecological assessment by suitably qualified professional(s) to accompany development proposals likely to impact on such areas or species.'

HER POL 36

'To consult with the National Parks and Wildlife Service and take account of their views and any licensing requirements, when undertaking, approving or authorising development which is likely to affect plant, animal or bird species protected by law.'

HER OBJ 35

'To ensure that development does not have a significant adverse impact, incapable of satisfactory avoidance or mitigation, on plant, animal or bird species protected by law.'

6.4 Receiving Environment

6.4.1 Desk Study Results

6.4.2 European Designated Sites

In accordance with the European Commission Methodological Guidance [61] and policies HER POL 31, 32 and 33 of the CDP [60], a list of European sites that could have been or can be potentially affected by the Development has been compiled. Guidance for Planning Authorities prepared by the Department of Environment Heritage and Local Government ('DeEHLG') [62] states that defining the likely ZoI for the screening and the approach used will depend on the nature, size, location, and the likely effects of a project. The key variables determining whether or not a particular European site is likely to be negatively affected by a project are:

- The physical distance from the Development to the European sites;
- The presence of impact pathways;
- The sensitivities of the ecological receptors; and,
- The potential for in-combination effects.

All SPAs and SACs within 15km have been considered to assess their ecological pathways and functional links. As acknowledged in the Office of Public Relations ('OPR') guidelines [63], few projects have a ZoI this large, however the identification of European sites within 15km has become widely accepted as the starting point for the screening process. For this reason, all SPAs and SACs within 15km have been identified for consideration as part of the screening.

There are 11 European sites located within 15km of the Site - these are identified in Figure 6-4 and Table 6-5.

Figure 6-4: European Designated Sites within 15km

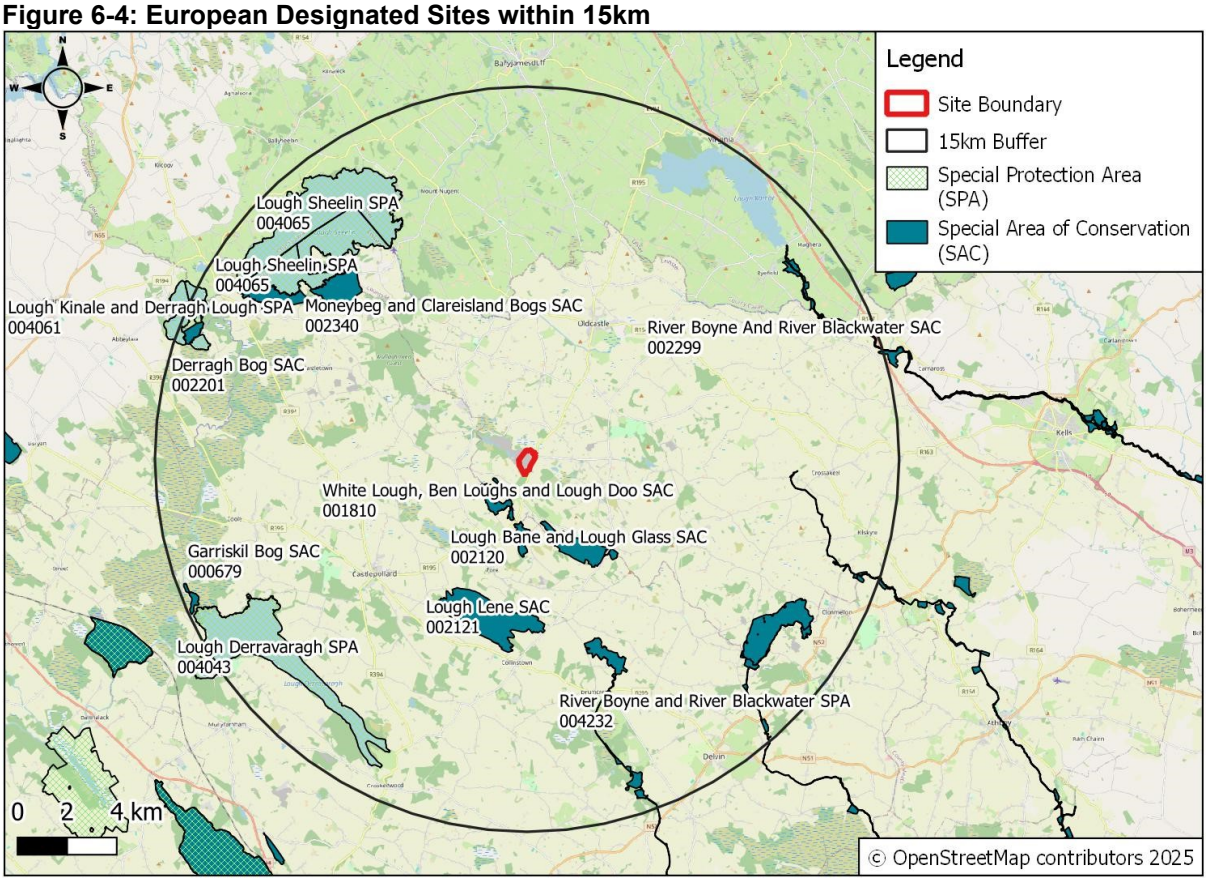


Table 6-5: European Sites within 15km of the Site

Site Name	Code	Distance (km)	Direction from the Site
Special Areas of Conservation ('SAC')			
White Lough, Ben Loughs and Lough Doo SAC	001810	Ca. 0.8km	SW
Lough Bane and Lough Glass SAC	002120	Ca. 2.0km	SE
Lough Lene SAC	002121	Ca. 5.1km	SW
River Boyne and River Blackwater SAC	002299	Ca 7.2km	SE
Moneybeg and Clareisland Bogs SAC	002340	Ca. 9.2km	NW
Derragh Bog SAC	002201	Ca. 13.9km	NW
Garriskil Bog SAC	000679	Ca. 14.0km	SW
Special Protection Areas ('SPA')			
Lough Sheelin SPA	004065	Ca. 9.9km	NW
Lough Derravaragh SPA	004043	Ca. 11.2km	SW

Site Name	Code	Distance (km)	Direction from the Site
River Boyne and River Blackwater SPA	004232	Ca. 12.7km	NE
Lough Kinale and Derragh Lough SPA	004061	Ca. 13.3km	NW

White Lough, Ben Loughs and Lough Doo SAC was designated as a European site in 1998. However, some of these European sites were designated much later such as Garriskil Bog SSAC and Derragh Bog SAC in 2020 and River Boyne and River Blackwater in 2014.

Further consideration of these European sites is provided in the Stage 1: Appropriate Assessment Screening Report ('AA') that has been submitted as part of the overall planning application.

6.4.2.1 Nationally Designated Sites

There are no NHAs located within 5km of the Site. However, there are four proposed Natural Heritage Areas ('pNHAs') identified within 5km of the Site (refer to Figure 6-5 and Table 6-6).

Figure 6-5: Proposed Natural Heritage Areas within 5km of the Site

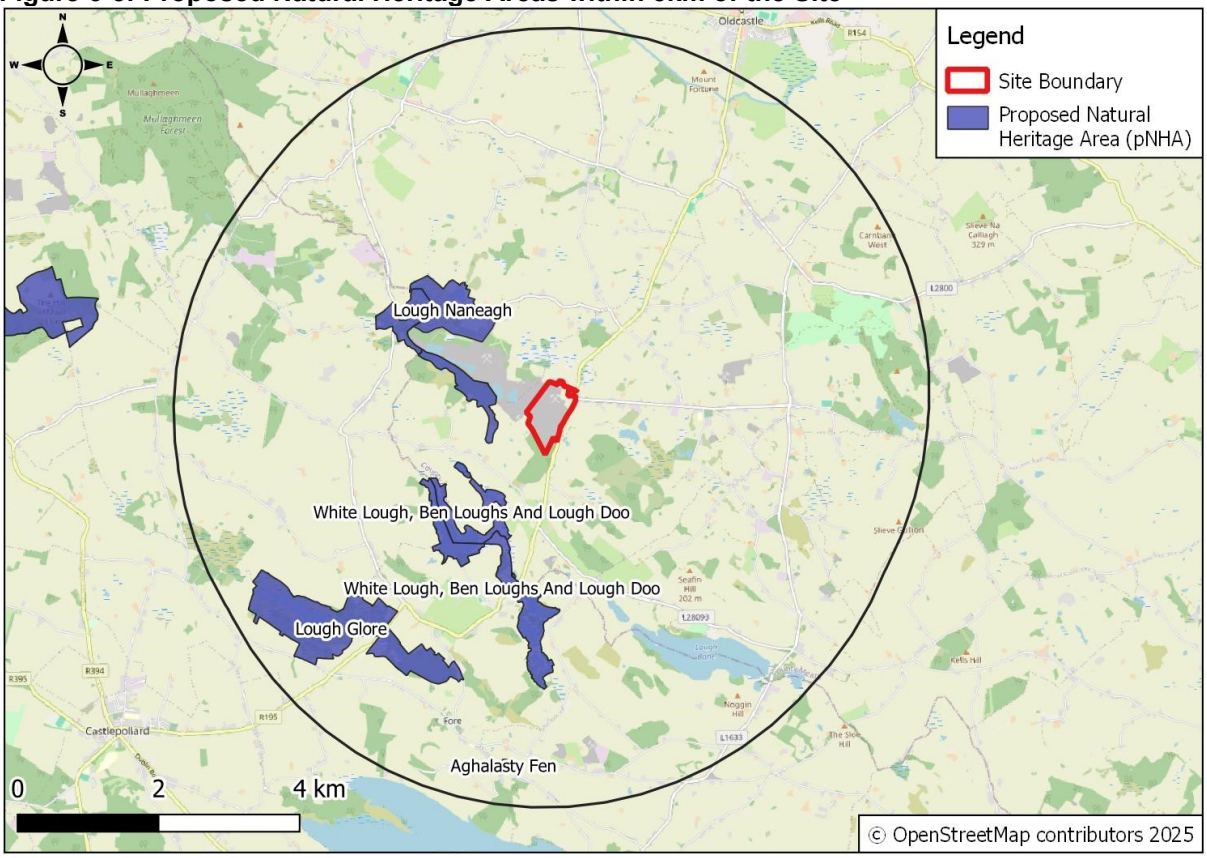


Table 6-6: Proposed National Heritage Areas within 5km of the Site

Site Name	Code	Distance (km) & Direction	Qualifying Interest
Proposed National Heritage Areas (pNHA)			
Lough Naneagh pNHA	001814	Ca. 0.43km	Lough Naneagh pNHA comprises a complex of small lakes and wetland areas in an undulating landscape characteristic of glaciation. This pNHA is located ca.10km northeast of Castlepollard and

Site Name	Code	Distance (km) & Direction	Qualifying Interest
			spans the county border between Meath and Westmeath. This pNHA was classified as a locally important site by An Foras Forbartha in 1972 and has been recommended as a pNHA due to the presence of lake habitats and transitional fen. Typical fen vegetation is found alongside bog plants such as heather (*Calluna vulgaris*) and sphagnum moss (*S. capillifolium*) in drier areas within this pNHA. Species-rich grasslands and woodland areas are also present within this pNHA on drumlins and hummocks, increasing the species-diversity within this site.
White Lough, Ben Loughs and Lough Doo pNHA	001810	Ca. 0.82km	There is no site synopsis available for this pNHA from the NPWS.
Lough Glore pNHA	000686	Ca. 3.0km	Lough Glore pNHA is a lake ca.3km northeast of Castlepollard, Co. Westmeath. This pNHA is considered to be a very productive midland limestone lake known for fishing and bird shooting. Lough Glore supports both aquatic vegetation, marginal vegetation and subsequently, a vast array of insect life. This pNHA also supports a variety of bird species including pochard, great-crested grebe, grebe, tufted duck, ringed plover, grey heron, coot, water rail and teal within the lake and snipe, lapwing, curlew, reed bunting and kestrel in the surrounding wetlands. This pNHA is also of conservation importance as it is a known site for otter, a designated species under Annex II of the EU Habitats Directive.
Aghalasty Fen pNHA	000672	Ca. 4.4km	This pNHA is situated in Co. Westmeath. Aghlasty fen is remarkably intact and notable due to its usual fen system which comprises a mat of vegetation floating above a flooded bog. This pNHA is characterised by a transitional plant community which contains plants associated with both fen and bog habitats. Of these species, two unusual bryophytes, *Sphagnum capillaceum* and *Acrocladium stramineum*, are supported.

6.4.3 Habitats

6.4.3.1 Historic Habitats

Aerial imagery from 1995, 2000, 2005, 2014, and 2022 provides evidence of changes within the Site. Through a desktop study of these images, the baseline habitats considered likely to be present during each year were identified and analysed. This desktop study identified a reduction of vegetated areas and a replacement with quarry infrastructure, exposed rock, and stockpiles, see below.

Historic Habitat - 1995

The earliest available aerial imagery for the Site dates back to 1995. The habitats identified within the Site from this image included active quarries and mines, hedgerows and treelines,

improved agricultural grassland, and other artificial lakes and ponds. Refer to Figure 6-6 for context.

Active Quarry and Mines (ED4)

The assessment of historical aerial imagery from 1995 indicates that this habitat dominated the central portion of the Site. A review of the aerial imagery indicates that this habitat covered an area of ca. 8ha in 1995.

Based on the available information and an assessment of similar habitats within the surrounding area, it is considered that this habitat would have been of low ecological value.

Buildings and Artificial Surfaces (BL1)

The assessment of historical aerial imagery from 1995 indicates that three buildings / structures were present within the northern portion of the Site.

Improved Agriculture Grassland (GA1)

The assessment of historical aerial imagery from 1995 indicated that the onsite quarry was predominantly surrounded by improved agricultural grassland. A review of the aerial imagery indicates that this habitat covered ca. 30ha of the Site in 1995. This habitat was divided into smaller fields by hedgerows / treelines as described below.

Based on the available information and an assessment of similar habitats within the surrounding area, it is considered likely that this habitat was utilised for grazing livestock and would have been of low local ecological value.

Hedgerows and Treelines (WL1/WL2)

The assessment of historical aerial imagery from 1995 indicated that hedgerow / treelines were present throughout the Site. Hedgerow / treelines formed the principal field boundaries within the improved agricultural grassland described above and were present around the perimeter of the Site. It is estimated that ca. 4km of hedgerow / treelines were present within and along the boundary of the Site in 1995, refer to Figure 6-6 below for context.

Based on the available information and an assessment of similar habitats within the surrounding area, it is considered that this habitat would have been of high local ecological value for local species.

Mixed Broadleaved Woodland (WD1)

According to the 1995 aerial image, a potential area of mixed broadleaved woodland was present in the northern section of the Site, adjacent to the active quarry. A review of the aerial imagery indicates that this habitat covered ca. 0.08ha within the Site in 1995.

Based on the available information and an assessment of similar habitats within the surrounding area, it is considered that this habitat would have been of high local ecological value for biodiversity.

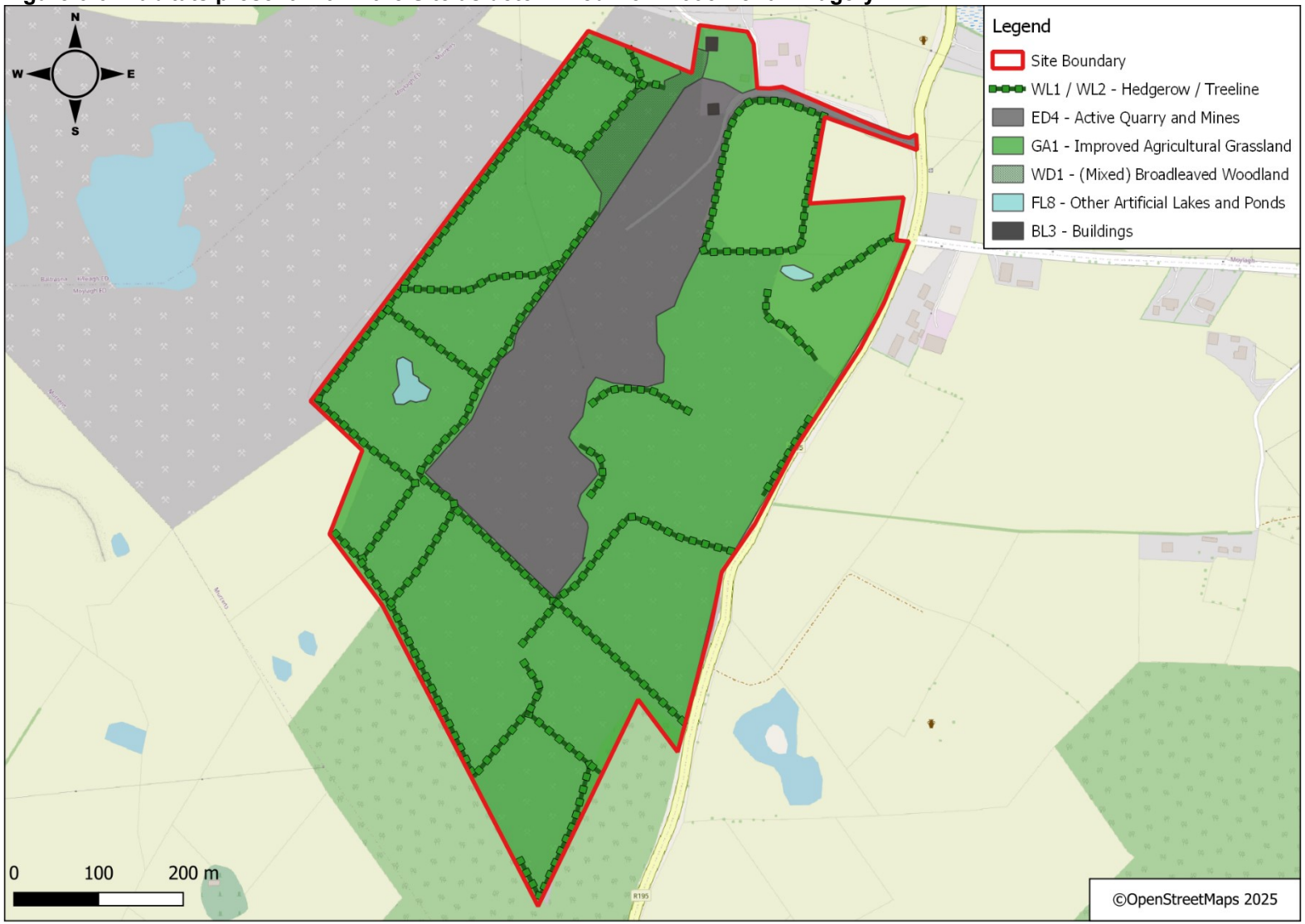
Other Artificial lakes and Ponds (FL8)

According to the 1995 aerial image, there were two potential ponds located within the Site. These ponds were located within the improved agricultural grassland onsite, refer to Figure 6-6 below for context:

- One pond was located ca. 50m west of the quarry and covered an area of ca. 970m2; and,
- The other pond was located ca. 120m east of the quarry and covered an area of ca. 340m2.

Based on the available information and an assessment of similar habitats within the surrounding area, it is considered that these two ponds, would have been of high local ecological value for local species.

Figure 6-6: Habitats present within the Site as determined from 1995 Aerial Imagery.

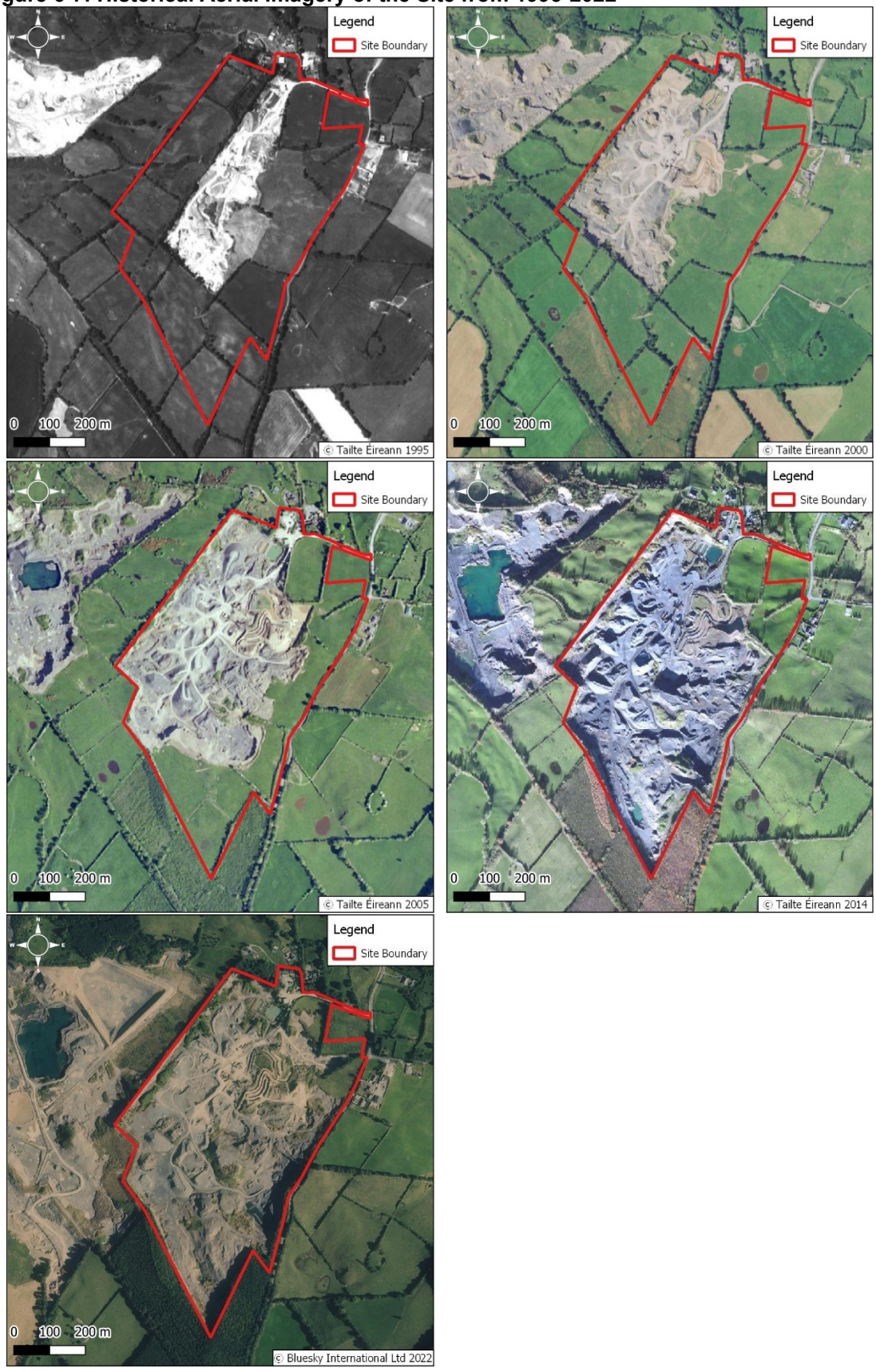


Aerial Imagery Historical Maps

A review of the historical aerial imagery from 2000, 2005, 2014 and 2022 illustrates the progressive expansion of the active quarry and mines habitat within the Site from the earliest imagery in 1995. The improved agricultural grassland, broadleaved woodland, hedgerow / treelines and other artificial lakes and ponds consistently decreased in size as the active quarry habitat expanded across the Site, refer to Figure 6-7 for context, which also illustrates the loss of natural habitats from 1995 to 2022.

The field survey conducted in 2025 confirmed the loss of these habitats within the Site, refer to Section 6.4.3.2 for further details.

Figure 6-7: Historical Aerial Imagery of the Site from 1995-2022



6.4.3.2 Existing Habitats

This section provides a description of the habitats and features of ecological significance that were identified as part of the field-based assessment that was undertaken for the Site on 16th January 2025. These are outlined below and illustrated in Figure 6-8.

Active Quarry and Mines (ED4)

This habitat was the dominant habitat within the Site. During the survey, steep quarry faces and exposed rock were key features of this habitat.

Given the level of disturbance from quarry works and ongoing stockpile removal works, minimum vegetation was present within this habitat. However, a number of herbaceous plant species were recorded including selfheal (*Prunella vulgaris*), creeping thistle (*Cirsium arvense*), dandelion (*Taraxacum spp.*), oxeye daisy (*Leucanthemum vulgare*), buttercup (*Ranunculus spp.*), black medic (*Medicago lupulina*), white clover (*Trifolium repens*), scarlet pimpernel (*Anagallis arvensis*), yarrow (*Achillea millefolium*), fringed willowherb (*Epilobium ciliatum*), thyme-leaved speedwell (*Veronica serpyllifolia*), coltsfoot (*Tussilago farfara*), hogweed (*Heracleum sphondylium*) and bird's-eye pearlwort (*Sagina procumbens*).

Grass species were also noted within this habitat, including perennial ryegrass (*Lolium perenne*), creeping bent (*Agrostis stolonifera*) and Yorkshire fog (*Holcus lanatus*). In addition, young gorse (*Ulex europaeus*) was noted within this habitat in less disturbed areas.

Buildings and Artificial Surfaces (BL1)

This habitat was located in the northern part of the Site and included buildings such as the Site office and storage sheds. An access road also connected the Site to the R195 regional road from this area.

Vegetation was noted recolonising the road margins, which included dandelion*,* mouse-ear hawkweed *(Pilosella officinarum),* and Yorkshire fog*.*

Recolonising Bare Ground (ED3)

Areas of recolonising bare ground were noted within the main quarry area. These habitats were primarily identified on undisturbed stockpiles within the Site. This habitat was most prominent in the northeast and extended down the central area to the southeast. Over time, these stockpiles have naturally been recolonised by vegetation.

The following species were identified within the recolonising bare ground onsite: mouse-ear hawkweed, dandelion, oxeye daisy, unidentified sphagnum moss species, common hogweed (*Heracleum sphondylium*), yarrow, fringed willowherb, coltsfoot, nettle (*Urtica dioica*), creeping buttercup (*Ranunculus repens*), hairy bittercress (*Cardamine hirsuta*), bramble (*Rubus fructicosus*), common chickweed (*Stellaria media*), bull thistle (*Cirsium vulgare*), broad-leaved dock (*Rumex obtusifolius*), white clover, daisy (*Bellis perennis*) and tansy ragwort (*Jacobaea vulgaris*).

Grasses, such as creeping bent, Yorkshire fog and orchard grass (*Dactylis glomerata*) were also identified growing within this habitat. In addition, immature willow (*Salix spp.*), hawthorn (*Crataegus monogyna*) and sycamore (*Acer pseudoplatanus*) trees were identified scattered throughout the recolonising bare ground onsite. Butterfly bush (*Buddleja davidii*) was also noted in this habitat.

Earth Banks (BL2)

Earth banks were located in the northeastern region of the Site, forming field boundaries within and bordering the Site.

The earth banks were covered in ruderals, weeds and grasses. The following species were noted in this habitat: Yorkshire fog, dandelion, thistle, bramble, yarrow, common hogweed, daisy, bull thistle, tansy ragwort, willow saplings, butterfly bush, nettle, white clover, ribwort

plantain (*Plantago lanceolata*), creeping bent, gorse, creeping buttercup, orchard grass, broad-leaved dock, colts-foot, hawksbeard *(Crepis spp.),* and hairy willowherb (*Epilobium hirsutum*).

Hedgerow / Treeline (WL1 / WL2)

Hedgerows / treelines and managed hedgerows were identified onsite during the field survey.

Hedgerows / treelines bordered the eastern, southern and western boundaries of the Site. In addition, a small section of hedgerow/treelines was present along the northern boundary of the Site. The dominant species identified within these linear habitats were hawthorn, sycamore, ash *(Fraxinus excelsior)* and hazel *(Corylus avellana).*

The understorey of the hedgerow / treelines comprised of bramble, dandelion, hogweed**,** broadleaved dock, gorse, nettle, tansy ragwort, buttercup, ivy (Hedera helix), young holly (*Ilex acquifolium)*, wild carrot (*Dacus carota*), hart's-tongue fern (*Asplenium scolopendrium*), dog rose (*Rosa canina*), box-leaf honeysuckle *(Lonicera niteda),* silvergreen byrum moss (*Bryum argenteum*), bracken (*Pteridium aquilinum)* and grasses included creeping bent, Yorkshire fog and perennial ryegrass.

Managed hedgerows were located within the northern portion of the Site, at the entrance to the quarry. These managed hedgerows ran along both sides of the access road and extended down to the weighbridge. These hedgerows primarily consisted of Monterey cypress (*Cupressus macrocarpa*). A section of young hawthorn hedgerow was located in the southwest portion of the Site.

Scrub (WS1)

This habitat was found mainly in the western portion of the Site. However, scattered scrub was also identified within the central region of the Site.

The scrub habitats onsite comprised of gorse, willow, holly and sycamore. An understory of brambles, dandelion, ash saplings, creeping bent, bracken, hogweed, clover, horsetail (*Equisetum arvense*), ribwort plantain, common rush (*Juncus effusus*) and ground ivy (*Glechoma hederacea*) was recorded in these areas. Butterfly bush was also recorded in scrub habitats onsite.

Other Artificial Lakes and Ponds (FL8)

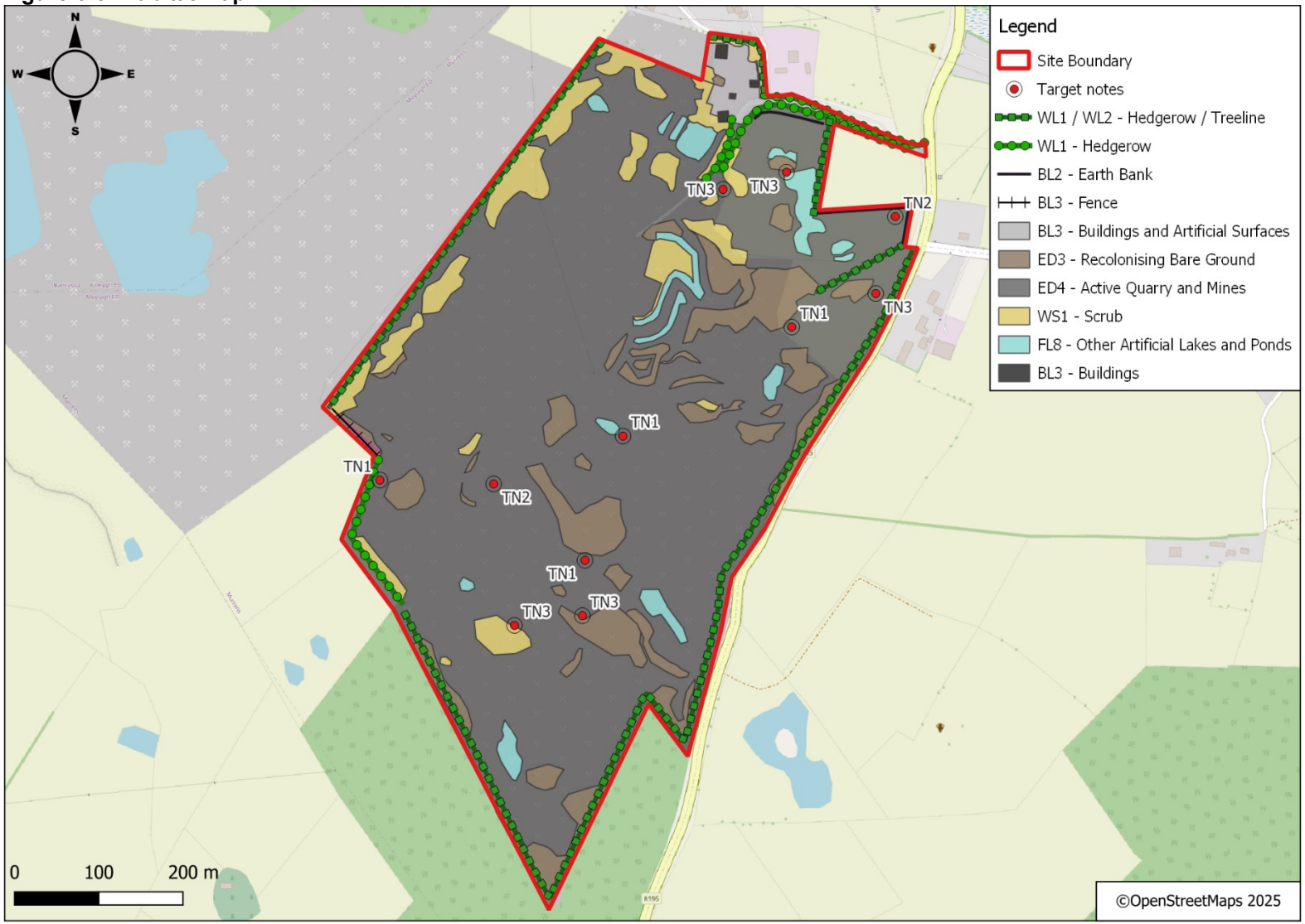
A number of ponds were located within the Site. The majority of these ponds appeared to be seasonal, pluvial surface water ponds. No botanical species were noted within these ponds. See figure 6-2 for the location of these ponds.

However, as discussed in Section 3.2, the onsite looped water settlement system utilised three settlement ponds and a settlement stream. These features were located within the north-central area of the Site at the time of the survey and formed part of the water treatment system implemented onsite.

Species identified around these waterbodies included common rush (*Juncus effusus*), bog bullrush (*Schoenoplectiella mucronata*), broadleaf cattail (*Typha latifolia*)**,** shield fern (*Polystichum setiferum*), knapweed (*Centaurea nigra*), duckweed (*Lemna minor),* hawthorn saplings, willow, bramble, ribwort plantain, horsetail, thistle and nettle.

In addition, one invasive species was recorded in this habitat, butterfly bush, refer to Section 6.4.3.3 for details.

Figure 6-8: Habitat Map



6.4.4 Notable / Protected Species

6.4.4.1 NBDC Records for Notable / Protected Species

Notable / protected species that may potentially have used the Site prior to and during the Development are listed in Table 6-7 below. These are informed by existing species data held by the NBDC, within 2km of the Site and span the period 1980 to 2024 reflecting species that were present during this period.

The NBDC records were accessed on 20th January 2025 and the following 2km grids were checked: N57B, N57C, N57D, N57G, N57H, N57I, N57L, N57M, N57N [64], Table 6-7 below presents the findings.

Table 6-7: NBDC Records of Notable/Protected Species within 2km of the Site

Common Name	*Scientific Name*	Dates Recorded	Designation
Bird Species			
Barn Swallow	*Hirundo rustico*	31/07/1991 31/12/2011	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Black Headed Gull	*Larus ridibundus*	31/07/1991 31/12/2011 08/07/2019	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Common Coot	*Fulica atra*	31/12/2011 08/07/2019	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II and III Section I and II Bird Species Birds of Conservation Concern Amber List
Common Goldeneye	*Bucephala clangula*	31/12/2011	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section II Bird Species Birds of Conservation Concern Red List
Common Grasshopper Warbler	*Locustella naevia*	31/07/1991	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Green List
Common Kestrel	*Falco tinnunculus*	31/07/1991 31/12/2011 03/07/2014	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Red List
Common Linnet	*Crduelis cannabina*	31/07/1991 31/12/2011	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Common Pheasant	*Phasianus colchicus*	31/07/1991 31/12/2011	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section I and Annex III and Section I Bird Species Birds of Conservation Concern Green List
Common Pochard	*Aythya farina*	31/12/2011	Wildlife Acts 1976 / 2000

Common Name	***Scientific Name***	**Dates Recorded**	**Designation**
			EU Habitats Directive Annex II Section I and Annex III Section II Bird Species Birds of Conservation Concern Red List
Common Snipe	*Gallinago gallinago*	31/07/1991	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section I and Annex III and Section III Bird Species Birds of Conservation Concern Red List
Common Starling	*Sturnus vulgaris*	31/07/1991 31/12/2011	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Common Wood Pigeon	*Columba palumbus*	31/07/1991 31/12/2011	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section I and Annex III Section I Bird Species Birds of Conservation Concern Green List
Eurasian Curlew	*Numenius Arquata*	08/07/2019	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section II Bird Species Birds of Conservation Concern Red List
Eurasian Tree Sparrow	*Passer montanus*	31/12/2011	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Eurasian Wigeon	*Anas Penelope*	31/12/2011	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section I and Annex III and Section II Bird Species Birds of Conservation Concern Amber List
Great Cormorant	*Phalacrocorax carbo*	31/12/2011	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Great Crested Grebe	*Podiceps cristatus*	08/07/2019	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
House Martin	*Delichon urbicum*	31/07/1991 31/12/2011	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
House Sparrow	*Passer domesticus*	31/07/1991	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Little Grebe	*Tachybaptus ruficollis*	31/07/1991	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Green List
Mallard	*Anas platyrhynchos*	31/12/2011	Wildlife Acts 1976 / 2000 EU Birds Directive Annex II Section I and Annex III and Section I Bird Species

Common Name	***Scientific Name***	**Dates Recorded**	**Designation**
			Birds of Conservation Concern Amber List
Mute Swan	*Cygnus olor*	31/12/2011 08/07/2019	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Northern Lapwing	*Vanellus vanellus*	31/07/1991 31/12/2011	Wildlife Acts 1976 / 2000 EU Birds Directive Annex II Section II Bird Species Birds of Conservation Concern Red List
Rock Pigeon (Dove)	*Columba livia*	31/12/2011	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section I Bird Species Birds of Conservation Concern Green List
Sand Martin	*Riparia riparia*	31/07/1991	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Sky Lark	*Alauda arvensis*	31/07/1991 31/12/2011	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Spotted Flycatcher	*Muscicapa striata*	31/07/1991	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Amber List
Tufted Duck	*Aythya fuligula*	31/12/2011	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II Section I and Annex III and Section II Bird Species Birds of Conservation Concern Amber List
Water Rail	*Rallus aquaticus*	31/12/2011	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Green List
Whooper Swan	*Cygnus cygnus*	31/12/2011	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex I Bird Species Birds of Conservation Concern Amber List
Yellowhammer	*Emberiza citronella*	31/07/1991	Wildlife Acts 1976 / 2000 Birds of Conservation Concern Red List
Aquatic Species			
Freshwater white-clawed Crayfish	*Austropotamobius pallipes*	31/12/1992 31/12/2007	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex IV
Amphibians			
Common Frog	*Rana temporaria*	05/03/2003 29/11/2018	Wildlife Act 1976 (as amended) Habitats Directive Annex V

Common Name	*Scientific Name*	Dates Recorded	Designation
		08/07/2019	
Smooth Newt	*Lissotriton vulgaris*	29/11/2018	Wildlife Acts 1976 / 2000
Bat Species			
Brown Long-eared Bat	*Plecotus auritus*	31/12/1992	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex IV
Soprano Pipistrelle	*Pipistrellus pygmaeus*	12/10/2015	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex IV
Flora			
Large white-moss	*Leucobryum glaucum*	21/03/2014	Wildlife Acts 1976 / 2000 Habitats Directive Annex VI
Terrestrial Mammals			
Eurasian Badger	*Meles meles*	31/12/2013 31/12/2014 31/12/2015 31/12/2016 29/04/2017	Wildlife Act 1976 / 2000
European Otter	*Lutra lutra*	16/02/1980 04/10/2010 14/10/2013	Wildlife Act Habitats Directive Annex II
Irish Stoat	*Mustela erminea subsp. hibernica*	12/05/2024	Wildlife Acts 1976 / 2000
Pine marten	*Martes martes*	31/12/2005	Wildlife Act EU Habitats Directive Annex V
West European Hedgehog	*Erinaceus europaeus*	02/10/2007 01/11/2007 29/10/2019	Wildlife Acts 1976 / 2000
Insect Species			
Marsh Fritillary	*Euphydryas aurinia*	01/06/2014	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II
Invasive Species			
Canadian Waterweed	*Elodea danadensis*	05/07/2016	High Impact Invasive Species Regulation S.I. 374 (Ireland)

Common Name	*Scientific Name*	Dates Recorded	Designation
Eastern Grey Squirrel	*Sciurus carolinensis*	07/09/2007 16/09/2007 31/12/2010	High Impact Invasive Species Regulation S.I. 374 (Ireland)
Nuttall's Waterweed	*Elodea nuttallii*	30/09/2007	High Impact Invasive Species Regulation S.I. 374 (Ireland)
Rhododendron	*Rhododentron ponticum*	26/04/2005 27/04/2005	High Impact Invasive Species Regulation S.I. 374 (Ireland)

*Note: Table includes only invasive species regulated under S.I. 374 (Ireland)

6.4.4.2 I-WeBS Data

I-WeBS data was requested for nearby sites within the vicinity of the Site. The records were reviewed in order to gain an understanding into the potential assemblage of bird populations that may utilise the areas within the vicinity of the Development.

Data from Wetlands at Grennan / Garrynabolie, Lough Bane and White / Annagh Lough Sites were received (refer to Table 6-1). The data received included available information for the three sites from 2014/2015 winter season to the 2023/2024 winter season.

Overall, 24 species were recorded within the I-WeBS sites. No species were recorded at levels considered to be of international importance. However, one species was recorded in numbers of national importance in the White / Annagh Lough site, see below.

Wetlands at Grennan / Garrynabolie Site – OV055

- The I-WeBS data provided for this site was limited. Data was only available the 2015/2016, 2016/2017, 2017/2018 and 2019/2020 wintering season;
- A total of 14 species were recorded during this period;
- During the most recent counts, the 2019/2020 winter season, a total of 9 species were recorded; and,
- No species were recorded in numbers of national or international importance.

Lough Bane Site – 0V099

- The I-WeBS data provided for this site included all of the wintering seasons between 2014/2015 to 2023/2024;
- A total of 16 species were recorded during this period;
- During the most recent counts, the 2023/2024 winter season, a total of 6 species were recorded; and,
- No species were recorded in numbers of national or international importance.

White / Annagh Lough Site – 0W011

- The I-WeBS data provided for this site included all of the wintering seasons between 2014/2015 to 2023/2024;
- A total of 21 species were recorded during this period;

- During the most recent counts available for the 2023/2024 winter season a total of 10 species were recorded; and,
- No species were recorded in numbers of international importance; however, little grebe were recorded in numbers of national importance during the 2016/2017 winter season.

It should be noted that these sites are not located within the immediate vicinity of the Site. As noted in Table 6-1, the nearest records to the Site would be Wetlands at Grennan / Garrynabolie site, which is located ca. 1.3km to the east of the Site.

Therefore, these populations of bird species are not located within close proximity to the Site. Furthermore, it should be noted that none of the species identified are considered to exclusively occur within this area.

6.4.4.3 Notable / Protected Species

Flora

Flora in the Historic Environment

The NBDC held a record for large white-moss within 2km of the Site in 2014 [64]. This plant is protected under the Wildlife Acts 1976 / 2000 and is listed as an Annex VI species under the Habitats Directive.

Flora in the Existing Environment

No notable or protected plant species were recorded onsite i.e. plants listed on the Flora (Protection) Order 2022 (S.I. No. 235/2022) or on Ireland Red List No. 10: Vascular Plants [49].

Amphibians

Amphibians in the Historic Environment

The NBDC held records of amphibians within 2km of the Site [64].

The oldest record for common frogs was held in 2003 and the most recent record was from 2019 (refer to Table 6-7) [64]. There were also records of smooth newts from 2018 [64]. A review of historical aerial imagery from 1995 revealed two ponds located to the west and east of the Site. These ponds could have provided suitable habitats for amphibians.

Amphibians in the Existing Environment

Amphibians require static or slow-moving water bodies in order to successfully lay their eggs and tend to favour shallow areas where they are less susceptible to being preyed on by fish.

The field survey conducted on 16th January 2025 did identify suitable habitats for amphibians within the Site. The three settlement ponds and the settlement stream within the north-central portion of the Site are considered suitable for amphibians. These features appeared to be wet year-round and supported marginal vegetation.

There were also areas of temporary surface water throughout the Site. As described in Section 6.4.3.2, these features appeared to be seasonal. However, some of these pluvial surface water ponds were noted as having the potential to support amphibians.

The field survey on 16th January 2025, identified 13 ponds within the Site that are considered suitable for amphibians. An amphibian survey conducted on 20th March confirmed the presence of smooth newts in six of these ponds. Refer to Table 6-8 for descriptions of the ponds onsite and Figure 6-9 for the locations of the recorded amphibians.

Table 6-8: Ponds Descriptions

Ponds No.	Description
1	This pond is a temporary surface water feature situated in the northeast corner of the site. It is relatively shallow, with a sloped eastern bank lined with large rocks. The pond is bordered by undisturbed stockpiles. The vegetation around the pond was sparse, with some areas devoid of vegetation.
2	This temporary surface water feature is located east of Pond 1. It is relatively shallow and clear, with a silty and sandy base. Large rocks border the pond, and the vegetation was sparse, with some areas devoid of vegetation.
3	This pond is a settlement stream located within the north-central portion of the Site. The pond is bordered by undisturbed stockpiles to the east, and Pond 4 bordered the pond to the west of the pond. The vegetation around the pond was sparse, with areas some areas being devoid of vegetation.
4	This pond is a settlement stream located in the north-central portion of the Site. It is bordered by scrub to the west and Pond 3 to the east. The western banks of the pond are densely vegetated, while an access track on the eastern bank, which separates this pond from Pond 3, is devoid of vegetation.
5	This temporary surface water feature is located in the east-central portion of the Site. It is relatively shallow and clear, with a silty and sandy base. Large rocks border the pond, and the vegetation was sparse, with some areas devoid of vegetation.
6	This temporary surface water feature is located in the east-central part of the Site. It is shallow and clear, with a silt and clay bedrock base. Large rocks border the pond, and the vegetation was sparse, with some areas devoid of vegetation.
7	This temporary surface water feature is located in the southeast section of the Site. The pond is deep and clear, with a gravel island in the middle and a gravel and cobble base. It is bordered to the south by quarry ledges. The vegetation around the pond was sparse, with areas some areas being devoid of vegetation.
8	This pond is a temporary surface water feature located southeast of the Site. It is shallow and clear and has a sand and gravel base. Large rocks border the pond, and the vegetation was sparse, with some areas devoid of vegetation.
9	This pond is a temporary surface water feature located in the southern corner of the Site. It could not be surveyed due to the steep cliff edges, which made it inaccessible.
10	This is one of the settlement ponds located in the north-central area of the Site as described in Section 6.4.3.2. This pond is deep and turbid, with moderate vegetation cover.
11	This settlement pond is similar to Pond 10 described above. The pond is deep and turbid and has moderate vegetation cover.
12	This settlement pond is similar to Pond 10 described above. It is deep and turbid, with moderate vegetation cover.
13	This pond is a temporary surface water feature located in the northwest corner of the Site. It is shallow and clear and has a sand and gravel base. The pond is located west of the settlement ponds and has moderate vegetation cover.

Figure 6-9: Results of Amphibians Presence within the Ponds

HSI Results

HSI establishes the suitability of a water body to support smooth newts based on a set of criteria detailed in Section 6.2.3.2. Tables 6-9 below present the results of the HSI for the 13 ponds surveyed.

Table 6-9: Habitat Suitability Index

Pond Name		**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**P11**	**P12**	**P13**
SI No	SI Description	SI Value	SI Value	SI Value	SI Value	SI Value	SI Value	SI Value	SI Value	SI Value	SI Value	SI Value	SI Value	SI Value
1	Geographic location	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2	Pond area	0.85	0.5	1.0	0.88	1.0	0.955	0.955	0.3	0.955	0.55	0.55	0.895	0.75
3	Pond permanence	0.5	0.5	0.5	0.9	0.5	0.5	1.0	0.5	0.5	0.9	0.9	0.9	0.5
4	Water quality	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
5	Shade	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6	Waterfowl effect	1.0	1.0	1.0	0.67	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
7	Fish presence	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
8	Pond Count	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
9	Terrestrial habitat	0.33	0.33	0.33	0.33	0.33	0.67	0.33	0.67	0.67	0.33	0.33	0.67	0.67
10	Macrophyte cover	0.4	0.4	0.4	0.4	0.4	0.6	0.4	0.75	0.65	0.4	0.4	0.4	0.75
Pond suitability		**0.671**	**0.636**	**0.682**	**0.686**	**0.682**	**0.758**	**0.727**	**0.691**	**0.764**	**0.681**	**0.681**	**0.767**	**0.757**
		Average	**Average**	**Average**	**Average**	**Average**	**Good**	**Good**	**Average**	**Good**	**Average**	**Average**	**Good**	**Good**

Presence / Absence Survey

Smooth newts were identified as being present within six of the thirteen ponds surveyed. The highest number of smooth newts was observed in Pond 7.

Table 6-10: The Egg Search, Torch Lighting and Netting Results

Pond No.	Date	Air Temp (°C)	Common Frog		Smooth Newt	
			Egg Search	Torching and Netting	Egg Search	Torching and Netting
1	20/03/2025	11°C	None	None	None	8
2	20/03/2025	11°C	None	None	None	3
3	20/03/2025	11°C	None	None	None	Poor Visibility
4	20/03/2025	11°C	None	None	None	Poor Visibility
5	20/03/2025	11°C	None	None	None	2
6	20/03/2025	11°C	None	None	None	9
7	20/03/2025	11°C	None	None	None	25+
8	20/03/2025	11°C	None	None	None	2
9	20/03/2025	11°C	None	None	None	Not Accessible
10	20/03/2025	11°C	None	None	None	Poor Visibility
11	20/03/2025	11°C	None	None	None	Poor Visibility
12	20/03/2025	11°C	None	None	None	None
13	20/03/2025	11°C	None	None	None	None

Badger

Badger in the Historic Environment

The NBDC held records of badgers within 2km of the Site [64]. The oldest record dates back to 2013 with the most recent record held in 2017 [64].

Based on historical aerial imagery from 1995, improved agricultural grassland covered the majority of the Site (ca.30ha in total). This habitat was divided into fields by ca. 4km of hedgerows / treelines. Badgers are known to make good use of the hedgerow systems in Ireland and evidence of sett building, foraging and commuting activity is often associated with these linear features.

In addition, as outlined in Section 6.4.3.1, ca. 0.08ha of woodland was potentially present within the Site in 1995. Badger setts are commonly found in deciduous or mixed woodlands, especially when these habitats are adjacent to open ground such as pastures / cropland fields. Therefore, this woodland area may have supported a badger sett.

The habitats present onsite in 1995 had the potential to support sett construction and commuting / foraging activity. A review of historical aerial imagery from 2000 -2022, shows the reduction of improved agricultural grassland and hedgerows over time and the loss of the woodland habitat onsite. This may have led to a decrease in badger activity within the Site. However, as the lands surrounding the Site were not altered as part of the Development, badger may have continued to commute through the Site to access the wider landscape.

Badger in the Existing Environment

The field survey recorded evidence of badger activity in the form of prints (refer to TN1 in Figure 6-8). However, no scat, latrines or confirmed setts were identified onsite.

A large mammal hole was identified atop a steep bank along the northern boundary of the Site during the field survey. This mammal hole was inaccessible given its precarious position. Therefore, it could not be confirmed whether this was a one-holed outlier sett or a fox den. This mammal hole was outside of the main quarry area.

Given the disturbed nature of the Site, which is primarily associated with bare or recolonising ground, foraging opportunities for badger were considered limited. Suitable habitats for sett construction were also considered limited.

Therefore, badgers may be utilising the Site but given the absence of suitable foraging habitats, it is not considered that the Site is of significant value for this species.

Bats

Bats in the Historic Environment

The NBDC held two records of bat species within 2km of the Site [64]. The oldest record was from 1992, and the most recent record was from 2015 [64].

Based on historical aerial imagery from 1995, ca. 4km of hedgerow / treelines bisected and bound the Site. Bats are known to follow linear features as they commute through the landscape and therefore, the hedgerow / treelines within the Site would have acted as suitable commuting habitats for bats. In addition, the presence of ponds within the improved agricultural grassland fields would likely have attracted insects, providing suitable foraging habitats for bats in 1995.

The maturity of the trees within the hedgerows / treelines or the ca. 0.08ha of potential woodland present in 1995 cannot be determined from aerial imagery. However, these trees may have had the potential to support roosting bats.

As described in Section 6.4.3.1, the aerial imagery from 1995- 2022 illustrates the progressive removal of these habitats within the Site to be replaced by active quarry habitat. This may have led to a decrease in bat activity within the Site.

Bats in the Existing Environment

No bat roost potential trees or buildings were identified within the Site during the field survey. The hedgerows / treelines bordering the Site have the potential to support commuting and foraging bats. However, these habitats were considered suboptimal for this purpose given the quarrying works undertaken at the Site.

In addition, the network of ponds onsite have the potential to support foraging bats but given the absence of dark corridors / linear features connecting these waterbodies to the wider landscape, it is not considered that these features are commonly frequented by bats.

It is not considered that the Site is of significant value for bats.

Birds

Birds in the Historic Environment

According to the NBDC records, a number of protected bird species have been recorded within the 2km of the Site [64]. These records span from 1991 to 2019 and include passerines, waders and wildfowl [64].

A review of historical aerial imagery from 1995 revealed two ponds, a potential 0.8ha woodland, ca.30ha of improved agricultural grassland and ca.4km of hedgerows / treelines. It is considered likely that the woodland and hedgerow / treelines previously onsite would have supported a range of breeding birds. In addition, the two ponds, which were ca. 970m^2 and ca. 340m^2 in size, likely had the potential to support waterbirds such as mallards, moorhen *(Gallinula chloropus)* etc. However, the suitability of these ponds for waterfowl would have decreased with livestock access to the waterbody. For example, ducks and large birds have shown a preference for isolated ponds [65]. In addition, the presence of livestock would have significantly decreased the potential for ground-nesting birds onsite due to nest trampling and a shorter grass height.

As described in Section 6.4.3.1, the aerial imagery from 1995- 2022 illustrates the progressive removal of these habitats within the Site to be replaced by active quarry habitat. This may have led to a decrease in bird activity within the Site.

A total of 24 species were recorded within the three I-WeBS sites reviewed as part of this assessment. No species were recorded at levels considered to be of International importance. However, little grebe was recorded in numbers of national importance during the 2016/2017 winter season in the White/Annagh Lough site. It should be noted that none of these I-WeBS sites are located within close proximity to the Site. The nearest I-WeBS site, Wetlands at Grennan / Garrynabolie, is ca.1.3km east of the Site. It is likely that the birds previously utilising the Site were different to the birds associated with these I-WeBS sites given the availability of suitable habitat within the Wetlands at Grennan / Garrynabolie and the likely presence of livestock within the Site. However, the potential presence of I-WeBS species within the Site in 1995 until 2000 (which shows that the ponds are no longer present) cannot be completely ruled out.

Birds in the Existing Environment

During the field survey, eight species were observed within or flying over the Site.

The eight species recorded onsite during the field survey included:

- Seven Green-Listed Birds of Conservation Concern Ireland ('BoCCI'), non- annex I, species were recorded - blackbird (Turdus merula), robin (*Erithacus rubecula*), wren (*Troglodytes troglodytes*), goldfinch (*Carduelis carduelis*), long tailed tit (*Aegithalus caudatus*), chaffinch (*Fringilla coelebs*) and buzzard (*Buteo buteo*); and,
- One Amber-listed BoCCI, non-annex I, species were recorded – linnet *(Linaria cannabina).*

The hedgerow / treelines located along the Site boundaries were noted as having the potential to provide suitable nesting habitat for a range of common bird species. However, no disused or active nests were identified during the field survey. Given the disturbed nature of the onsite habitats and the ongoing quarry operations in the Site, it is not considered to be a site of importance for any notable or protected bird species.

Peregrine Falcon

The field survey undertaken in January and March 2025 identified a cliff face on the Site's eastern boundary as suitable for peregrine falcon. This cliff has been created by the quarry activities at the Site.

During the single peregrine falcon survey conducted on 19th March 2025, the survey did not identify any active peregrine falcon nests onsite. However, at 10.30, two adult peregrine

falcons (male and female) were observed flying from the southwest, calling each other. One landed on the cliff edge carrying nesting materials, while the other remained circling above calling. The two peregrine falcons were then observed flying north of the Site.

At 11.15, the male peregrine falcon was observed flying from the north of the Site, heading towards the woodland located off the Site to the southeast.

Two peregrine falcons (male and female) were observed flying into the Site from the southeast of the woodland at 11.17. The peregrine falcons were heard calling and observed in courtship flight, which lasted until 11.20, then flew northwest of the Site. Calls were still coming from the northwest of the Site at 11.27, with no visual sightings.

At 12:00, two peregrine falcons came from the southwest and were observed circling the southeast of the Site while displaying and calling to each other before departing southeast towards the woodland offsite. Following the 12:00 sighting, no further peregrine falcon activity was observed, and the survey concluded at 13:00.

Sand Martin

The field survey undertaken in January 2025 identified potential sand martin nest holes recorded at two locations within the Site (refer to TN2 in Figure 6-8). One was located within the stockpile in the southwest-central area of the Site. The other potential nest holes were located in the northeast corner. These potential sand martin nest holes were recorded outside of the breeding bird season so their status as an active breeding habitat could not be confirmed.

Sand martins require steep or vertical slopes of fine sand. They will tunnel into sand even when it is being excavated and may even tunnel in heaps of loose sand. Both males and females make a horizontal tunnel 45-90cm long with a chamber at the end.

Suitable sites may be used for years. Sites are abandoned once the face slumps, becomes weathered (forming resistant crust), overgrown with vegetation, or accessible to predators. New tunnels will be dug as the cliff collapses, or as old holes become too big.

During the sand martin survey conducted on 19th March 2025, sand martins were observed flying and displaying in the wider landholding northeast of the Site boundary. The sand martins were then identified flying and displaying over stockpiles within the Site.

There were ca. 54 nest holes identified within the stockpile in the southwest-central area of the Site. There were no visuals of the sand martins utilising this stockpile. However, sand martins were observed flying and displaying above the nest holes in the northeast corner. There were ca. 56 nest holes identified within the northeast corner of the Site.

Invasive Species

Invasive Species in the Historic Environment

The NBDC held records of invasive species within 2km of the Site [64]. Records have been consistent with invasives recorded in 2005, 2007, 2010 and 2016 [64]. It cannot be determined from aerial imagery if invasive plants were present onsite from 1995-2022.

Invasive Species in the Existing Environment

No invasive species listed on the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (i.e. species of which it is an offence to disperse, spread or otherwise cause to grow in any space) were identified onsite.

Butterfly bush (*Buddleja davidii*), a non-regulated invasive species that has the potential to impact local biodiversity, was recorded in multiple habitats onsite. There is no direct legal provisions associated with butterfly bush. No other non-regulated invasive species were recorded onsite.

Other Species

Other Species in the Historic Environment

Otter

The NBDC held records of otter within 2km of the Site [64]. The oldest record dates back to 1980 with the most recent record from 2013 [64].

It should be noted that there are no designated watercourses or waterbodies located within the Site and the closest EPA designated hydrological feature to the Site is the Bane South (Lough), which is located ca. 340m north of the Site. This lough is linked to the Moylagh River, which flows in a north / north-westerly direction into the Rathmea River, which discharges into numerous loughs.

It is considered unlikely that otters would have dispersed over 300m into the Site from these hydrological features. Otters tend to avoid open areas which are devoid of suitable cover and are typically associated with aquatic, riparian and estuarine habitats. Given the likely presence of livestock and the open nature of the previous onsite habitats, the historic environment was not considered to be an important site for otter and it is unlikely that this species utilised the onsite habitats.

Pine martins

The NBDC held records of pine martin within 2km of the Site. The most recent record held was in 2005 [64].

Pine martens display a preference for woodland habitats, especially conifer trees, to forage and shelter in but have also been recorded in scrub, crags and rocky areas. Pine marten tend to avoid open areas which are devoid of suitable cover. Therefore, the improved agricultural grassland within the Site in 1995 was not considered suitable for this species. However, the ca. 0.08ha woodland may have supported this species, albeit unlikely given its small size and isolated nature. It is unlikely that the Site was previously utilised by this species and as such, the historic environment is not considered to be a site of importance to this species.

West European Hedgehog

The NBDC held records of west European hedgehog within 2km of the Site [64]. Th earliest from 2007 and the most recent in 2019 [64].

The west European hedgehog is a common and widespread species typically found in scrub, hedgerows, woodland, and rank grassland habitats. In 1995, the Site contained improved agricultural grassland, mixed broadleaved woodland and hedgerows / treelines. It is considered that these habitats had the potential to support this species.

As described in Section 6.4.3.1, the aerial imagery from 1995- 2022 illustrates the progressive removal of these habitats within the Site to be replaced by active quarry habitat. This may have led to a decrease in hedgehog activity within the Site.

Irish Stoat

The NBDC held records of Irish stoats within 2km of the Site [64]. The most recent record was in 2024. [64].

Irish stoats occur in most habitats with sufficient cover; however, they display a preference for woodland habitats. Stoats tend to avoid open areas that lack suitable cover. As per pine marten and otter, it is unlikely that the Site was of significant importance to Irish stoat given its open nature, the likely presence of livestock and the small area associated with the woodland habitats onsite.

Marsh Fritillary

The NBDC held records of marsh fritillaries within 2km of the Site, the most recent being in 2014 [64].

Marsh fritillary are typically found in wet or marshy areas. Suitable habitat for this species include damp, flower-rich grasslands, sand dunes, heaths, fens and bogs. Devil's-bit scabious *(Succisa pratensis)* is the only known host plant for marsh fritillary larvae and is a key feature of its optimal habitat.

Devil's-bit scabious is associated with damp soils. Unfortunately, the dampness of the soil onsite cannot be determined from aerial imagery. However, given the absence of records of devil's-bit scabious, the likely presence of livestock and general management associated with improved agricultural grassland fields, it is considered unlikely that devil's-bit scabious and subsequently, marsh fritillary were supported by the historic environment onsite.

Freshwater white-clawed crayfish

The NBDC held records of freshwater white-clawed crayfish within 2km of the Site [64]. The oldest record dates back to 1992, and the most recent record was held in 2007 [23].

Freshwater white-clawed crayfish prefer clean, well-oxygenated, flowing water bodies such as rivers and streams with rocky or stony substrates for shelter. However, they have also been identified in water bodies such as lakes and canals. They are sensitive to pollution and sedimentation and typically require stable water conditions.

However, the ponds had no connection to watercourses and lacked the flowing water conditions preferred by this species, they are not considered suitable habitats for white-clawed crayfish.

Other Species in the Existing Environment

Otter

The NBDC held records of otter within 2km of the Site [64]. The oldest record dates back to 1980 with the most recent record from 2013 [64].

The field survey conducted in January 2025 did not identify any signs of otter activity on the Site.

As noted above, there are no designated watercourses or waterbodies located within the Site and the closest EPA designated hydrological feature to the Site is the Bane South (Lough), which is located ca. 340m north of the Site.

The onsite habitats are not considered to be suitable for otters. It is unlikely that otters will have dispersed over 300m into the Site from these hydrological features.

Pine martins

The NBDC held records of pine martin within 2km of the Site [64].The most recent record held was in 2005.

No evidence of pine martin was identified as part of the field survey undertaken on the Site in January 2025.

Pine martens display a preference for woodland habitats, especially conifer trees, to forage and shelter in but have also been recorded in scrub, crags and rocky areas. Pine marten tend to avoid open areas which are devoid of suitable cover.

Therefore, it is considered that the onsite habitats would not be suitable for pine marten.

West European Hedgehog

The NBDC held records of west European hedgehog within 2km of the Site [64]. Th earliest from 2007 and the most recent in 2019 [64].

No evidence of hedgehog was identified as part of the field survey undertaken on the Site in January 2025 [64].

As noted above, the west European hedgehog is a common and widespread species typically found in scrub, hedgerows, woodland, and rank grassland habitats.

Therefore, the onsite habitats are not considered suitable for this species.

Irish Stoat

The NBDC held records of Irish stoats within 2km of the Site [64]. The most recent record was in 2024. [64].

No evidence of Irish stoat was identified as part of the field survey undertaken on the Site in January 2025.

Irish stoats occur in most habitats with sufficient cover; however, they display a preference for woodland habitat and tend to avoid open areas that lack suitable cover.

The onsite habitats are therefore not considered suitable for this species.

Marsh Fritillary

The NBDC held records of marsh fritillaries within 2km of the Site, the most recent being in 2014 [64].

No evidence of marsh fritillary was identified as part of the field survey undertaken on the Site in January 2025.

As noted above, marsh fritillary are typically found in wet or marshy areas. Suitable habitat for this species include damp, flower-rich grasslands, sand dunes, heaths, fens and bogs. In addition, there was also no evidence of devil's-bit scabious (*Succisa pratensis*) on the Site, this being the only known host plant for marsh fritillary larvae and therefore a key feature of an optimal habitat.

It is therefore considered that the on-site habitats are not suitable for this species.

Freshwater white-clawed crayfish

The NBDC held records of freshwater white-clawed crayfish within 2km of the Site [64]. The oldest record dates back to 1992 and the most recent record was held in 2007 [64].

No evidence of freshwater white-clawed crayfish was identified as part of the field survey undertaken on the Site in January 2025.

Freshwater white-clawed crayfish prefer clean, well-oxygenated, flowing water bodies such as rivers and streams with rocky or stony substrates for shelter. They have also been identified in identified in water bodies such as lakes and canals.

However, the ponds identified on the Site had no connection to watercourses and lacked the flowing water conditions preferred by this species. They are therefore not considered suitable habitats for white-clawed crayfish.

Fox Scat

The field survey identified fox *(Vulpes vulpes)* scat (TN3); refer to Figure 6-8 for further details.

Mammal Holes

As described above a larger mammal hole was identified atop a steep bank along the northern boundary of the Site.

In the northeast of the quarry, a small mammal hole was identified during the field survey. This mammal hole had no prints leading into it or out. There is evidence of rabbit prints throughout the Site. It is considered to be a potential rabbit hole.

No other notable or protected species were identified within the landholding or are considered likely to occur, given the nature of the habitats and activities at the Site and on the adjoining lands.

6.5 Characteristics and Potential Impacts of the Development

6.5.1 Identification of Potentially Significant Effects on Identified Receptors

Based on the methodology that is set out in Section 6.2, Table 6-11 sets out the findings of the evaluation of important and legally protected receptors. Each receptor is assessed and a scoping justification for each receptor is provided for the potential historical impacts and also the ongoing operational phase and proposed remedial works.

6.5.2 Historical / Current Mitigation

The Applicant has provided the following information regarding mitigation measures that were historically in place during the period for which substitute consent is being sought and are in place as part of the ongoing operations. These measures have been taken into consideration during the assessment of potential impacts.

6.5.3 Water Quality Mitigation Measures

Chapter 8 outlines Water Quality Mitigation Measures implemented in the Development which consist of the design mitigation measures and operational mitigation measures. Refer to Section 8.5.

Design Mitigation

The Applicant operates a closed-loop recirculation water system for settlement ponds, and there is no discharge from the onsite operations.

Operational Mitigation

The Applicant has indicated that mitigation measures completed at the Site (and Registered Area) were in accordance with the EPA (2006) Environmental Management Guidelines: Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [66], whereby:

- All plant and HGVs used were refuelled onsite on a concrete plinth which flows into an adjacent 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 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 (interceptors located onsite) and removed from the Site for disposal or recycling.

6.5.4 Air Quality Mitigation Measures

Chapter 9 outlines the Air Quality Mitigation Measures implemented in the Development, which consist of design mitigation measures and operational mitigation measures. Refer to Section 9.5.

Design Measures:

- HGVs used established haul routes, which were regularly maintained; and,
- All HGVs exiting the site used the wheel wash facilities.
- Operational Measures
- Systems were established to record all potential dust complaints associated with the Development;
- Training was provided to Site personnel on dust mitigation measures;
- The boundaries of the Development were regularly inspected for potential dust;
- Public roads near the Development were regularly inspected for potential dust;
- Speed restrictions were applied within the Site (15km/hr); and,
- Site roads were regularly cleaned and maintained.

Table 6-11: Valuation of Potential Ecological Receptors

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
Protected Sites					
European Designated Sites	Historic Environment	European Communities (Natural Habitats) Regulations 1997 (as amended)	Internationally designated sites for conservation.	A remedial Appropriate Assessment Stage 1 ('AA') was prepared as part of the overall planning application, in line with policies: HER POLs 31, 32, 33 and 35 and OBJ 33 and 35 of the 'CDP' [60] . The AA concluded that the Development, either alone or in-combination with other plans, projects or land uses, has not had any significant effects on any European sites or any of their designated features of interest and that progression to Stage 2 of the Appropriate Assessment process (i.e. Natura Impact Statement) was not considered necessary [67]. For full details on the assessment of impacts to European sites, refer to the AA submitted as part of planning.	Natura 2000 sites have been scoped out for further consideration. Refer to AA submitted as part of planning for full details.
	Existing Environment			As outlined above, an AA was prepared as part of the overall planning application. This AA concluded that the Development, either alone or in-combination with other plans, projects or land uses, will not result in any direct or indirect significant effects on any European sites or their designated features of interest.	As above
Nationally Designated Sites	Historic Environment	Wildlife Act 2000 (as amended)	Nationally designated sites for conservation.	There are no NHAs within 5km of the Site; however, there are four pNHAs. These sites were included in this assessment in-line with policies HER POL 31, 32 and 35 and OBJ 35 of the 'CDP' [60]. There are no direct connections or impact pathways between the Site and these pNHAs, and these have been scoped out from further assessment.	Natural Heritage Areas have been scoped out from further consideration.
	Existing Environment			As above	As above

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
Habitats					
Active Quarry and Mines (ED4)	Historic Environment	N/A	Low Local Value	It is understood quarry operations began on the Site in the 1940's. An assessment of available aerial imagery was undertaken for the years 1995, 2000, 2005 and 2014 and 2022. Based on the earliest aerial imagery in 1995, the habitat (ED4) covered ca. 8.0ha of the Site. In 2000 aerial imagery indicated that this habitat covered ca. 15.2ha which increased to ca. 24.0ha in 2005 and ca. 32.5ha in 2014 to ca. 39ha in March 2025. This habitat was considered to be of low ecological value and has been scoped out for further consideration in terms of potential historical impacts.	Active Quarry and Mines has been scoped out from further consideration.
	Existing Environment			The January 2025 field survey confirmed that this remained the dominant habitat within the Site. No expansion or alternations to this habitat is proposed as part of the Development other than the proposed remedial / enhancement works, as outlined in Section 6-8. This habitat was considered to have been of low ecological value and has therefore been scoped out from further consideration.	Active Quarries and Mines have been scoped out from further consideration.
Buildings and Artificial Surfaces (BL1)	Historic Environment	N/A	Low Local Value	The assessment of historical aerial imagery available from 1995 indicated that three buildings/structures were present within the northern portion of the Site. See Figure 6-4 for context. Subsequent available aerial imagery from 2000, 2005 and 2014 and 2022 indicated a small expansion of this habitat within the same area. The 1995 aerial imagery would indicate expansion into a small area of agricultural grassland or existing hard standing, but it is difficult to be certain from the quality of the imagery. Neither of the potentially replaced habitat types would have been considered of ecological importance.	Buildings and Artificial Surfaces have been scoped out from further consideration.

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
				In view of this and that no expansion or alternations to this area is proposed as part of the Development this receptor has been scoped out from further consideration.	
	Existing Environment	N/A	Low Local Value	The January 2025 survey confirmed the presence of this habitat, located in the northern part of the Site and included buildings such as the Site office and storage sheds. An access road also connected the Site to the R195 regional road from this area. Given its lack of ecological value and the fact that no alternations are proposed this receptor has been scoped out from further consideration for ongoing operations.	Buildings and artificial surfaces have been scoped out from further consideration.
Hedgerows / Treelines (WL1 / WL2)	Historic Environment	Wildlife Act 2000 (as amended)	High Local Value	The assessment of historical aerial imagery from 1995 indicated that hedgerows and treelines were present throughout the Site. Hedgerows and treelines formed the principal field boundaries within the improved agricultural grassland and were present around the perimeter of the Site. It is estimated that ca. 4km of hedgerows and treelines were present within and along the boundary of the Site in 1995. Refer to Figure 6-5 for context. A subsequent review of available aerial imagery from 2000, 2005, 2014 and 2022 indicated that ca. 2.8km of this hedgerow / treeline was removed over this period as a result of the removal of the onsite agricultural grassland, which was bordered by this habitat. This habitat was considered to be of high local ecological value and has therefore been scoped in for further consideration.	Hedgerow / Treelines have been scoped in for further consideration.
	Existing Environment			Hedgerows / treelines and managed hedgerows were identified onsite during the field survey in January 2025. Hedgerows / treelines bordered the eastern, southern and western boundaries of the Site. In addition, a small section of hedgerow / treelines was present along the northern boundary of the Site and	Hedgerow / Treelines have been scoped out for further consideration.

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
				some managed hedgerows ran along the access track and extended down to the weighbridge. This habitat was considered to be of high local value. All hedgerows / treelines bordering and within the Site will not be altered as part of the Development and this receptor has been scoped out from further consideration.	
Improved Agriculture Grassland (GA1)	Historic Environment	N/A	Low Local Value	The assessment of historical aerial imagery from 1995 indicated that the on-site quarry operations were surrounded by improved agricultural grassland and that this habitat covered ca. 30ha of the Site in 1995. A subsequent review of available aerial imagery from 2000, 2005, 2014 and 2022 indicated that habitat was removed as the quarry operations expanded from 1995 to 2022. However, improved agricultural grassland is of low ecological value and has therefore been scoped out from further consideration.	Improved agricultural grassland has been scoped out from further consideration.
	Existing Environment			The field survey did not identify this habitat on the Site.	Improved agricultural grassland has been scoped out from further consideration.
Mixed Broadleaved Woodland (WD1)	Historic Environment	Wildlife Act 2000 (as amended)	High Local Value	The assessment of historical aerial imagery from 1995 indicated that a potential area of mixed broadleaved woodland was present in the northern section of the Site, adjacent to the active quarry and that this habitat covered ca. 0.08ha within the Site in 1995. The assessment of subsequent historic aerial imagery from 2000, 2005, 2014 and 2022 indicated that this habitat was removed as the quarry operations expanded over this period.	Mixed broadleaf woodland has been scoped in for further consideration.

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
				Mixed broadleaf woodland is of high local ecological value. This habitat has therefore been scoped in for further consideration. Remedial and ecological works proposed in this report will be implemented to offset this habitat loss as outlined in Section 6.8.	
	Existing Environment	Wildlife Act 2000 (as amended)	High Local Value	The field survey did not identify this habitat on the Site.	Mixed Broadleaf Woodland has been scoped out from further consideration.
Other Artificial Lakes and Ponds (FL8)	Historic Environment	N/A	Low Local Value	The assessment of historical imagery from 1995 indicated there were two potential ponds located within the Site. These ponds were located within the improved agricultural grassland onsite, refer to Figure 6-5 for context: • One pond was located ca. 50m west of the quarry and covered an area of ca. 970m^2; and, the second pond was located ca. 120m east of the quarry and covered an area of ca. 340m^2. • A subsequent review of the historic aerial imagery from 2005, 2010, 2014 and 2022 indicated that these ponds had been lost due to the expansion of the quarry operations. It is considered that these ponds would have been of high local ecological value for local species and may have supported amphibians. This receptor has therefore been screened in for further consideration. Remedial and ecological works proposed in this report will be implemented to offset this habitat loss as outlined in Section 6.8.	Other artificial ponds and lakes have therefore been screened in for further consideration.
	Existing Environment			The January 2025 survey identified a number of ponds located within the Site. The majority of these ponds appeared to be seasonal, pluvial surface water ponds. No botanical species were noted within these ponds.	Other Artificial lakes and ponds have been scoped in for

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
				In addition, the onsite looped water settlement system utilised three settlement ponds and a settlement stream. These features were located within the north-central area of the Site at the time of the survey and formed part of the water treatment system implemented onsite. No expansion or alternations to these areas is proposed as part of the Development to the looped water settlement system or settlement ponds. However, the removal of the remaining aggregate within the Site has the potential to have an impact on the surface water ponds which have the potential to support amphibians, and therefore further consideration will be given to these waterbodies.	further consideration.
Recolonising Bare Ground (ED3)	Historic Environment	N/A	Low Local Value	The assessment of historic aerial imagery from 1995 did not identify this habitat on site. However, the aerial imagery from 2000, 2005, 2014 and 2022 showed the development of this habitat over time as a result of the increased quarrying activities, where disturbed and disused areas naturally regenerated. Given the low ecological value of this habitat, this receptor has been scoped out from further consideration.	Recolonising bare ground has been scoped out from further consideration.
	Existing Environment			The January 2025 survey identified areas of recolonising bare ground within the main quarry area. This habitat was primarily identified on undisturbed stockpiles within the Site. This habitat was most prominent in the northeast and extended down the central area to the southeast. Over time, these stockpiles have naturally been recolonised by vegetation. This habitat will be removed as part of the ongoing Development. However, given its lack of ecological value, this receptor has been scoped out from further consideration for ongoing operations.	Recolonising bare ground has been scoped out from further consideration

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
Scrub (WS1)	Historic Environment	N/A	Low Local Value	The assessment of historic aerial imagery from 1995 did not identify this habitat. However, the arial imagery from 2000, 2005, 2014 and 2022 showed the development of this habitat over time as a result of the increased quarrying activities. Based on a review of the aerial image, it is not considered that the scrub present on the Site was of significant value for biodiversity and it has been scoped out from further consideration.	Scrub has been scoped out from further consideration.
	Existing Environment		Low Local Value	The January 2025 survey identified this habitat mainly in the western portion of the Site. However, scattered scrub was also identified within the central region of the Site. Scrub within the Site will not be altered as part of the Development and it has therefore been scoped out from further consideration.	Scrub has been scoped out from further consideration
Earth Bank (BL2)	Historic Environment	N/A	Low Local Value	The assessment of historic aerial imagery from 1995 did not identify this habitat on the Site. However, aerial imagery from 2000, 2005, 2014, and 2022 showed the development of this habitat over time as a result of increased quarrying activities. Based on a review of the aerial image, it is not considered that these banks were of significant value for biodiversity, and it has been scoped out from further consideration.	Earth Bank has been scoped out from further consideration
	Existing Environment			The January 2025 survey identified earth banks in the northeastern region of the Site, which formed field boundaries within and bordering the Site. Based the Site walkover, it is not considered that these banks present on Site was of significant value for biodiversity and it has been scoped out from further consideration.	Earth bank has been scoped out from further consideration

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
Flora and Fauna					
Protected Flora	Historic Environment	Flora (Protection) Order 2022 (S.I. No. 235/2022)	N/A	The NBDC held one record of a large white- moss from 2014 [64]. This species is known to occur in wet and dry acid woodlands, as well as bogs, heaths and poor fen habitats. This is a species protected under the Flora Protection Order. The mixed broadleaved woodland potentially identified in 1995 in the northern section of the Site could have provided a suitable habitat for this protected species. However, a historical review of aerial imagery from 2000, 2005, 2014 and 2015 indicated the loss of this woodland, which would have resulted in a loss of suitable habitat for this protected species. Therefore, this species has been scoped in for further consideration. Remedial and biodiversity enhancement works will be implemented as part of the Development to offset the loss of the mix of broadleaved woodland, as detailed above and in section 6.8.	Protected Flora have been scoped in for further consideration.
	Existing Environment		N/A	The 2025 field survey did not identify any protected flora species on the Site. It should, however, be noted that the survey was conducted outside of the optimum botanical survey season. There are certain species of flora, such as red hemp nettle (*Galeopsis ladanum var. angustifolia*), that live in niche habitats such as disturbed ground, similar to those found in quarries. In the absence of surveys within the optimum season, the potential presence of protected botanical species cannot be ruled out. Therefore, potential impacts on protected flora has been scoped in for further consideration.	Protected Flora have been scoped in for further consideration.
Amphibians	Historic Environment	Wildlife Act 2000 (as amended)	Low Local Value	The earliest record of amphibians held by the NBDC was for common frog was in 2003 and the most recent record was from 2019	Amphibians have been scoped in for

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
		EU Habitats Directive Annex V		(refer to Table 6-6). There was also a record of smooth newts from 2018. A review of historical aerial imagery from 1995 revealed two ponds located to the west and east of the Site which could have provided suitable habitats for amphibians. A review of subsequent arial imagery from 2002, 2005, 2014 and 2022 showed these ponds were removed as the quarry operations expanded. It is considered that the removal of the ponds may have resulted in the removal of suitable habitat for amphibians and therefore this receptor has been scoped in for further consideration.	further consideration.
	Existing Environment		Low Local Value	The Site provides suitable habitat for amphibians, and the surveys have confirmed the presence of smooth newt within six of the ponds located on Site. The ponds are also considered suitable for common frogs, however, the survey conducted to date have not confirmed the presence of this species. Given the court-regulated submission deadline, only a single amphibian survey could be completed for the Site. As a result, the full extent of amphibian populations could not be confirmed. No alternations to these settlement ponds are proposed as part of the Development. However, the removal of the remaining aggregate within the Site has the potential to have an impact on the surface water ponds which have the potential to support amphibians, and therefore further consideration will be given to these waterbodies.	Amphibians have been scoped in for further consideration.
Badgers	Historic Environment	Wildlife Act 2000 (as amended)	Low Local Value	The NBDC held records of badgers within 2km of the Site. The oldest record dates back to 2013 with the most recent record held in 2017 [64].	Badgers have been scoped in for further consideration.

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
				The habitats present onsite in 1995 had the potential to support sett construction and commuting / foraging activity. The loss of habitat from the Site since 1995, by way of linear features (hedgerow / treeline of ca. 2.8km) and potentially woodland of 0.08ha, could have impacted on badger activity. Due to the loss of suitable habitat for badger, this receptor has therefore been scoped in for further consideration.	
	Existing Environment		Low Local Value	The field survey undertaken in January 2025 recorded evidence of badger activity in the form of prints (refer to TN1 in Figure 6-7). However, no scat, latrines or confirmed setts were identified onsite. A large mammal hole was identified atop a steep bank along the northern boundary of the Site during the field survey. This mammal hole was inaccessible given its precarious position. Therefore, it could not be confirmed whether this was a one-holed outlier sett or a fox den. This mammal hole was outside of the main quarry area and will not be impacted by the removal of the stockpiles. Given the disturbed nature of the Site, which is primarily associated with recolonising ground, foraging opportunities for badger were considered limited, as were suitable habitat for sett construction. The Site is therefore considered to be suboptimal for this species. Therefore, badgers may be utilising the Site, but given the suboptimal nature of the on-site habitats for foraging or sett construction, it is not considered that the Site is of significant value for this species. This species has, therefore, been scoped out from further consideration.	Badgers have been scoped out for further consideration.
Bats	Historic Environment	Wildlife Act 2000 (as amended)	High Local Value	The NBDC held records of bat species within 2km of the Site, the earliest in 1992 and the most recent in 2015. The loss of linear features (hedgerow / treeline of ca. 2.8km), potentially some woodland (ca. 0.08ha) and two ponds between	Bats have been scoped in for further consideration.

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
		EU Habitats Directive Annex IV		1995 and ca. 2022 could have impacted on roosting, commuting and foraging bats and reduced overall bat activity levels. Given the potential impact on bats in the historic environment, this receptor has been scoped in for further consideration. Remedial and ecological works proposed in this report will be implemented to offset the habitat loss. See Section 6-8.	
	Existing Environment		High Local Value	The field survey undertaken in January 2025 did not identify any bat roost potential trees. The hedgerow / treelines identified on the Site have the potential to be utilised by commuting and foraging bats. These habitats will not be impacted by the Development. Given the habitats presented on Site, it is not considered that the Site is of significant value to bats. This receptor has, therefore, been scoped out for further consideration.	Bats have been scoped out from further consideration.
Birds	Historic Environment	<u>Nesting Birds</u> Wildlife Act 2000 (as amended)	Low Local Value	The NDBC held records for a number of notable / protected bird species within 2km of the Site. These records span from 1991 to 2019 and include passerines, waders and wildfowl. A review of aerial imagery from 1995–2022 shows that two ponds, a potential ca. 0.08ha woodland, and hedgerow/treelines were previously present on Site, and it is considered likely that these had the potential to support a range of breeding farmland birds. Due to livestock access, the ponds are also likely to have been suitable for certain wetland birds such as mallards and moorhens ect.. A review of I-WeBS sites, as part of the assessment, noted that none of the sites were located within close proximity to the Site, the nearest being 1.3km east of the Site. Of the 24 species recorded at the three I-WeBS sites, none were recorded at levels of International Importance. Only little grebe was recorded at a level of National importance.	Birds have been scoped in from further consideration.

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
				It was not considered that the Site was of any significant value for wetland birds species given the nature of the on-site habitats and presence of livestock within the agricultural land. However, the progressive removal of pond, woodland and hedgerow / treeline habitat from 1995 to 2022 and would have led to a likely decrease in the availability of habitats suitable for birds that are likely to have been using the Site. Given the likely loss of suitable habitats, this receptor has been scoped in for further consideration. Remedial and ecological works proposed in this report will be implemented to offset this habitat loss as outlined in Section 6.8.	
Birds	Existing Environment	<u>Nesting Birds</u> Wildlife Acts 1976 / 2000 <u>Peregrine Falcon</u> Wildlife Acts 1976 / 2000 EU Habitats Directive Annex I Bird Species <u>Sand Martin</u> Wildlife Acts 1976 / 2000 Birds of Conservation	High Local Value	<u>Nesting Birds</u> The field survey of January 2025 identified eight species within or flying over the Site. The hedgerow / treelines located along the Site boundaries were noted as having the potential to provide suitable nesting habitat for a range of common bird species. However, no disused or active nests were identified during the field survey. There will be no impact on the hedgerow / treeline habitats on the Site as part of the development. <u>Peregrine Falcon</u> The Site provides a potential foraging habitat for peregrine falcon, and during the field survey in January and March 2025 identified a cliff face on the Site's eastern boundary that is considered a suitable nesting habitat for peregrine falcon. Given the court-regulated submission deadline, only a single sand martin and peregrine falcon survey could be completed for the Site. As a result, breeding peregrine falcons could not be confirmed; however, high levels of peregrine activity were consistently recorded during the peregrine falcon survey conducted in March 2025.	Sand martin and peregrine falcon have been scoped in for further consideration.

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
		Concern Amber List		In addition, there is another quarry located west of the Development in the wider surrounding area which has the potential to support active nests. However, Mitigation measures are therefore required to ensure that no impacts occur to peregrine falcons that may use the Site for breeding purposes in the future. It should be noted the cliff was created as part of the quarrying activities. Prior to the quarry's activities, there would have been no suitable nesting habitat for this species. <u>Sand Martin</u> Sand martin are commonly associated with quarries as these sites often provide suitable nesting habitat in exposed / disturbed banks. The habitats within the Site boundary do provide suitable nesting habitat for this species. The onsite habitats are also considered to be sub-optimal for foraging sand martin. In addition, sand martin nesting holes were observed at two locations within the Site (TN2 Figure 6-7). These nesting holes were present within the stockpiles in the southwest central area and northeast corner of the Site. Sand martins were observed flying above the nest holes in the northeast corner. However, mitigation measures will be implemented to ensure that no impacts occur to sand martin that may nest onsite in the future. Given the presence of suitable habitat for both peregrine falcon and sand martin these species have been scoped in for further consideration.	
Invasive	Historic Environment	Species dependant	N/A	The NBDC held records of four invasive species within the 2km of the Site, Canadian waterweed, western grey squirrel, nuttall's waterweed and rhododendrum. The records have been held consistently in 2005, 2007, 2010 and 2016. The survey conducted in 2025 did not identify any signs or evidence of these species.	Invasive species have been screened out from further consideration.

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
				It is not considered likely that the historical works at the Site would have resulted in any unintentional spread of these species and they have therefore been screened out from further consideration.	
	Existing Environment	Species dependant	N/A	Butterfly bush, a non-regulated invasive species that has the potential to impact local biodiversity, was recorded in multiple habitats on the Site. There is no direct legal provisions associated with butterfly bush. No other non-regulated invasive species were recorded onsite. No high impact invasive species or plant species listed on the First Schedule of the 2024 European Union (Invasive Alien Species) Regulations 2024 (i.e. species of which it is an offense to disperse, spread or otherwise cause to grow in any space) were identified onsite. Therefore, this receptor has been scoped out from further consideration.	Invasive species have been screened out for further consideration.
Other species	Historic Environment	Wildlife Act 2000 (as amended) EU Habitats Directive Annex II and IV	N/A	<u>Otter</u> The NBDC held records of otter, the earliest from 1989 and the most recent from 2013. The nearest potentially suitable habitat for otter is located ca. 340m north of the Site and it is considered unlikely that otters would have dispersed over 300m into the Site. In addition, given the likely presence of livestock and the open nature of the previous onsite habitats, the historic environment was not considered to be important site for otter. Therefore, Otter has been scoped out from further consideration.	Other species has been scoped in for further consideration.
		Wildlife Act 2000 (as amended)	N/A	<u>Pine Marten</u> The NBDC held a record of Pine Marten within 2km of the Site from 2005.	

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
		EU Habitats Directive Annex V Wildlife Act 2000 (as amended) Wildlife Act 2000 (as amended)	Low Local Value Low Local Value	Pine marten tend to avoid open areas which are devoid of suitable cover. Therefore, the improved agricultural grassland evident within the Site from historic aerial imagery from 1995 was not considered suitable for this species. The ca. 0.08ha of woodland that was potentially present at that time may have provided suitable habitat for this species, however given its small size and isolated nature, it is not likely to have been of value for this species. Pine marten has therefore been scoped out from further consideration. <u>West European Hedgehog</u> The NBDC held records of hedgehog within 2km of the Site from 2007 to 2019. From an assessment of historic aerial imagery from 1995 it is considered that the agricultural grassland, hedgerow / treelines, and mixed broadleaf woodland present at that time on the Site would have had the potential to support this species. The progressive removal of these habitats, as described in Section 6.4.3.1, may have led to a decrease available habitat for this species within the Site. This receptor has therefore been scoped in for further consideration. <u>Irish Stoat</u> The NBDC held one record of Irish Stoat within 2km of the site from 2024. The progressive removal of these habitats, as described in Section 6.4.3.1, may have led to a decrease available habitat for this species within the Site. This receptor has therefore been scoped in for further consideration.	

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
		Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II	N/A	<u>Marsh Fritillary</u> The NBDC held a record of Marsh Fritillary within 2km of the Site from 2014. Marsh fritillaries are typically found in wet or marshy areas. fens and heathlands. Devil's bit-scabious is the only known host plant for marsh fritillary larvae and is a key feature of its optimal habitat. This is associated with damp soil and it has not been possible to determine the historic dampness of the soil on Site from aerial imagery. Given the nature of the on-site habitats, likely presence of livestock and the general management of improved agricultural grassland fields, it is considered unlikely that devil's bit-scabious and, subsequently, marsh fritillary were supported by the historic environment. This receptor has therefore been scoped out from further consideration.	
		Wildlife Acts 1976 / 2000 EU Habitats Directive Annex IV	N/A	<u>Freshwater white-clawed crayfish</u> The NBDC held records of freshwater white-clawed crayfish within 2km of the Site in 1992 and in 2007. Freshwater white-clawed crayfish prefer clean, well-oxygenated, flowing water bodies such as rivers and streams with rocky or stony substrates for shelter. They are sensitive to pollution and sedimentation and typically require stable water conditions. It is considered that the two ponds that were present within the improved agricultural grassland in 1995 within the Site were not suitable for white-clawed crayfish as they were not connected to watercourses and lacked the flowing water conditions preferred by this species. This receptor has therefore been scoped out from further consideration.	

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
	Existing Environment	Wildlife Act 2000 (as amended) EU Habitats Directive Annex II and IV	N/A	<u>Otter</u> The field survey in January 2025 did not identify any evidence of Otter by way of spraints or prints on the Site. The nearest potentially suitable habitat for otter is located ca. 340m north of the Site and it is considered unlikely that otters would have dispersed over 300m into the Site. Given the absence of suitable habitat for this species, this species has been scoped out for further consideration.	Other species has been scoped out from further consideration.
		Wildlife Act 2000 (as amended) EU Habitats Directive Annex V	N/A	<u>Pine Marten</u> The field survey in January 2025 did not identify any evidence of this species. Pine marten tend to avoid open areas which are devoid of suitable cover. Therefore, given the absence of suitable habitat for this species this receptor has been scoped out from further consideration.	
		Wildlife Act 2000 (as amended)	N/A	<u>West European Hedgehog</u> The field survey in January 2025 did not identify any evidence of this species. Given the open nature of the on-site habitats, it is not considered that the Site is of significant value for this species and this receptor has therefore been scoped out from further consideration.	
		Wildlife Act 2000 (as amended)	N/A	<u>Irish Stoat</u> The field survey of January 2025 did not identify any evidence of this species. Given the open nature of the habitats on the Site, it is not considered that the Site is of significant value for this species and this receptor has therefore been scoped out from further consideration.	
				<u>Marsh Fritillary</u>	

Potential Biodiversity Receptor	Environment	Relevant Legislation	Valuation	Scoping Justification	Scoping Result
		Wildlife Acts 1976 / 2000 EU Habitats Directive Annex Wildlife Acts 1976 / 2000 EU Habitats Directive Annex IV Wildlife Acts 1976 / 2000.	N/A N/A Low Local Value	The field survey undertaken in January 2025 did not identify any evidence of this species on the Site. Given the open nature of the on-site habitats, it is considered that the Site is not of significant value for this species and this receptor has therefore been scoped out from further consideration. <u>Freshwater white-clawed crayfish</u> The field survey undertaken in January 2025 did not identify any evidence of this species on the Site. There were no suitable water bodies on the Site for this species and this receptor has been scoped out from further consideration. <u>Fox</u> Three fox scats and footprints were noted within the Site. No fox dens were confirmed present on Site, however as noted above a large mammal hole was identified on the northern boundary. The hole is located outside of the main quarry area and will not be impacted by the removal of the stockpiles. It is not considered that the development will have any impact on fox using the area. Therefore, this receptor has been scoped out from further consideration.	

6.5.5 Summary of Potential Impacts

Following a detailed assessment, the following receptors were identified as significant and brought forward for further consideration due to Potential Historical Impacts and impacts associated with the remedial works (please see Table 6-12).

Table 6-12: Screening Summary

Receptor	Potential Historical Impact	Potential Operational Phase Impacts
Hedgerow / Treeline (WL1 / WL2)	Habitat loss	
Mixed Broadleaf Woodland (WD1)	Habitat loss	
Other Artificial Lakes and Ponds (FL8)	Habitat loss	Habitat loss
Flora	Habitat loss	Habitat loss
Birds	Habitat loss	Suitable habitats for Peregrine falcon and Sand martins
Bats	Habitat loss	
Amphibians	Habitat loss	Habitat loss
Badger	Habitat loss	
Other Species	Habitat loss	

In addition to the species listed above, general mitigation / best practice measures have also been included for the Development. As noted above, the project presents opportunities for enhancing the area for biodiversity. Further details of ecological enhancement measures are provided below.

6.6 General Remedial and Development Mitigation Measures

During the Remedial and Development Phase, all works will comply with all relevant legislation and best practice guidance to reduce any potential environmental impacts. The following guidance relevant to biodiversity will be referred to:

- CIEEM, Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (2018 and revisions);
- NRA, 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes';
- Guidelines for the Protection of Biodiversity within the Extractive Industry [38];
- Fossitt's Guide to Habitats in Ireland;
- Heritage Council's 'Best Practice Guidance for Habitat Survey & Mapping';
- NRA, 'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes;
- C532 – Control of Water Pollution from Construction, Guidance for Consultants and Contractors [68];
- CIRIA C811- Environmental Good Practice on Site (5th edition) [45];
- Guidance for the Treatment of Bats Prior to the Construction of National Road Schemes [46];

- Guidance for the Treatment of Badgers Prior to the Construction of National Road Schemes [47]; and,
- Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads [48].

6.7 Remedial Mitigation Measures

The following mitigation measures will be adhered to during the Development.

6.7.1 Protection for Peregrine Falcon

To ensure that peregrine falcon that may use the Site will be protected from the Development, the following measures will be implemented:

- All personnel operating on-site will be made aware of the legal protection afforded to peregrine falcons and biodiversity signage will be erected throughout the quarry;
- Should a peregrine falcon nest be identified on-site, all personnel operating on the Site will be made aware of the presence and location of the nest. Access will be restricted below cliffs which are actively being utilised by peregrine falcons. This will be done using fencing and / or other appropriate barriers;
- Infrastructure will not be installed, nor any material stockpiled, within 25-50m of rock faces supporting peregrine falcon;
- A buffer of 25-50m will be implemented from any identified peregrine falcon nests on-site. If stockpile removal works are required during the breeding season (1st March to 31st August), the ECoW will need to be consulted. This distance may be increased if this buffer is deemed insufficient and peregrine falcon become disturbed due to works on-site;
- As part of the restoration plan for the Site, the quarry ledges will be left in place and unplanted. This will provide suitable breeding habitat for peregrine falcon; and,
- An annual peregrine falcon monitoring programme will be established during the remedial phases of the Development to establish the potential effects, if any, of the Development on peregrine falcon. The findings of the monitoring will be submitted to Meath County Council, the National Biodiversity Records Centre and NPWS.

The mitigation measures that will be implemented on-site will ensure that the Development does not result in undue disturbances to peregrine falcons.

6.7.2 Protection for Sand Martin

To avoid potential impacts as a result of the removal of stockpiles on sand martins, the following mitigation measures will be implemented:

- All personnel operating onsite will be made aware of the presence (including the location) of sand martin nests onsite and the legal protection afforded to this species;
- Annual monitoring for breeding sand martin by the project ECoW will be undertaken for the duration of the remedial works. The report will be submitted to Meath County Council on an annual basis;
- Areas, where nesting activity is noted, will be clearly marked to ensure disturbance is avoided and routinely monitored, making changes to these marked areas as necessary;
- All exposed faces designated for excavation during the breeding season (1st March to 31st August) will be assessed for their potential to provide breeding sites by February

each year under the advice of the ECoW. These areas can then be managed or worked in such a way as to make them unattractive to sand martin so that the removal of stockpiles can continue without interruption. These management procedures include reprofiling the stockpiles to less than 45° or utilising netting to cover nest holes outside the breeding season. This will prevent sand martin from nesting / burrowing within the active areas onsite;

- Old disused / inactive nests will be removed outside of the nesting season under the supervision of the ECoW, to ensure that no birds are utilising the nests, and the nests are fully removed;
- Regular checks of the Site for evidence of sand martin nesting will be undertaken between March and April, particularly after the Site's closures such as Easter;
- Before the commencement of the nesting season, a suitable aggregate face for sand martins will be set aside. As the phased removal of the earth banks within the Site progresses, a sand martin embankment will be created to ensure active nesting habitat is retained as restoration progresses through the quarry, refer to Section 6.3.1 for further details. The sand martin embankment will be sited away from main activities; and,
- Should sand martin be observed nesting within the works area, then the ECoW will be consulted for advice.

6.7.3 Protection for Amphibians

Given the confirmed presence of smooth newt and suitable breeding, foraging and sheltering habitat for amphibians, In order to ensure that the works do not have adverse effects on amphibians, the following remediation / mitigation measures will be implemented:

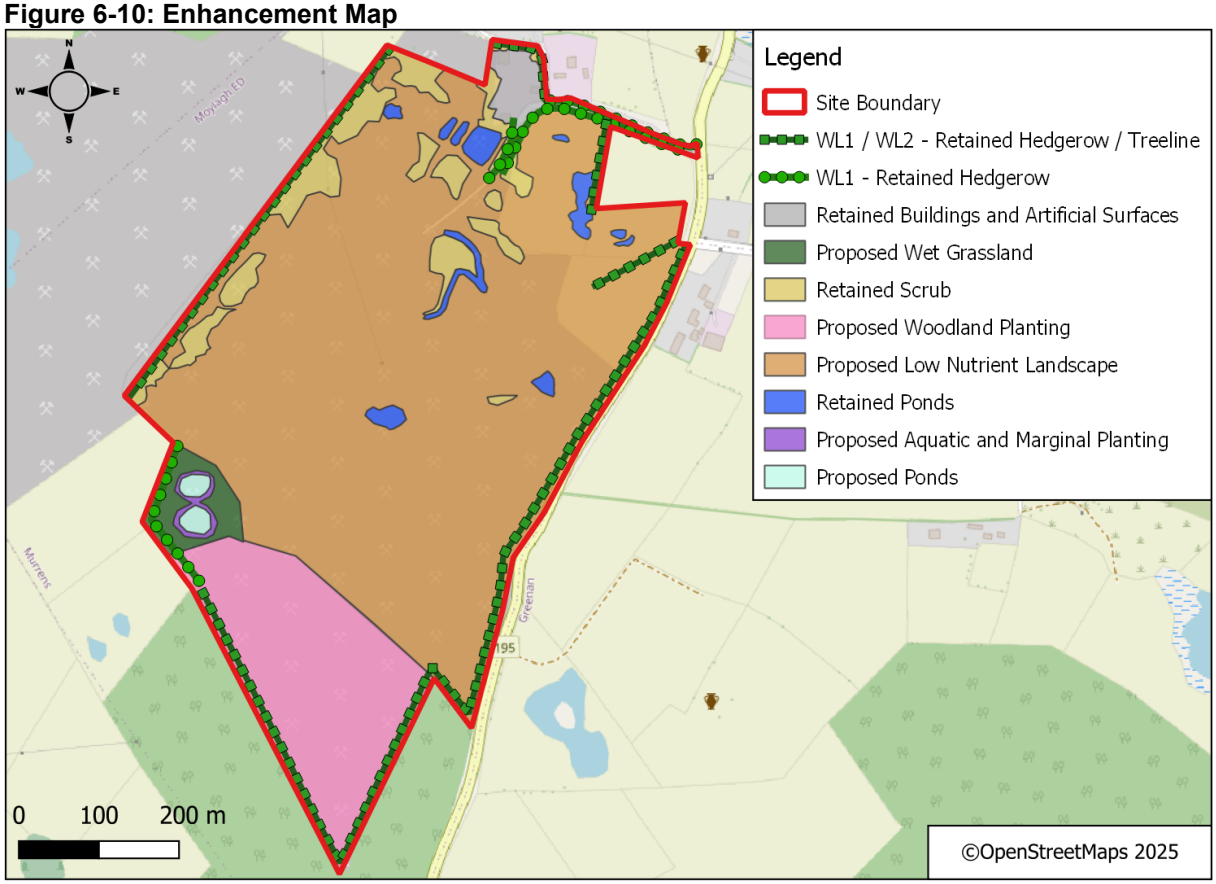
- Amphibian surveys will be completed as per standard best practice for each of the water bodies in the Site;
- No works or alternates to the existing waterbodies will take place until amphibians have been confirmed as being absent;
- Vegetation clearance and ground stripping adjacent to the ponds will be supervised by the ECoW to ensure no adverse effects occur to any amphibians in the area;
- Should potential impacts to waterbodies confirmed as supporting amphibians be required, the NPWS will be consulted with regards to the requirement for a derogation licence; and,
- Should amphibians be encountered on Site during the works, the 'ECoW' will be consulted for advice.

Two new ponds will be constructed to compensate for the ponds removed as part of historical quarrying activities at the Site. In addition, hibernacula and habitat piles will be installed in the landscaped area around the two new ponds to support any potential amphibians in the area (See Section 6.8 below).

6.8 Ecological Enhancement / Remediation Measures

The following ecological enhancement / remedial measures for the Site will be implemented to offset for the loss of habitats as a result of historic activities at the Site. The Ecological Enhancement / Remediation Plan has been developed taking into consideration the species that use or have the potential to utilise the area following the implementation of the plan. Refer to the Figure 6-8 below.

Figure 6-10: Enhancement Map



6.8.1 Habitat Creation

Habitat creation will be undertaken on the Site, as outlined in Figure 6-9 above. This will include a proposed new wet grassland, native woodland area, two new ponds and the restoration of existing quarry habitat to a low nutrient landscape. In addition, all existing ponds and areas of scrub will be retained.

Please note that Stockpiled topsoil and subsoil material stored onsite will be used, where required, for this restoration process. The re-use of soil from the Site will help maintain the seed bank and genetic integrity of the area.

6.8.1.1 Proposed Woodland

As part of the enhancement measures, woodland planting of ca. 6 ha (620m^2) is proposed within the southern tip of the Site. Refer to Figure 6-9. The proposed planting will create new woodland, compensating for the historic woodland and hedgerow / treeline habitat loss and will provide a source of food for a variety of species throughout the year. For example, the foliage and seeds from beech trees are eaten by a variety of species and acorns from oak trees are known to be a valuable food source. In addition, as these trees mature and develop cracks and crevices in the bark, they will provide roosting opportunities for hole-nesting birds, bats and other wood-boring insects. This woodland will provide nesting and foraging opportunities for a variety of bird and mammal species.

Advanced nursery stock will be used as part of the planting mix. Trees and shrubs will be planted directly into square tree pits. The tree pits will be at least 100mm greater than the root system, with the depth not exceeding the root ball. The pit will be backfilled with a mix of topsoil, planting compost and polymer granular. The planting will occur within the first available season (November to March), and any trees that fail to become established within 5 years of planting will be replaced by trees of a similar size / species within the next planting season.

Natural succession processes will in time form a woodland understorey.

The proposed woodland will be planted with the planting mix detailed in Table 6-13 below

Table 6-13: Example Woodland Species Mix

Common Name	Scientific Name
Woodland Trees (Upper and Lower Canopy)	
Pedunculate oak	*Quercus robur*
Scots pine	*Pinus sylvestris*
Beech	*Fagus sylvatica*
Ash	*Fraxinus excelsior*
Downy Birch	*Betula pubescens*
Holly	*Ilex Aquifolium*
Hawthorn	*Crataegus monogyna*

6.8.1.2 Proposed Ponds / Wetland

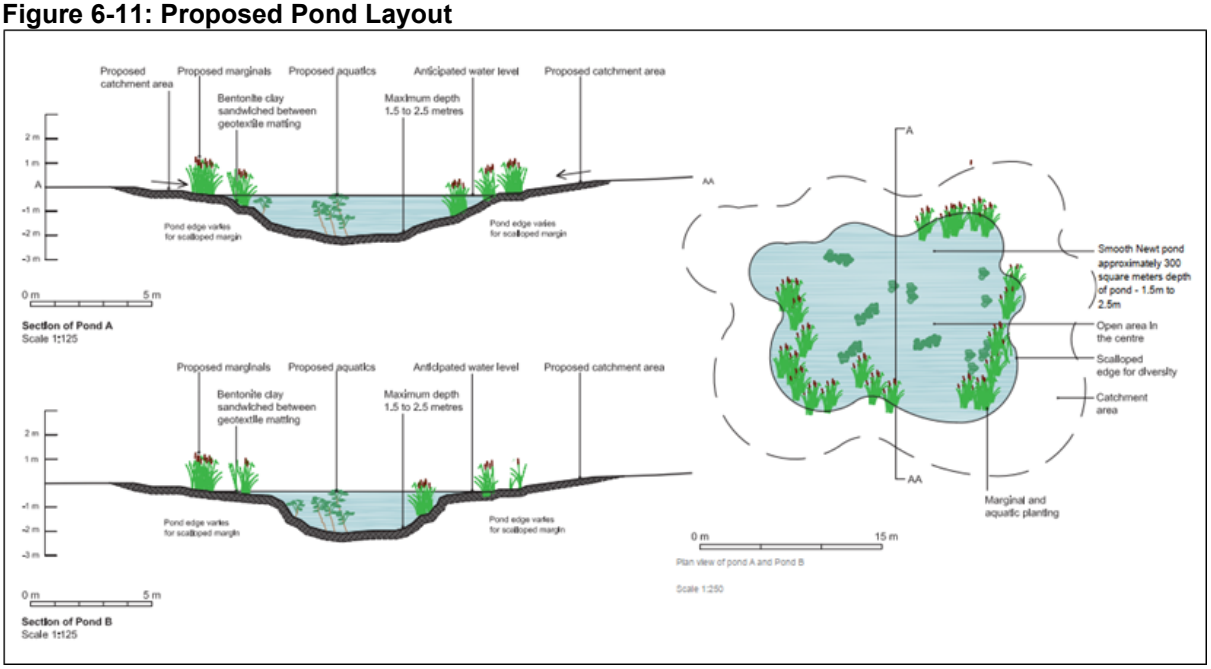
To increase the availability of suitable habitat for amphibians onsite, it is proposed to construct two ponds within the southwest portion of the Site.

The ponds will be designed to have deeper open areas of water alongside gradual sloping shoreline banks with shallow areas. The first pond will be ca. 28m x 37m and the second pond will be ca. 32m x 38m. The two ponds will have different depths (ca. 1m and 2m respectively) and will be designed to remain wet year-round. This will be achieved through an appropriate clay lining or geotextile membrane. Refer to Figure 6-10 below for an example of an appropriate pond layout.

These ponds will provide suitable habitat for egg-laying and larvae development for native amphibian species such as the common frog and smooth newt. Emergent wetland vegetation will be planted into these ponds. This vegetation is essential for breeding / reproduction processes.

The retained scrub and recolonising bare ground / transitional vegetation onsite will provide amphibian species with shelter from excessive heat, dryness and predators.

Figure 6-11: Proposed Pond Layout



Aquatic and Marginal Planting

Planting of marsh vegetation around the ponds will jump start the plant establishment process which will lead to earlier colonisation of wetland species such as aquatic invertebrates, amphibians, and birds. New plant material will be sourced from suppliers who specialise in the provision of local seeds and plant materials. Each of the plant specimens will be checked prior to planting to avoid the transfer of fish or material from undesirable plants.

Aquatic vegetation will be planted either in containerised baskets or the substrate depending on the type of liner used. Plants will be planted into soil in the baskets in groups of between 5 and 8 individuals of the same species. The container will then be sited in the water at a depth of no more than 750mm.

Marginal vegetation will be plug planted. Planting will be in groups of the same species, with individual plants spaced about 300mm apart. The exact location of the aquatic and marginal vegetation will be determined by a suitably qualified and experienced ecologist and only after the ponds have been built. This is to allow the ecologist to assess the exact conditions that have been created and thus to ensure that the planting is sited in the most appropriate location possible.

Table 6-14 presents the mix of marginal and aquatic plants which would be suitable for use within the ponds.

Table 6-14: Planting mix for Ponds and Marginal Mix for Banks

Common Name	Scientific Name
Acquatics	
Pond water crowfoot	*Ranunculus peltatus*
Pondweeds	*Potamogeton natans, or perfoliatus*
Common hornweed	*Ceratophyllum demersum*
Frog bit	*Hydrocharis morus-rane*

Common Name	Scientific Name
Lesser Water Parsnip	*Berula eracta*
Water starwort	*Callitriche platycarpa*
Marginals	
Soft rush	*Juncus effusus*
Arrow-head	*Sagittaria sagittifolia*
Water mint	*Mentha aquatica*
Reed sweet-grass	*Glyceria maxima*
Branched bur-reed	*Sparganium erectum*
Meadowsweet	*Filipendula ulmaria*
Ragged robin	*Lychnis flos-cuculi*
Water forget-me-not	*Myosotis scorpioides*
Yellow flag iris	*Iris psedudacorus*
Water plantain	*Alisma plantago-aquatica*
Marshmallow	*Althaea officinalis*

6.8.1.3 Proposed Wet Meadow

The outer margins of the ponds will be planted with a wet meadow mix (species for potential inclusion are specified in Table 6-15) encompassing an area of ca. 0.8ha (7,800m^2). The seed mix will be locally sourced. Seeding will take place in either spring or autumn and will simply comprise broadcasting the seeds in an appropriate quantity throughout the identified zone. Further soil spreading / penetration will occur as required.

The ecologist will assess the exact conditions that have been created after operations have ceased to ensure an appropriate seed mix is sown in the area surrounding the ponds. This mix will be utilised should the conditions allow it.

Table 6-15: Wet Meadow Mix Example

Common Name	Scientific Name
Grasses	
Marsh foxtail	*Alopecurus geniculatus*
Sweet vernal grass	*Anthoxanthum odoratum*
Tufted hair grass	*Deschampsia cespitosa*
Meadow fescue	*Festuca pratensis*
Red fescue	*Festuca rubra*

Common Name	Scientific Name
Rough meadow grass	*Poa trivialis*
Sedges	
Glaucous sedge	*Carex flacca*
Hairy sedge	*Carex hirta*
Sneezewort	*Achillea ptarmica*
Bugle	*Ajuga reptans*
Marsh marigold	*Caltha palustris*
Cuckooflower	*Cardamine pratensis*
Meadowsweet	*Flipendula ulmaria*
Square stalked St. Jonhn's sort	*Hypericum tetrapterum*
Autumn hawkbit	*Leontodon autumnalis*
Greater birds's foot trefoil	*Lotus pendunculatus*
Gypsywort	*Lycopus europaeus*
Ragged robin	*Lychnis flos-cuculi*
Common fleabane	*Pulicaria dysenterica*
Lesser spearwort	*Ranunculus flammula*
Creeping buttercup	*Ranunculus repens*
Great burnet	*Sanguisorba officinalis*
Marsh wouldwort	*Stachys palustris*

6.8.1.4 Proposed Low Nutrient Habitat

No soil will be spread on this area as it is envisaged that calcareous flora and pioneer species will colonise this low nutrient habitat, which will cover ca. 30ha (306,500m^2). The creation of this low nutrient habitat will provide suitable conditions for red hemp nettle growth and establishment. Any areas of scrub and existing ponds within this area will be retained.

This low nutrient landscape will be monitored for this species and should it be recorded in this area, suitable management and protection strategies will be implemented such as the control of scrub and competitor species.

These new areas will be allowed to naturally regenerate from the seedbank within the material onsite and from sources in the surrounding area. No additional soil will be imported or spread in this area.

It is envisaged that pioneer species will colonise this low-nutrient habitat, and natural regeneration processes will take place within the quarry floor.

6.9 Cumulative and In-combination Impacts

As described above, the Proposed Development works are unlikely to have a significant impact on valued ecological receptors onsite.

A review of the Meath County Council Planning ePlan website did not identify any current granted plans or projects within the Site. However, there were two historic cases, detailed below:

- MCC Ref: 971223;
- Decision: Granted 08/12/1997;
- Description: 'New entrance';
- MCC Ref: 98967;
- Decision: Granted 09/12/1999; and,
- Description: 'To construct an MV E.S.B. sub-station in existing quarry'.

A further historical case to the south of the Site is detailed below:

- MCC Ref: KA802993;
- Decision: Granted 18/09/2009;
- Expiration Date: 17/08/2014; and,
- Description: 'An extension of the existing sand & gravel pit over an area of 4.4 hectares'.

In addition, the majority of nearby planning permissions are related primarily to one-off dwellings and light manufacturing (MCC Ref: 24315) [69]. It is considered unlikely that the Development and these planning permissions would result in any in-combination effects on significant impacts on biodiversity, given the small-scale nature of the permissions granted. A planning application for a quarry extension was permitted directly to the south of the Site; further details are provided below:

MCC Ref: KA141129 & ABP Ref: PL.17.245257

- MCC Decision: Granted 07/07/2015;
- Expiration Date: 15/12/2036; and,
- Description: 'The development will consist of: Extension of the existing sand & gravel pit (Quarry Ref: QY24) to include: an extraction area of c.23.9 hectares; perimeter landscaped screening berms; all other associated site works/ancillary activities; and restoration to a beneficial agricultural & ecological after-use within an overall planning application area of c.28.5 hectares. This planning application will be accompanied by an Environmental Impact Statement ('EIS'). Significant further information/revised plans submitted on this application'.

The EIS submitted as part of this application concluded:

> *'At its closest point the application site lies immediately adjacent to parts of the Lough Naneagh pNHA and 225m north of White Lough, Ben Loughs and Lough Doo SAC however, no significant impacts from the proposed extension to the sand and gravel extraction operations are predicted on these designated sites with the potential zone of influence of the sand and gravel pit.*
>
> *The proposed extension of the Murrens will result in the direct loss of 28.5 acres of agricultural land over the lifetime of mineral extraction operations at this site. The majority*

of habitat that would be lost consists of agriculturally improved grassland of low ecological and conservation value, sections of low significance hedgerow and a number of ephemeral ponds, the loss of which is not predicted to be significant.

Habitats of value that will be lost include sections of high significance hedgerow/treelines and five permanent ponds that are assessed as being of Local (higher) value. The residual impact of loss of these habitat would be significant over the medium to long-term but which can be reversed through the restoration of the site post-quarrying operations.

A number of protected species have been confirmed within the application site, including the valued species of Smooth Newt that is assessed as being of 'County' value. However, through careful consideration of the potential impacts and the implementation of suitable mitigation to minimise these effects the extension of the sand and gravel extraction is not likely to have a significant impact on the local conservation status of these species. An amphibian mitigation strategy has been approved and a derogation licence issued by NPWS to Steve Judge of SLR Consulting Ireland (on behalf of BD Flood) for the implementation of these mitigation works.

The restoration of the sand and gravel pit upon completion of the mineral extraction will restore the land back to agricultural and nature conservation purposes. In the long-term this would restore the site back to a value similar to that which currently exists. However, the restoration will also provide an opportunity to create habitat features that would have benefits for wildlife over the longer-term at this site.'

As part of this application, a screening for Appropriate Assessment was also submitted and concluded that the proposed extension of quarrying operations was not likely to have any impacts on the Natura 2000 network.

This permission was appealed to An Bord Pleanála ('ABP'), and according to ABP's Inspectors Report, the Inspector concluded:

- '*Overall, it is reasonable to conclude that on the basis of the information on the file, which I consider adequate in order to issue a screening determination, that the proposed development, individually or in combination with other plans or projects would not be likely to have a significant effect on White Lough, Ben Loughs and Lough Doo SAC (Site Code: 001810), or any other European site, in view of the site's Conservation Objectives, and a Stage 2 Appropriate Assessment (and submission of a NIS) is not therefore required.'*

ABP granted this permission on the 16th December 2016.

The 'EIA' and 'AA' submitted as part of this application concluded that there would be no impacts on biodiversity. On the basis that it was concluded that this development would not result in any significant impacts on biodiversity and based our assessment of the potential impacts associated with both the historical activities and the Development, which also concluded that there would be no significant impacts provided that the mitigation measures are followed, it can be concluded that there will be no in-combination impacts between these two Sites.

6.9.1 Cumulative and In-combination Impacts Conclusion

It is determined that the planning permissions in the surrounding area, of the Site did not result in significant in-combination effects on biodiversity. As such, they are unlikely to contribute to any cumulative effects on biodiversity.

It should be noted that any potential cumulative impacts will be further minimised as all operations will be undertaken in line with relevant best practice guidelines and legislation alongside the mitigation measures detailed within this 'rEIAR'.

Taking into account that the Development will have an imperceptible residual impact on biodiversity provided the mitigation measures within this 'rEIAR' are implemented as outlined in Sections 6.5 and 6.6, it is considered unlikely that any significant cumulative and in-combination impacts will arise or have arisen as a result of the Development. Subsequently, the cumulative impacts on ecology arising from the Development in combination with other developments are considered to be imperceptible.

6.10 Interactions with Other Environmental Attributes

The Environmental Attributes with which flora and fauna interact include:

- **Chapter 9: Air Quality and Climate:** Air quality and climate change have the potential to impact ecosystems. Therefore, an assessment was carried out on the emissions to air from the Development and the projected GHG emissions; refer to Chapter 9 for further details.

6.11 Residual Impacts

Based on the methodology set out in Section 6.2, the initial assessment of ecological receptors (Table 6-8) is summarised in Table 6-16 below.

Table 6-16: Initial Screening Summary of both Potential Historical and Potential Development Impacts

Receptor	Potential Historical Impact	Potential Development Impact
European Designated Sites		
Nationally Designated Sites		
Active Quarry and Mines (ED4)		
Buildings and Artificial Surfaces (BL3)		
Hedgerows / Treelines (WL1 / WL2)	Habitat Loss	
Improved Agricultural Grassland (GA1)		
Mixed Broadleaf Woodland (WD1)	Habitat Loss	
Other Artificial Lakes and Ponds (FL8)	Habitat Loss	Habitat Loss
Recolonising Bare Ground (ED3)		
Scrub (WS1)		
Earth Bank (BL2)		
Flora and Fauna		
Protected Flora	Habitat Loss	Habitat Loss
Amphibians	Habitat Loss	Habitat Loss
Badgers	Habitat Loss	
Bats	Habitat Loss	

Receptor	Potential Historical Impact	Potential Development Impact
Birds	Habitat Loss	Habitat Loss – Sand martin and peregrine falcon
Invasive		
Other Species	Habitat Loss	

The ecological receptors shaded in green in Table 6-16 above were screened out from further assessment as the potential impacts were not considered to be significant; refer to Table 6-8 for further details.

In addition, an assessment of potential effects on Natura 2000 sites was undertaken and is presented in Stage One: Appropriate Assessment – AA which forms part of the planning application. The conclusion of the AA found that the Development, either alone or in combination with other plans, projects or land uses, has not had and will not have any direct or indirect significant effects on any European sites in light of the site's conservation objectives and best scientific knowledge. No reasonable scientific doubt exists in relation to this conclusion. Accordingly, the progression to Stage 2 of the Appropriate Assessment process (i.e., preparation of a Natura Impact Statement) is not considered necessary. Therefore Natura 2000 sites have been screened out from further consideration within this 'rEIAR'.

The following species and habitats outlined in Table 6-8, were identified as receptors that warranted further consideration to avoid impacts:

- Hedgerow / Treeline (WL1 / WL2);
- Mixed Broadleaf Woodland (WL1);
- Other Artificial lakes and ponds (FL8);
- Protected Flora;
- Birds;
- Bats;
- Amphibians;
- Badger; and,
- Other species.

Mitigation has been proposed for each of these ecological receptors alongside biodiversity enhancement measures for the Site as part of the landscape plans and are outlined in Sections 6.6, 6.7 and 6.8. The results of these measures on these ecological receptors and the resulting residual impact are described below in Table 6-17.

Table 6-17: Valuation of Potential Ecological Receptors Post Mitigation and Enhancement

Receptor	Potential Impact	Assessment of Impacts Post Mitigation and Enhancement	Residual Impact
Hedgerow / Treeline	Net loss of habitat	It is considered that following the implementation of the remedial / enhancement measures, which includes the planting ca. 6ha of native woodland as well as the creation of other habitats on Site, that the loss of the hedgerows as part of the historical operations will be offset once fully established.	Imperceptible.

Receptor	Potential Impact	Assessment of Impacts Post Mitigation and Enhancement	Residual Impact
Mixed Broadleaf Woodland	Net loss of habitat	It is considered that following the implementation of the remedial / enhancement measures, which includes the planting ca. 6ha of native woodland as well as the creation of other habitats on Site, that the loss of the mixed broadleaf woodland as part of the historical operations will be offset once fully established.	Imperceptible
Other Artificial Lakes and Ponds (FL8)	Net loss of habitat Stockpile removal	It is considered that following the implementation of the remedial / enhancement measures, which includes the creation of two new ponds as well as the creation of other habitats on Site, the potential impacts on this receptor will be imperceptible, and as such, there will be no residual impacts as a result of historical operations. It is considered that following the implementation of monitoring and inspection of the Site by the 'ECoW', in advance of any removal of stockpile (as outlined in Section 6-12), that the potential impacts on this receptor will be imperceptible, and as such there will be no residual impacts as a result of the Development.	Imperceptible
Protected Flora	Habitat Loss Optimal Botanical Survey Season	<u>Habitat Loss</u> It is considered that following the implementation of the remedial / enhancement measures, which includes the planting ca. 6ha of native woodland as well as the creation of other habitats on Site, the potential impacts on this receptor will be imperceptible, and as such, there will be no residual impacts. <u>Optimal Botanical Survey Season</u> It is considered that following the implementation of monitoring by the 'ECoW', as outlined in Section 6-12, that botanical surveys will be undertaken within the optimum survey season. The ECoW will undertake a botanical survey within the optimum survey season in advance of the removal of the stockpile to check for the presence of protected or notable species. Should protected or notable species be identified, the project 'ECoW' will consult with the NPWS. It is therefore considered that the potential impacts on protected flora will be imperceptible, and as such there will be no residual impacts as a result of the Development.	Imperceptible
Amphibians	Habitat Loss	It is considered that following the implementation of the remedial / enhancement measures, which includes the creation of two new ponds, the protection measures for amphibians in existing ponds on the Site, as well as the creation of other habitats on Site, the potential impacts on this receptor will be imperceptible, and as such there will be no residual impacts as a result of historical operations.	Imperceptible
Badgers	Habitat Loss	It is considered that following the implementation of the remedial / enhancement measures, which includes the creation of ca. 6ha of new native woodland as well as the creation of other habitats on Site, the potential impacts on this receptor will be imperceptible, and as such there will be no residual impacts as a result of historical operations.	Imperceptible
Bats	Habitat Loss	It is considered that following the implementation of the remedial / enhancement measures, which includes the	Imperceptible

Receptor	Potential Impact	Assessment of Impacts Post Mitigation and Enhancement	Residual Impact
		planting ca. 6ha of native woodland as well as the creation of other habitats on Site, that the potential impacts on this receptor will be imperceptible, and as such there will be no residual impacts as a result of historical operations.	
Birds	Habitat Loss	It is considered that following the implementation of the remedial / enhancement measures, which includes the planting ca. 6ha of native woodland, the creation of two new ponds / wetland and specific measures with regard to peregrine falcon and sand martin (see Sections 6.7.1 and 6.12) potential impacts on this receptor will be imperceptible. As such there will be no residual impacts as a result of the historical operations and the Development.	Imperceptible
Other Species	Habitat Loss	It is considered that following the implementation of the remedial / enhancement measures, which includes the planting ca. 6ha of native woodland as well as the creation of other habitats on Site, that the potential impacts on this receptor will be imperceptible, and as such there will be no residual impacts as a result of historical operations.	Imperceptible

Based on the findings of a detailed desk-based study and field survey undertaken by MOR Environmental Ecologists, along with a review of all ecological information available for the Site and the wider area, it is considered that the Site was and is currently of low ecological value.

It is reasonable to conclude that, with the implementation of the remediation measures and appropriate mitigation measures and adherence to standard best practice procedures outlined in this chapter, no significant negative ecological impacts are anticipated as a result of the Development, both historically or as part of future ongoing operations.

6.12 Monitoring / Surveys

An Ecological Clerk of Works ('ECoW') will be appointed to the project to oversee compliance with the required ecological mitigation and remedial / biodiversity enhancement measurements

The 'ECoW' will inspect the Site and undertake a botanical survey within the optimum survey season in advance of the removal of the stockpile to check for the presence of protected or notable species. Should protected or notable species be identified, the project 'ECoW' will consult with the NPWS.

The 'ECoW' will inspect the Site and undertake amphibian surveys in line with best practice in advance of the removal of the stockpile to check for the presence of amphibians within the surface water ponds to be impacted by the removal of the remaining aggerate stockpiles. Should amphibians be identified, the project 'ECoW' will consult with the NPWS with regards to the requirement for a derogation license.

Peregrine falcon Surveys and Sand martin surveys will be undertaken by the 'ECoW' for the next five years to monitor for the presences of the species and to ensure no impacts occur to breeding birds as a result of the Development, the findings of the monitoring will be submitted to Meath County Council and the National Biodiversity Records Centre.

6.13 Reinstatement

Not applicable.

6.14 Do Nothing Scenario

Should the project not be granted permission, the proposed remedial / habitat enhancement works will not be realised. It is considered that the proposed remedial plan will provide for a better outcome at the local level than the do-nothing scenario.

6.15 Difficulties Encountered

This 'rEIAR' is 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.

However, based on the available information and updated Site surveys, it is considered that the assumptions made in this assessment are reasonable in terms of assessing historical impacts that may have occurred.

6.16 Conclusions

Based on the findings of a detailed desk-based study, a review of all the ecological information available for the Site and wider area and a field survey by MOR Ecologists, it is considered reasonable to conclude the following:

- The Site itself was and is currently considered to be of low local ecological value;
- The Development will not result in any significant impacts on ecological receptors identified both onsite and in the surrounding area following the implementation of appropriate mitigation measures; and,
- The proposed remedial plan and biodiversity enhancement measures will replace habitats removed as part of the historic quarrying activities, supplement the existing habitats on and bordering the Site and provide additional habitats and opportunities for species already existing within the area.

7 LAND, SOILS & GEOLOGY

7.1 Introduction

This chapter of the rEIAR has been prepared by the MOR Environmental team. It provides a description and assessment of the likely and significant effects on the geological and soil environment from the historical operational works of the Site. Where likely significant effects were identified, appropriate remedial measures to reduce or avoid these effects have been outlined.

7.2 Methodology

The study area for the Land, Soils and Geology assessment has been defined on the basis of a 2 km radius from the Site, as suggested in the Institute of Geologists Ireland ('IGI') Guidelines [70]. In line with these guidelines and in line with a review of the land, soils and geological environment, the study area may be extended beyond the 2 km radius to reflect the sensitivity of the subsurface and the presence of sensitive features which may be impacted by the Site.

In order to determine the baseline environment, a desk-based study was undertaken to collect and review background information in advance of a site survey. A site-specific topographical survey was also conducted to collect data on the topography of the area.

7.2.1 Legislative Context

The importance and sensitivity of the geological receptors within the Site were 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.

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

- IGI Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements [70];
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes [71];
- Department of Environment, Heritage and Local Government: Quarries and Ancillary Activities - Guidance for Planning Authorities [12];
- EPA Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [72]; and,
- IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment [73].

7.2.2 Desk-Based Study and Site Visit

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 [74];
- Environmental Protection Agency ('EPA') Online Mapping [75];
- J.M. Leigh Surveys Ltd. Geophysical Survey Report for Murrens Quarry [76];
- Sixwest Topographic Survey [77];

- GSI Meath – County Geological Report for Murrens [78]; and,
- Causeway Geotech Murrens Quarry, Oldcastle, Ground Investigation Report [79].

A site visit was carried out by MOR Environmental personnel on the 27th November 2024. The purpose of the site visit was to liaise with the site operator, gain an understanding of the site operations, identify potential areas of concern and assess the potential impact of quarrying activities on the geological environment.

The findings of the desk-based study and site visit are presented in Section 7.3.

7.2.2.1 Site Investigations

Sixwest conducted a topographic survey in December 2024 [77] to collect accurate information on the landscape's traits and features within the Site. Deliverables from the survey included an ortho map, the elevation of various features and detailed satellite images of the specific areas of the Site. Details for the findings of the topographic investigation are further discussed in Section 7.3.3. The topographic survey is presented within Appendix 7-1.

Causeway Geotech carried out an intrusive site investigation in January 2025 to collect information on the underlying geology of the site to inform the site-specific geological setting and determine if the site has had any lasting negative effects on the soils and geology environment. Details of the investigation findings are presented in Sections 7.3.5 and 7.3.7 and the investigation report is presented in Appendix 7-2. The site investigation programme carried out by Causeway Geotech involved the excavation of six. trial pits in the north of the Site and drilling of three. boreholes using a rotary core drilling rig across the Site. These site investigation locations are presented in Appendix A of the Causeway Geotech ground investigation report presented in Appendix 7-2 and within Figure 7-1 below.

Figure 7-1: Site Investigation Locations extracted from Causeway Geotech Report

7.2.3 Impact Assessment Methodology

Following on from the identification of the baseline environment, the available data was utilised to identify and categorise potential effects on the land, soils and geological environment as a result of the Development.

The significance of effects due to the Development has been assessed in accordance with the EPA guidance document Guidelines on the Information to be Contained in Environmental Impact Assessment Reports [27]. These are outlined in Chapter 1 (Introduction) of this rEIAR and are dependent on the sensitivity of the environmental attributes and the magnitude of the impact.

The sensitivity of the land, soils and geological environment was assessed on completion of the desk study. Using the table presented in Box 4.1 of the 2008 NRA Guidelines [71], which is also presented in Appendix C of the IGI Guidelines [70], the sensitivity of the soils and geological attributes within the study area is set out in Table 7-1 below.

The magnitude of the impact takes into account the likely scale of the predicted change to the baseline conditions and considers the duration of the impact i.e. temporary or permanent. The criteria for determining the magnitude of the impact on the land, soils and geological environment is based on the table presented in Box 5.1 of the 2008 NRA Guidelines [71], which is also presented in Appendix C of the IGI Guidelines [70], is presented in Table 7-2 below.

Potential impacts may have a negative, neutral or positive effect on the land, soils and geological environment.

Table 7-1: Estimation of Importance of Geology Attributes

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

Importance	Criteria	Typical Example
	Volume of peat and / or soft organic soil underlying site is small on a local scale.	Poorly drained and / or low fertility soils. Uneconomically extractable mineral resource.

Table 7-2: Estimation of Magnitude of Impact

Magnitude	Criteria	Typical Example
Large adverse	Results in a loss of attribute.	Loss of high proportion of future quarry or pit reserves. Irreversible loss of high proportion of local high fertility soils. Removal of entirety of geological heritage feature. Requirement to excavate / remediate entire waste site. Requirement to excavate and replace high proportion of peat, organic soils and/or soft mineral soils beneath the development.
Moderate adverse	Results in impact on integrity of attribute or loss of part of attribute.	Loss of moderate proportion of future quarry or pit reserves. Removal of part of geological heritage feature. Irreversible loss of moderate proportion of local high fertility soils. Requirement to excavate / remediate significant proportion of waste site. Requirement to excavate and replace moderate proportion of peat, organic soils and/ or soft mineral soils beneath the development.
Small adverse	Results in minor impact on integrity of attribute or loss of small part of attribute.	Loss of small proportion of future quarry or pit reserves. Removal of small part of geological heritage feature. Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils. Requirement to excavate / remediate small proportion of waste site. Requirement to excavate and replace small proportion of peat, organic soils and/or soft mineral soils beneath the development.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity.	No measurable changes in attributes.
Minor beneficial	Results in minor improvement of attribute quality.	Minor enhancement of geological heritage feature.

Magnitude	Criteria	Typical Example
Moderate beneficial	Results in moderate improvement of attribute quality.	Moderate enhancement of geological heritage feature.
Major beneficial	Results in major improvement of attribute quality.	Major enhancement of geological heritage feature.

The impact assessment matrix table presented in Box 5.4 of the 2008 NRA Guidelines [71] and in Appendix C of the IGI Guidelines [70], and presented in Table 7-3 below, provides a framework for the consistent and transparent assessment of predicted effects across all technical chapters; however individual assessments are based on relevant guidance and the application of professional judgement.

In taking the sensitivity of the geological attribute and the magnitude of the impact, the significance of the effect is assessed. For the purpose of this assessment, effects rated as being "Significant-Moderate" or above are considered to be significant in EIA terms. Effects rated as being "Moderate" are subject to professional judgement regarding significance, with a rationale provided for this in the main assessment. Effects identified as less than moderate significance are not considered to be significant in EIA terms.

Table 7-3: Impact Assessment Matrix

Sensitivity of Receptor	Magnitude of Impact			
	High Adverse	**Medium Adverse**	**Small Adverse**	**Negligible**
Very High	Profound	Profound/ Significant	Significant / Moderate	Not Significant
High	Profound / Significant	Significant/ Moderate	Slight / Not Significant	Imperceptible
Medium	Significant	Moderate	Slight	Imperceptible
Low	Moderate / Slight	Slight/ Not Significant	Not Significant	Imperceptible

7.3 Receiving Environment

7.3.1 Historical Land Use

A review of the Tailte Eireann historical maps and the historical aerial photography available for viewing as basemaps on the GSI open data viewer [74], was carried out to assess the changes in land use. The historical maps include the first edition 6-inch map dated 1829 – 1841; the first edition 25-inch map dated 1897 to 1913, and the last edition 6-inch series dated 1830's to 1930's. The aerial photography includes photos dated 1995, 1996 - 2000, 2001 – 2005, 2006 – 2012 and 2013 – 2018.

The first edition 6-inch map identifies the Site area as undeveloped but with two structures of unknown use in the northern part of the Site and one structure of unknown use along the eastern Site boundary. Several historical gravel pits are mapped in the immediate area surrounding the Site.

The first edition 25-inch map identifies two lime kilns and a structure of unknown use, but denoted as P, in the northern part of the Site. These structures have since been removed. The structure mapped along the eastern site boundary in the first edition 6-inch map is not present in the first edition 25-inch map. The land is indicated to be predominantly dry with a small area of potential marsh in the north of the site and a larger area in the centre of the site. A possible

water body is mapped in the centre of the site within this larger marshy area. The gravel pits mapped in the first edition 6-inch map are not present in the first edition 25-inch map; however, one additional gravel pit is mapped to the northeast of the Site.

The last edition 6-inch map presents similar information on the Site and surrounding land as that shown in the first edition 25-inch map. The possible water body in the centre of the site is identified as 'water' on the last edition of the 6-inch map.

The recorded history of the Site recognises the Development as having pre-1995 origins.

Black and white aerial photography from 1995 shows that extraction has taken place within the central and northern areas of the Site and that the surrounding land is undeveloped. The extension of the quarry to the western site boundary is shown in the 1996 – 2000 aerial photography, and the water system on the site appears to be in development at this time. The 2001 – 2005 and 2006 – 2012 aerial photography shows the extension of the quarry towards the east and south of the Site, and the quarry extents are to the eastern and southern site boundaries are shown in the 2013 – 2018 aerial photography. Since then, the quarry has been extended to the north, as observed during site walkovers.

This review of the historical maps and aerial photography indicates that the land surrounding the Site has been used as far back as the early to mid-1800s for gravel extraction. The main change in land use to the land surrounding the Site, is the development of the neighbouring quarry to the west, the construction of the local road network and the development of one-off residential housing.

Overall, the surrounding land to the north, east and south of the Site has remained predominantly unchanged.

7.3.2 Current Land Use and Site Description

According to the Corine Land Cover mapping presented on EPA Maps [75], the current land use for the majority of the Site and to the west of the Site is characterised as a 'mineral extraction site'. This corresponds with the Site quarry and neighbouring quarry extraction activities. The northern area of the Site and the surrounding land to the north of the Site is classified as 'land principally occupied by agriculture with significant areas of natural vegetation'. The surrounding land to the east and south of the Site is classified as agricultural areas used for 'pasture'.

There are various land uses within the 2km study area, with most land use identified as forested or agricultural.

Inland marshes are identified ca. 1.9km south of the Site and, according to the nomenclature guide provided by the European Topic Centre on Urban Land and Soil Systems [80], consist of low-lying land usually flooded in winter, and with ground more or less saturated by fresh water all year round.

Directly ca. 0.72km to the northwest, and ca. 0.42km and ca. 1.1km to the southeast of the Site respectively, the area is dominated by 'broad-leaved forests. These areas are characterized by trees with a minimum height of 5m, and include deciduous and evergreen broad-leaved tree species coving >75% of the tree covered area; sporadically occurring patches of coniferous trees not exceeding 25% of the tree covered area and sporadically occurring <25ha patches of shrubs, herbaceous vegetation, mosses and lichens, and denuded spots underneath [80].

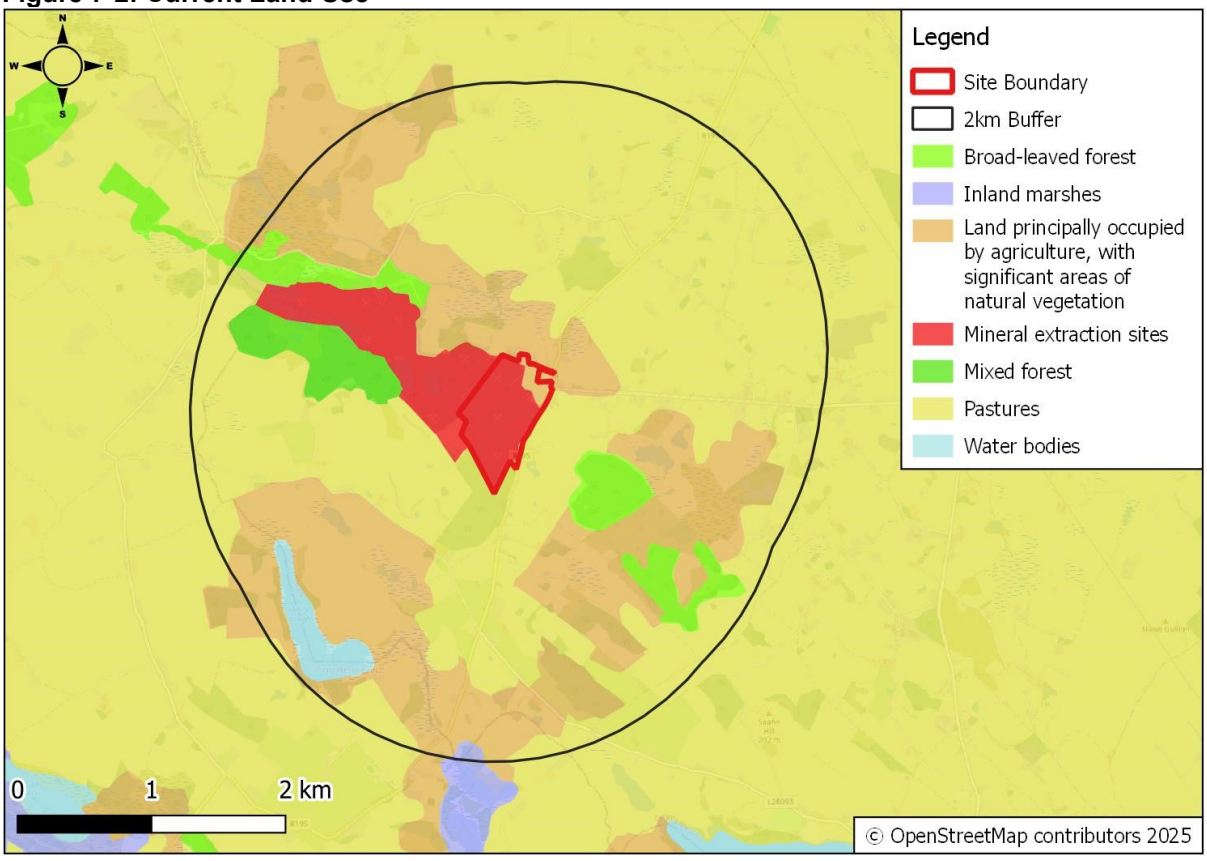
Directly ca. 0.45km east of the Site, the area is dominated by 'mixed forests'. These areas are characterized by trees including shrubs and bush understory where neither broad-leaved nor coniferous species pre-dominate. These areas consist of deciduous and coniferous trees with 25-75% share, evergreen or deciduous coniferous (needle-leaved) trees with 25-75% share

and randomly occurring <25ha patches of shrubs, herbaceous vegetation, mosses and lichens, and/or denuded spots underneath [80].

Areas of 'land principally occupied by agriculture with significant areas of natural vegetation' are present to the north of the Site, ca. 0.6km east of the Site and ca. 0.6km southwest of the Site are characterised by areas principally occupied by agriculture, interspersed with significant natural or semi-natural areas (including forests, shrubs, wetlands, water bodies, mineral outcrops) in a mosaic pattern. The remaining land use within the 2km study area identified as 'pasture' consists of lands that are permanently used (at least 5 years) for fodder production. These lands can be extensively or intensively grazed permanent grasslands with the presence of farm infrastructure such as fences, shelters, enclosures, watering places, drinking trough, and/or regular agricultural measures and works such as mowing, drainage, hay making, seeding, manuring and shrub clearance [80].

The surrounding area also comprises a number of individual private dwellings and farms; small businesses, local roads and the R195 regional road from which the Site is accessed.

Figure 7-2: Current Land Use



7.3.3 Topography

Based on the topographic contour data available on the GSI public data viewer [74], the Site is located in a hummocky landscape, with higher topography generally to the south and southeast and softly undulating landscape to the north. Greenan hill and Ballany hill to the southeast are topographic highs of 209 mOD and 197 mOD respectively.

A site-specific topographic survey was conducted by Sixwest in December 2024 and is presented in Appendix 7-1. Results of this survey show that the Site has been extracted to various depths. The minimum elevation within the Site is recorded as 114 mOD in the southern section in an area characterized by standing water. The maximum elevation within the Site is

recorded as 152 mOD within the centre of the Site which corresponds to a stockpile located to the northwest of a vegetated area.

The ridge height around the quarry ranges:

- From 130 mOD to 136 mOD along the northern site boundary;
- From 130 mOD to 146mOD along the eastern site boundary;
- From 132 mOD to 140 mOD along the southern site boundary; and,
- From 134 to 140 mOD along the western site boundary.

7.3.4 Soils

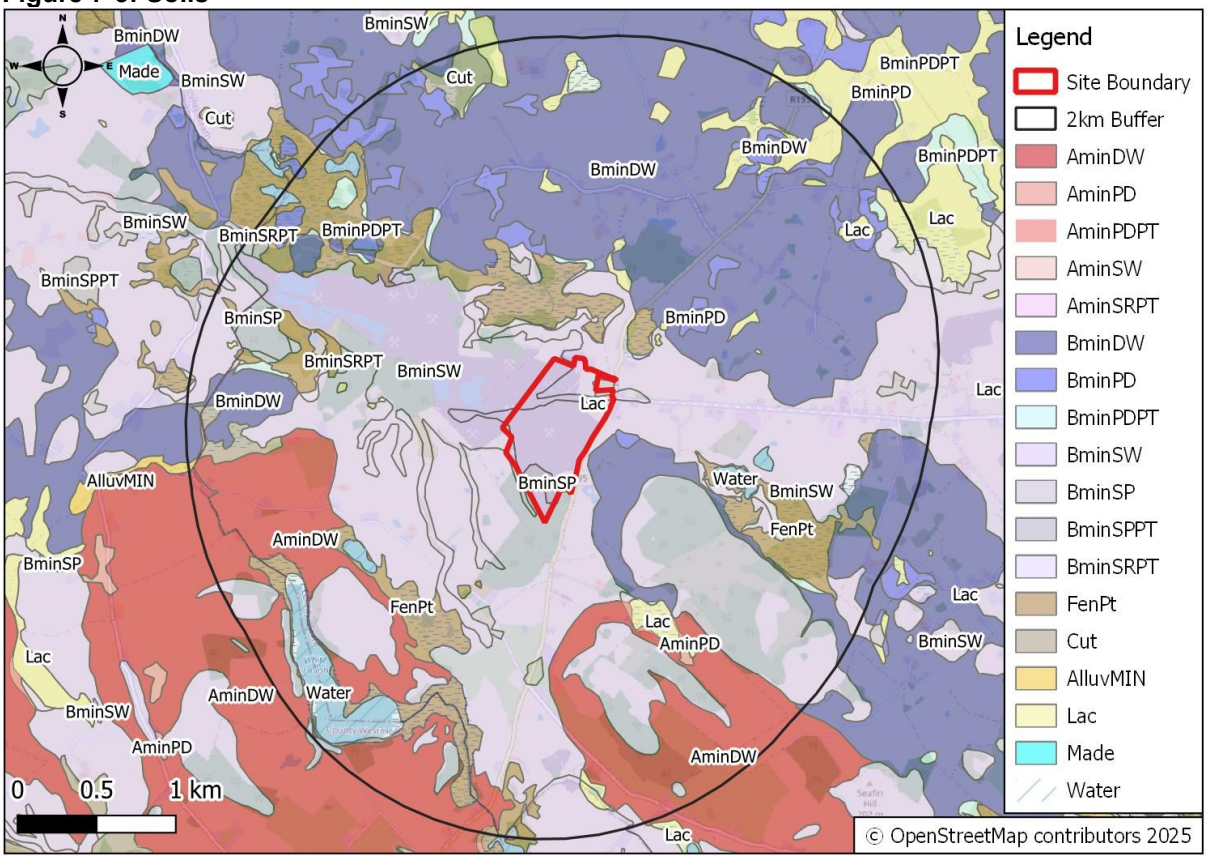
According to the GSI database soil map [74], the Site is characterised by soils of basic, shallow, well drained minerals ('BminSW') throughout the majority of the Site. Small areas in the northeast and southeast areas of the Site care characterised by basic, shallow, poorly drained minerals ('BminSP').

In addition to the above soil types, the surrounding study area comprises gravels and tills derived from limestone (basic minerals), till chiefly derived from cherts (acidic minerals), peaty deposits and alluvium along riverbanks and lacustrine deposits. These soils are categorised into the following soil types and presented in Figure 7-2 below:

- Mainly basic, deep, well drained minerals ('BminDW') throughout the study area;
- Mainly basic, poorly drained minerals ('BminPD') predominantly in the north of the study area;
- Mainly basic, shallow, peaty/non-peaty minerals ('BminSRPT');
- Mainly acidic, deep, well drained minerals ('AminDW');
- Mainly acidic, poorly drained minerals ('AminPD');
- Patches of lacustrine ('Lac') and alluvium ('AlluvMIN');
- Patches of peaty soils throughout the study area, which include:
    - Blanket peat ('BkPt');
    - Fen peat ('FenPt');
    - Cutover / cutaway peat ('Cut');
    - Mainly basic, peaty, poorly drained minerals ('BminPDPT');
    - Mainly basic, shallow, rocky, peaty/ non-peaty minerals ('BminSRPT'); and,
    - Mainly acidic, peaty, poorly drained minerals ('AminPDPT') are identified only in the southeast of the study area.

Soils in the study area directly correlate to quaternary geology (i.e. subsoils) discussed in section 7.3.5.

Figure 7-3: Soils



7.3.5 Quaternary Geology

Quaternary sediments are soft materials that have been deposited over the last 2.6 million years and in Ireland, much of this is glacial sediment deposits. These deposits make up the subsoils across the country.

According to the GSI mapping [74], quaternary sediments (subsoils) within the majority of the Site are characterised by gravels derived from limestones ('GLs') as shown in Figure 7-3 below. Two long bands of an esker comprised of gravels of basic reaction ('BasEsk') cut through the northern area and southern area of the Site, orientated east to west and northwest to southeast respectively. Eskers comprised of gravels of basic reaction are long and narrow ridges of glacio-fluvial materials which were deposited at the base of an ice sheet during the last ice age. Hence the orientation of these eskers corresponds with the direction of travel of these paleo ice sheets. The northwestern boundary of the Site is dominated by the esker. The GSI mapping also shows gravels derived from Limestones throughout the Site, and a small section of lacustrine sediments ('L') recorded in the northeastern section of the Site, bordering the northern esker band. These gravel deposits and eskers are described in more detail in section 7.3.6. Lacustrine subsoils comprised well-sorted, laminated beds of silts and clays deposited in low-energy lacustrine environments, corresponding to possible glacial lakes associated with the eskers and paleo-glacial activity in the study area.

As observed during the site walkover, the majority of the site is comprised of glacio-fluvial material and gravels. However, these materials are absent in the eastern side of the Site, where soft Limestone bedrock is present (refer to Section 7.3.7 for more information).

In addition to gravel deposits and esker, the main subsoils are till derived from limestones ('TLs') to the east, north and west of the study area; and till derived from chert ('TCh') in the south of the study area.

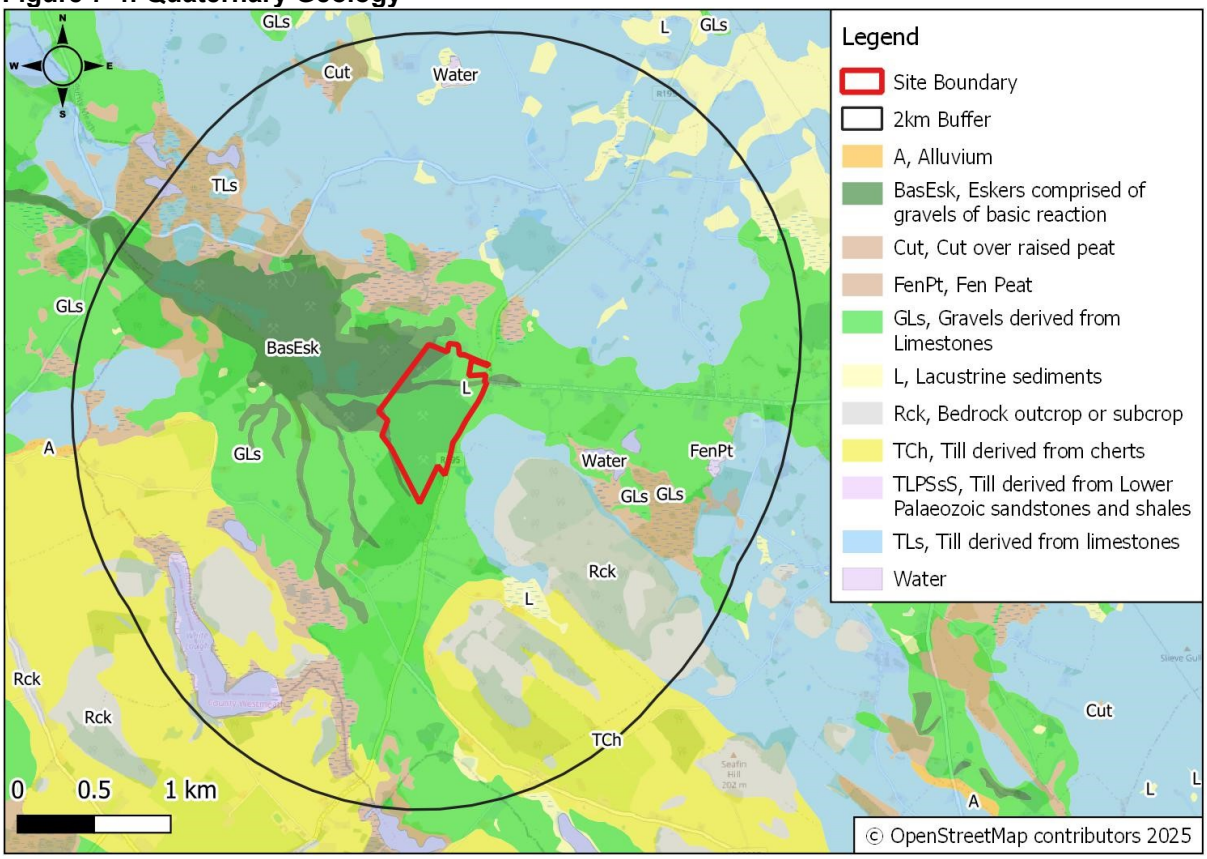
Isolated areas of Fen peat ('FenPt') and cutover peat ('Cut') are present throughout the study area and correspond with the location of areas of peaty soils. Fen peat is described as peatland situated within a depression that has been in contact with bedrock or soils rich with minerals, often basic, corresponding to limestone geology within the area.

There are several lacustrine sediment deposits across the study area and there are areas of bedrock outcrop or subcrop ('Rck') in the south of the study area.

The subsoil permeability varies across the study area. It is classified as high where there are gravel and fluvio-glacial deposits, low where there are peat deposits and moderate elsewhere. Areas which do not have a classification correspond to areas where the subsoil is less than three meters thick. These areas correspond to the mapped areas of bedrock outcrop of subcrop.

Subsoil permeability assessed with subsoil depth provides an indication of how well-protected the groundwater is and how vulnerable the groundwater is to pollution. Additional information on this is provided in Chapter 8 – Water.

Figure 7-4: Quaternary Geology



All trial pits excavated as part of the site investigation programme identified the following soil layers underneath the northern area of the Site:

- Made ground – bitmac; brown, slightly gravelly fine to coarse SAND and firm brown, slightly sandy, slightly gravelly CLAY with low to medium cobble content and occasional rootlets and plastic throughout;
- Gravel layer – Light brown to grey, slightly sandy, slightly clayey, angular fine to coarse GRAVEL with medium cobble and boulder content; and,
- Sand layer - Light orangish brown to dark brownish grey gravelly, slightly clayey, fine to coarse SAND. Cobbles and boulders present with depth.

The sand layer was identified to a depth of 4.5m below ground level ('mbgl'), corresponding to a topographic level of 122.1 mOD. However, the depth of these subsoils in the northern section of the site (BH01) was proven to be eight meters thick and present down to 112.36 mOD. Subsoils toward the southern section of the site are thinner with only 3m of subsoils identified at BH03 and none identified at BH02. Refer to Appendix 7-2 for the Causeway Geotechnical site investigation report and Figure 7-1 for the site investigation locations.

7.3.6 Glacial Landforms

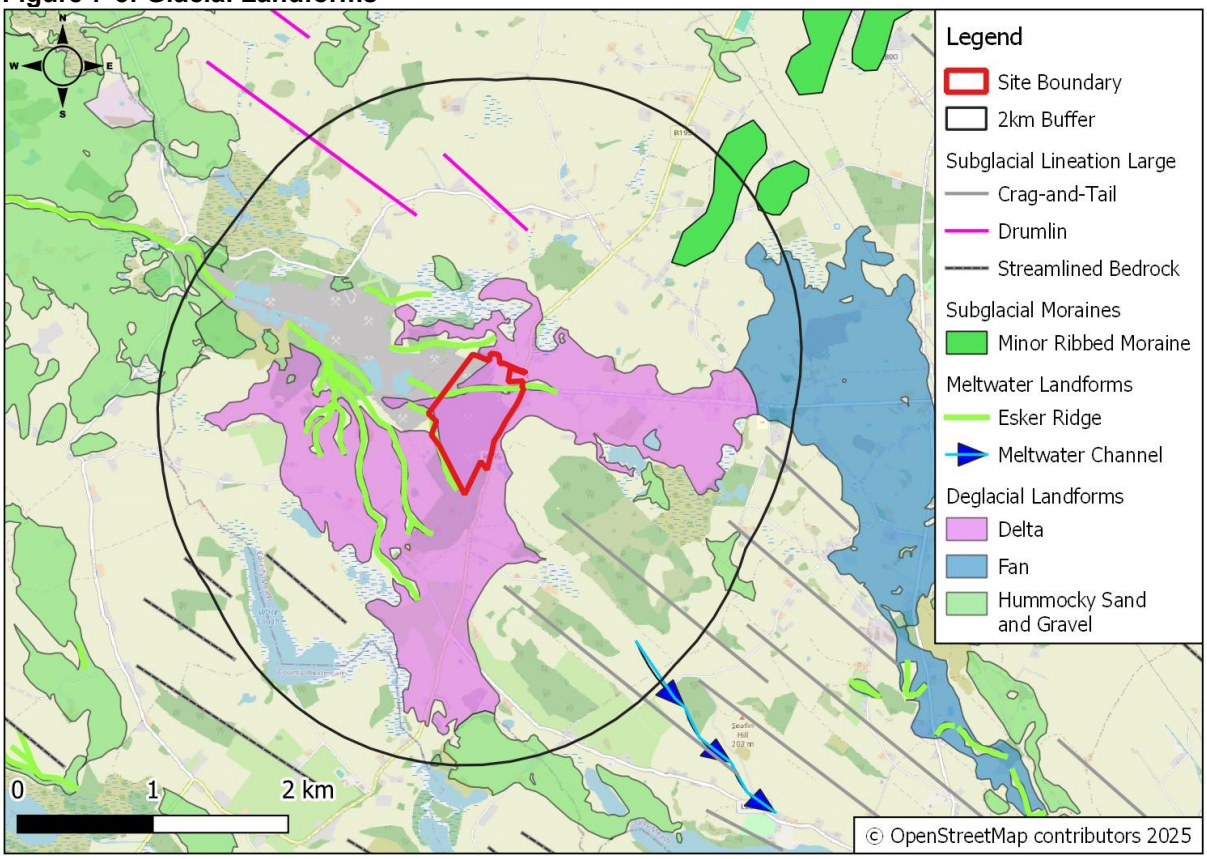
The Site is located within a hummocky landscape defined by glacial landforms, including a series of esker ridges known as the Finnea-Murrens Esker, both within and surrounding the quarry, the Murrens Supraglacial Delta within which the Site is located, and the Drumone Fan. Other glacial landforms include drumlins and moraines, as well as features cut into the bedrock, which indicate the direction of travel of the ice sheet, such as crag and tail and streamlined bedrock.

Eskers are features relating to streams that form beneath ice sheets, bounded by ice walls in the form of tunnels, allowing fluvial coarse-grained sediments to be deposited during deglaciation. Drumlins are elongated hills in a general teardrop shape and are formed from glacial reworking of underlying till or moraine. Streamlined bedrock are lineation features within exposed bedrock that occur during the advancement and the retreat of glaciers where erosional striations occur. Crag-and-tail features form as a glacier moves across an area of resistant rock while eroding surrounding softer rock, resulting in a protruding outcrop (crag). The softer rock that is eroded (tail) remains as a gradual, gentle sloping fan or ridge. Drumlins, streamlined bedrock and crag-and-tail are features which indicate the direction and orientation of the paleo-glacier, which in this area is orientated northwest to southeast.

Drumlins, streamlined bedrock and crag-and-tail features are orientated in a general northwest-to-southeast trend across the study area. Still, none are located within the Site boundary, as shown in Figure 7-4. Hummocky sand and gravel landscapes are recorded to the northwest and southeast of the Murrens Supraglacial Delta and are generally in line with the orientation of other glacial features within the study area.

The Murrens Supraglacial Delta and the Finnea-Murrens Esker are classified as a geological heritage site. Additional information on these features is presented in Section 7.3.8.

Figure 7-5: Glacial Landforms



7.3.7 Bedrock Geology

According to GSI mapping [74] the bedrock beneath the majority of the Site is comprised of cherty limestone and minor shales known as the Derravaragh Cherts unit (Palaeozoic era, Carboniferous period, Mississippian subperiod) as shown in Figure 7-5 below. According to the GSI reports on Geological Heritage sites of Westmeath Mullingar Bypass [81], the Derravaragh Cherts unit occurs in the upper part of the Lucan Formation. Cherts consist of unfossiliferous thinly bedded calcisiltites and wackestones interbedded with the shales. The chert layers within the Derravaragh Cherts formation are often regionally referred to as 'Festoon cherts' due to their nodular and 'chain-like- impressions. According to the GSI reports on Geological Heritage sites of Westmeath Lough Derravaragh [82], the cherts in this formation are resistant to erosion and is comprised of multiple concentric thin bands of chert rock.

The northeastern section of the Site including the main office and main entrance from the R195 to the quarry is comprised of dark limestone and shale known as the Lucan Formation (Palaeozoic era, Carboniferous period, Mississippian subperiod). According to the GSI reports on Geological Heritage sites of Westmeath Mullingar Bypass [81], this formation is representative of basinal marine facies and often referred to as Lower 'Calp' limestone.

Bedrock outcrops to the southeast of the Site shows the area is gently dipping at a 15° angle in a general southeast direction.

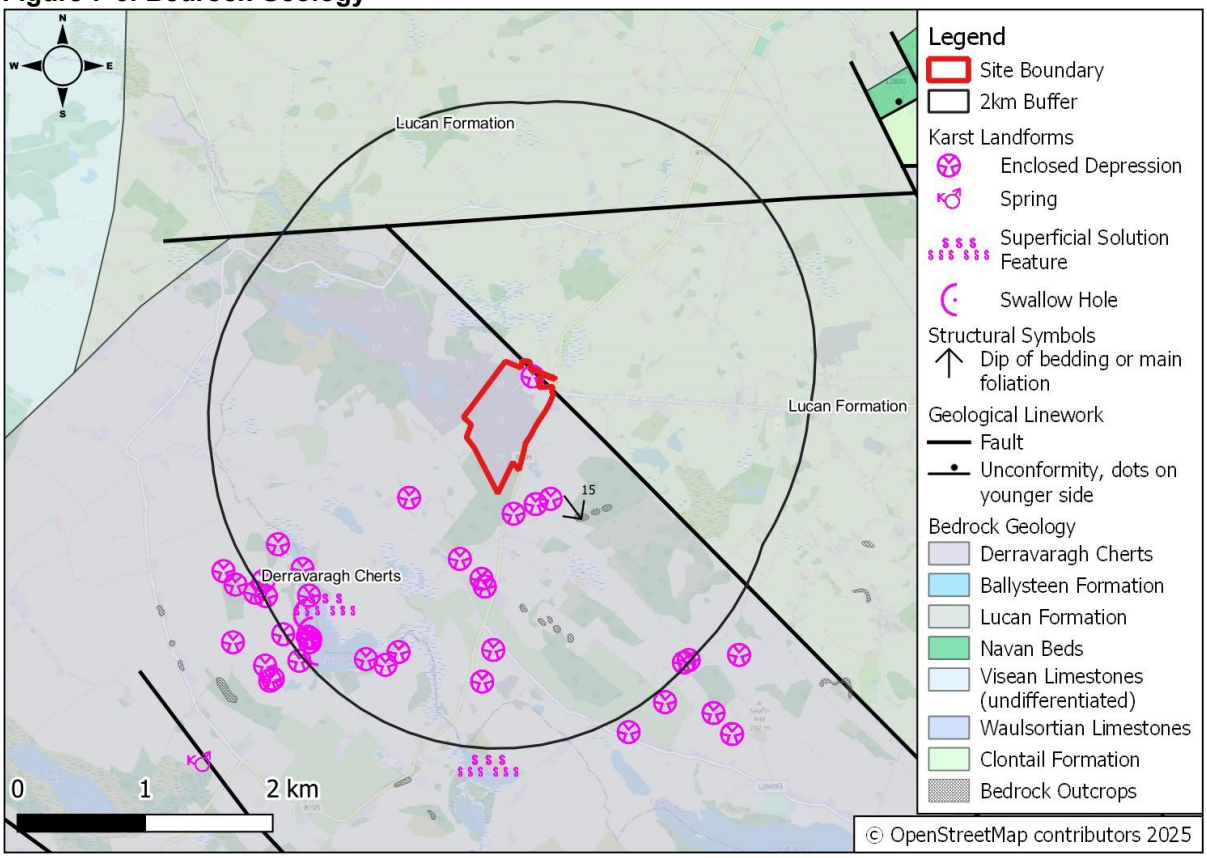
According to GSI mapping [74], large faults are present across the wider area including a fault that divides the Derravaragh Cherts and the Lucan Formation within the Site, which is orientated northwest to southeast. A second fault is located ca. 1.5 km north of the Site and is orientated east to west. The faults intercept at a 45° angle.

GSI mapping [74] shows a karst landform known as an enclosed depression along the northern boundary of the Site. Enclosed depressions are regarded as the most common landforms of karst. They function to funnel rainfall and runoff vertically down to recharge the underlying bedrock aquifer. The smallest of these features are termed dolines. These are formed by two main methods, i.e. the slow solutional removal of rock from the surface downward (solution doline) or by the collapse of overlying rock or overlying material into an underground cave or chamber (collapse doline). Most dolines are considered polygenetic in origin and are usually formed from a combination of solution and collapse.

This enclosed depression mapped within the Site can be clearly seen in the 2006 – 2012 satellite imagery. However, this area has since been reworked and undergone excavation in correspondence with extraction activities, and hence the feature was not observed during a site walkover. Bedrock was also not observed in this excavated area and so it is assumed that there was no connection between the mapped enclosed depression and the underlying bedrock aquifer.

There are several karst features present in the south of the study area and are predominantly classified as enclosed depressions. Superficial solution features are mapped along the eastern shore of White Lough and three swallow holes are mapped along the western shore of the lake. Additional information on karst features is presented in Section 7.3.9.

Figure 7-6: Bedrock Geology



7.3.8 Geological Heritage

The Site lies within the Murrens geological heritage site (Site Code: IGH7). According to the Meath County Geological Site Report for Murrens [78], the site is described as a wooded ridge – esker and hummocky ground including gravel pit. The geological and geomorphological interest in the site is due to the long, beaded esker system that feeds into a large, supraglacial delta complex with flanking fans and kames. The Murrens extends from County Westmeath

to Meath over a distance of 15km and comprised of 11 segments and includes glacio-geological features of eskers and a fan and delta system. The Murrens corresponds to the hummocky landscape discussed in section 7.3.6 above.

In terms of site importance, the report states:

> *"This site is of very good quality, showing spectacular topography. Unique in Ireland and of international importance, the esker will be recommended for NHA designation."*

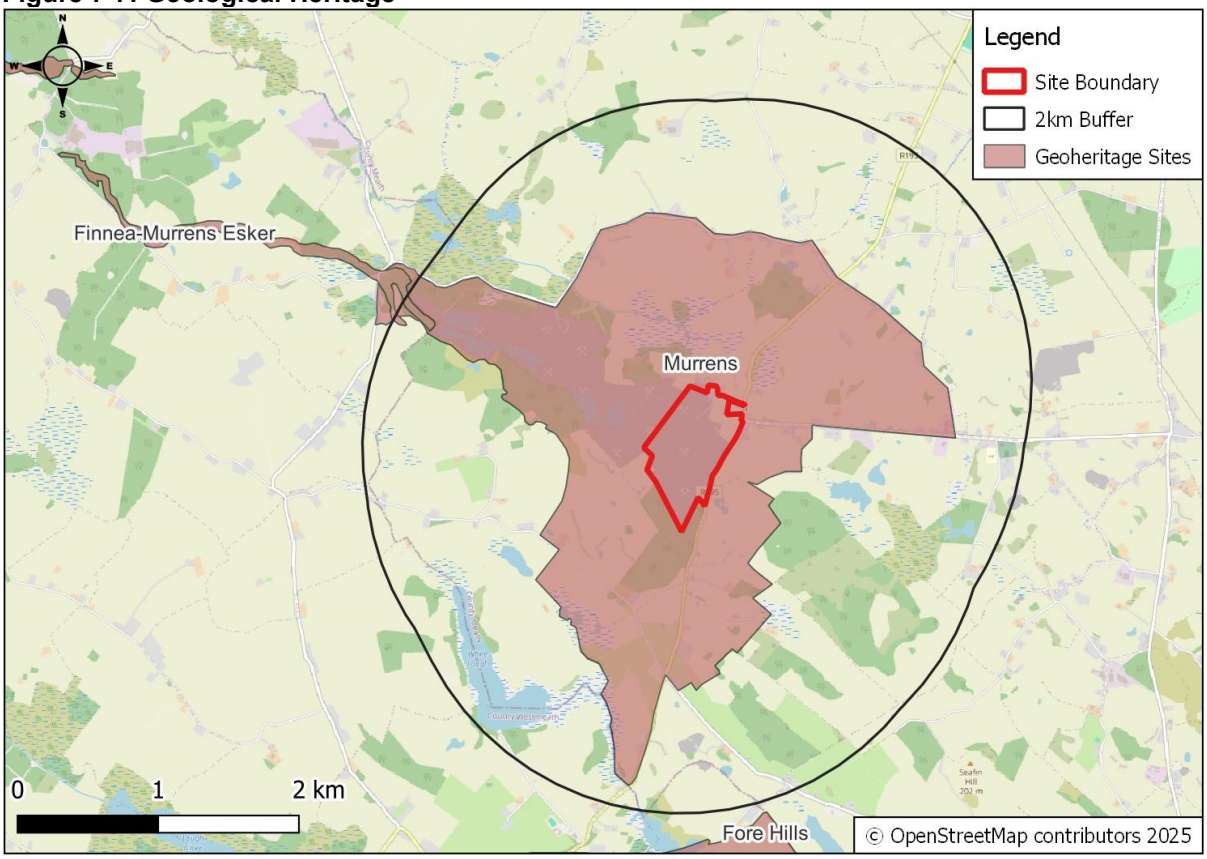
The Finnea-Murrens Esker (Site Code: IGH 7) geological heritage site is located ca. 1.8km northwest of the Site. According to the Meath – County Geological Site Report for Finnea-Murrens Esker [83], the site is described as long, linear series of esker sand and gravel segments deposited under ice sheet as they withdrew north-westwards across northwest Meath and north Westmeath at the end of the last Ice Age. The geological and geomorphological interest in the site is due to the preservation of the feature including its elevated ridge of sands and gravels. The feature is also important in representing paleo-flow of the glacier's orientation. The Finnea-Murrens Esker corresponds to the deltaic landscape discussed in section 7.3.6.

In terms of site importance, the report states:

> *"This esker and the associated sands and gravels in the locality seem to be a good example of a deglacial, meltwater-deposited complex… The southeasternmost extremity of the esker, in Tonashammer Townland, has been designated part of an NHA…"*

County Geological Sites are considered the best geological heritage sites within the Republic of Ireland. They are, therefore, included in County Development and County Heritage Plans and are protected under their respective county policy. Geological heritage sites are shown in Figure 7-8 below.

Figure 7-7: Geological Heritage



7.3.9 Geohazards

According to the GSI [84], karst features within a landscape can cause difficulties for planning and developments due to the following hazards and issues:

- Karstic environments include dissolution landforms such as sinkholes and other enclosed depressions;
- Dissolution landforms can affect infrastructure and development stability due to unanticipated settlement of sediments within such landforms;
- Karstic landscapes are susceptible to land collapses;
- Lowering of the water table, mining activities or damage to water mains or pipes can often induce man-made sinkholes to develop;
- Underground cavities can also act as pathways along which contaminants and spills can travel, often travelling long distances relatively quickly; and,
- Karst Features can pose a potential flood risk in relation to groundwater flooding.

It is noted that karst is an ever evolving and dynamic underground environment. Therefore, new features can appear at the surface over time and older features may become inactive. Although karst is mapped in the general area to the south of the Site, to karst features were identified in the immediate area of the Site during the site walkover. A review of the OSI 6" and 25" historic maps and aerial photography available in the GSI public data viewer as basemaps, did not identify and features which could be karstic in nature within the immediate area of the Site.

According to the GSI database [74], landslide susceptibility within the Site boundary ranges from Low (inferred) to Moderately Low. Mapped areas of Moderately Low susceptibility areas

coincide with several small areas related to stockpiles within the centre of the quarry. It is noted that there are no recorded landslides within a 15km radius of the Site, the closest being a single event ca. 18.3km southeast in the Girley Bog located in Chamberlainstown, County Meath. The event occurred 1st January 1999 with details of the event unavailable.

Southeast of the Site, the area is classified as having a Moderately Low to High susceptibility. The area corresponds with topographic highs as noted in Section 7.3.3.

7.3.10 Land Use and Economic Geology

According to the EPA maps and as described in Sections 7.3.1 and 7.3.2, land use within the Site has transitioned from agricultural usage as pastures to a mineral extraction site. The Site is within an area of moderate potential for granular aggregate and moderate to high potential for crush rock aggregate.

There are several mapped historical pits and quarries located within the study area as well as several early to mid-20th century aged pits, indicating the historical use of the study area for extraction activities.

It is noted that the quarrying activities within the Site and within the adjacent quarry provide an economic benefit to the area.

7.3.11 Contaminated Land

According to EPA Maps [75], there are no facilities which hold an EPA-issued license or other types of permits within the 2km study area. The nearest facility which holds an EPA-issued license is the Ballinamoney Farms Unlimited Company ca. 4.1km northeast of the Site. The farm holds an Industrial Emissions Licensing facilities ('IEL') licence and an Integrated Pollution Prevention Control facility ('IPCC') licence.

Additionally, Snow's Quarry, ca. 5.4km east, holds a Section 4 Discharge licence granted by the Meath County Council.

7.4 Conceptual Site Model

The conceptual site model ('CSM') relating to land, soils and geology for the Murrens Quarry and study area was developed based on the information presented in Chapter 3 of this rEIAR, information collected from the desk study and site-specific surveys as presented in Section 7.3 of this Chapter.

In summary, the Site is located within a hummocky landscape which is characterised by geomorphological fluvioglacial features such as eskers and a supraglacial delta. These features form the Murrens Supraglacial Delta and the Finnea-Murrens Esker which are classified as a Geological Heritage Site.

The general land use is agricultural land used for pasture with a history of quarrying activities for the extraction of sand, gravel and limestone aggregate. The soils and subsoils underlying the site are predominantly sand and gravel in nature, with cobbles and boulders within the deposits, and correspond to the fluvioglacial deposits mentioned above. Cherty, limestone bedrock is present in the east of the Site and is identified as the Derravaragh Cherts formation.

There are no geohazards or EPA-licensed facilities of concern within the study area.

7.5 Characteristics and Potential Impact of 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 Donegal; and,
- The release of pollutants from plant and equipment onto the land soils (and subsequent risks posed to human health and the environment).

7.5.1 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). This is further evidenced in the Corine Land Cover inventory, where agriculture and pasture are 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 original land use would be considered as having 'low' sensitivity and converting it to industrial or extraction use would have resulted in an impact of 'negligible' magnitude. Therefore, it is considered that the effect from the Development of the land use was "imperceptible", given the minor extent of land which underwent change of use.

The soils and subsoils are part of the Murrens Geological Heritage Area and are classified as a County Geological Site. Hence, in terms of the Geological Heritage Site, the soils are considered to be of 'high' importance. This Geological Heritage Site covers an area of ca. 6.8 km^2 and the Site covers an area of ca. 39 hectares (0.39 km^2), i.e. ca. 6% of the Geological Heritage Area. It should be noted that no visual evidence of contamination was observed in the wider Site. Moreover, no environmental incidents relating to the soils and geology were identified during this assessment. The impact to the Geological Heritage Site as a result of the extraction activities from the development is considered to be "small adverse" i.e. removal of small part of a geological heritage area. Hence, the effect on the soils is assessed as being "slight/ not significant".

It is noted that the NRA Guidelines [71]/ IGI Guidelines [70] state that the quarry, as it exists, is considered to be of at least "high" importance due to being a moderately to large size existing quarry and having proven economically extractable mineral resources. The fluvioglacial soils and limestone bedrock within the quarry are therefore considered to be of at least "high" importance as they are both considered to be economically extractable mineral resources with a high significance or value on a national scale. Since these soils and bedrock are regarded as of "very high" importance due to their value as an extractable resource, the magnitude of the impact on these soils and bedrock from quarrying activities is considered "negligible". Therefore, the significance of the effect is considered "not significant".

7.6 Mitigation Measures

The Applicant has indicated that mitigation measures completed at the Site were generally in accordance with the EPA (2006) Environmental Management Guidelines: Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [66], whereby:

- All plant and HGVs used were refuelled onsite on a concrete plinth which flows into an adjacent 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 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 (interceptors located onsite) and removed from the Site for disposal or recycling.

As part of planned Restoration works, the following mitigation measures should be implemented in relation to geology and soils:

- 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 be 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 Site for disposal or recycling.

7.7 Cumulative and In-Combination Effects

The potential cumulative impact of the extraction onsite is the degradation of the Murrens 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 there are at least two active quarries within the Murrens CGS, including the Site. The total area covered by the Site is ca. 39ha, which represents ca. 6% of the Murrens CGS. Given the extensive nature of Murrens CGS, the Finnea-Murrens CGS and the scale of the Site, it is considered that the impact is adverse and long-term in nature but "not significant".

7.8 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 the 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;
- Chapter 11 – Noise and Vibration: The interactions that construction/ operational activities related to geological extraction may have noise and vibration impacts. These impacts are addressed in Chapter 11;
- Chapter 12 – Landscape and Visual: The extraction of geological material has had an impact on the landscape, which is discussed in Chapter 12; and,
- Chapter 14 – Material Assets: The removal of the bedrock as an economic asset has an impact on the level of traffic and transportation of materials in the area. These impacts are addressed in Chapter 14.

7.9 Indirect Impact

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

7.10 Residual Impact

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

Given that no evidence of contamination was observed, no pollution incidents were reported, and 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 will be "not significant".

Given that the previous extraction activities have resulted in the removal of bedrock geology, the extensive nature of the Murrens geological heritage site, the difference in materials in the geological heritage site and the Development Site, as well as the scale of the Development Site, the residual impact on bedrock geology will be "not significant".

7.11 Monitoring

Not applicable.

7.12 Reinstatement

Not applicable.

7.13 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 abate subsequently. 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 of the rEIAR has been prepared by the MOR Environmental team. It provides a description and assessment of the likely and significant effects 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. Where likely significant effects were identified, appropriate remedial measures to reduce or avoid these effects have been outlined.

8.2 Methodology

The study area for the hydrological and hydrogeological assessment has been defined on the basis of a 2 km radius from the Site, as suggested in the IGI Guidelines [70]. In line with these guidelines and in line with a review of the land, soils and geological environment, the study area may be extended beyond the 2 km radius to reflect the sensitivity of the subsurface and the presence of sensitive features which may be impacted by the Site.

In order to determine the baseline environment, a desk-based study was undertaken to collect and review background information in advance of a site survey. A site-specific topographical survey was also conducted to collect data on the topography of the area; refer to Section 7.3.3 of Chapter 7 of this rEIAR for information on the topographic survey.

8.2.1 Legislation Context

The EU Water Framework Directive (2000/60/EC) ('WFD') established a framework for the protection of both surface water 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 the 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 dependent ecosystems.

The importance and sensitivity of the water 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.

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 [70];
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes [71];
- CIRIA–C532 - Control of Water Pollution from Construction sites - Guidance for Consultants and Contractors [85];
- Department of Environment, Heritage and Local Government: Quarries and Ancillary Activities - Guidance for Planning Authorities [12];
- EPA Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [66];
- Groundwater Regulations 2010 (S.I. No. 9 of 2010) as amended (S.I. No. 389 of 2011, S.I. No. 149 of 2012, S.I. No. 366 of 2016, S.I. No. 287 of 2022) [86];

- Surface Water Regulations 2009 (S.I. No. 272 of 2009) as amended (S.I. No. 327 of 2012, S.I. No.386 of 2015, S.I. No. 77 of 2019, S.I. No. 659 of 2021, S.I. No. 288 of 2022 and S.I. No. 410 of 2023) [87]; and,
- European Union (Drinking Water) Regulations 2023 (S.I. No. 9 of 2023) .

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') [88];
- Environmental Protection Agency ('EPA') Maps database [75];
- Environmental Protection Agency ('EPA') Catchments [89]: and,
- Office of Public Works ('OPW') 'Flood Maps' [90].

8.2.3 Impact Assessment Methodology

Following on from the identification of the baseline environment, the available data was utilised to identify and categorise potential effects on the hydrological and hydrogeological environment as a result of the Development.

The significance of effects due to the Development has been assessed in accordance with the EPA guidance document Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. These are outlined in Chapter 1 (Introduction) of this rEIAR and are dependent on the sensitivity of the environmental attributes and the magnitude of the impact.

The sensitivity of the hydrological and hydrogeological environment was assessed on completion of the desk study. Using the table presented in Box 4.2 (hydrology / surface water) and Box 4.3 (hydrogeology / groundwater) of the 2008 NRA Guidelines [71] [71], which is also presented in Appendix C of the IGI Guidelines [70].

The magnitude of the impact takes into account the likely scale of the predicted change to the baseline conditions and considers the duration of the impact i.e. temporary or permanent. The criteria for determining the magnitude of the impact on the hydrological and hydrogeological environment is based on the table presented in Box 5.2 and Box 5.3 of the 2008 NRA Guidelines [71], which is also presented in Appendix C of the IGI Guidelines [70]. The magnitude of impact on hydrological and hydrogeological receptors is set out in Table 8-3 and Table 8-4, respectively below.

The sensitivity of the hydrological (surface water) receptors and the magnitude of impact on these receptors are presented in Table 8-1 and 8-2 below, respectively.

The sensitivity of the hydrogeological (groundwater) receptors and the magnitude of impact on these receptors are presented in Table 8-3 and 8-4 below, respectively.

Potential impacts may have a negative, neutral or positive effect on the water environment.

Table 8-1: Estimation of Sensitivity 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.

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

Table 8-2: Estimation of Magnitude of Impact on Hydrology Attributes

Magnitude	Criteria	Typical Example
Large adverse	Results in a loss of attribute.	Loss or extensive change to a waterbody or water dependent habitat. Increase in predicted peak flood level >100mm. Extensive loss of fishery. Calculated risk of serious pollution incident >2% annually. Extensive reduction in amenity value.
Moderate adverse	Results in impact on integrity of attribute or loss of part of attribute.	Increase in predicted peak flood level >50mm. Partial loss of fishery. Calculated risk of serious pollution incident >1% annually. Partial reduction in amenity value.

Magnitude	Criteria	Typical Example
Small adverse	Results in minor impact on integrity of attribute or loss of small part of attribute.	Increase in predicted peak flood level >10mm. Minor loss of fishery. Calculated risk of serious pollution incident >0.5% annually. Slight reduction in amenity value.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity.	Negligible change in predicted peak flood level. Calculated risk of serious pollution incident <0.5% annually.
Minor beneficial	Results in minor improvement of attribute quality.	Reduction in predicted peak flood level >10mm. Calculated reduction in pollution risk of 50% or more where existing risk is <1% annually.
Moderate beneficial	Results in moderate improvement of attribute quality.	Reduction in predicted peak flood level >50mm. Calculated reduction in pollution risk of 50% or more where existing risk is >1% annually.
Major beneficial	Results in major improvement of attribute quality.	Reduction in predicted peak flood level >100mm.

Table 8-3: Estimation of Importance of Hydrogeology Attributes

Importance	Criteria	Typical Example
Extremely High	Attribute has a high quality or value on an international scale	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation, e.g. SAC or SPA status.
Very High	Attribute has a high quality or value on a regional or national scale	Regionally Important Aquifer with multiple wellfields. Groundwater supports river, wetland or surface water body ecosystem protected by national legislation - NHA status. Regionally important potable water source supplying >2500 homes. Inner source protection area for regionally important water source.
High	Attribute has a high quality or value on a local scale	Regionally Important Aquifer. Groundwater provides large proportion of baseflow to local rivers. Locally important potable water source supplying >1000 homes. Outer source protection area for regionally important water source. Inner source protection area for locally important water source.
Medium	Attribute has a medium quality or value on a local scale	Locally Important Aquifer. Potable water source supplying >50 homes. Outer source protection area for locally important water source.

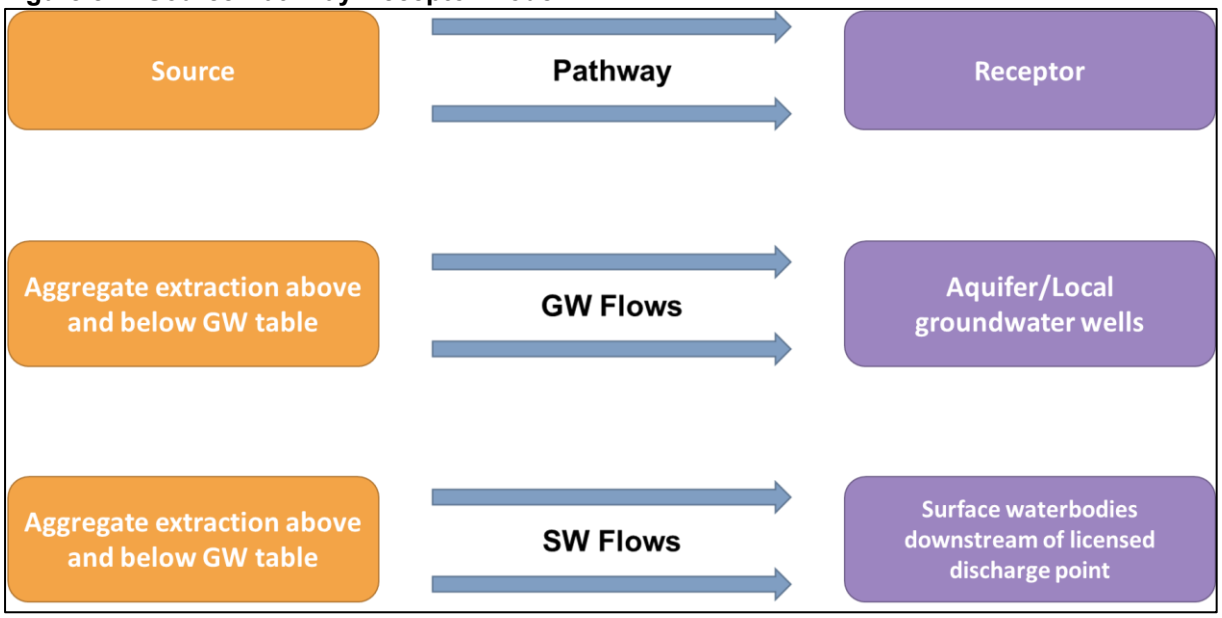
Importance	Criteria	Typical Example
Low	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer Potable water source supplying <50 homes.

Table 8-4: Estimation of Magnitude of Impact on Hydrogeology Attributes

Magnitude	Criteria	Typical Example
Large adverse	Results in a loss of attribute.	Removal of large proportion of aquifer. Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems. Potential high-risk pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >2% annually.
Moderate adverse	Results in impact on integrity of attribute or loss of part of attribute.	Removal of moderate proportion of aquifer. Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. Potential medium risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >1% annually.
Small adverse	Results in minor impact on integrity of attribute or loss of small part of attribute.	Removal of small proportion of aquifer. Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. Potential low risk pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >0.5% annually.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity.	Calculated risk of serious pollution incident <0.5% annually.

Once the importance and sensitivity of the hydrological and hydrogeological attributes are 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 EPA:

- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003) [8]; and,
- EPA (May 2022) – Guidelines on the Information to be contained in Environmental Impact Assessment Reports [27].

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 first presented a summary guide that defines the steps 1 to 7 (Table 8-5) taken in each element of the impact assessment process 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 8-5: Assessment Methodology

Attribute	Status / Occurrence	Importance
Step 1	Identification and Description of Potential Impact Source 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 and water sources. The potential impact can only arise as a result of a source and pathway being present.

Attribute	Status / Occurrence	Importance
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: (1) mitigation by avoidance, and (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 the 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 subsoils and bedrock exposed during quarrying activities, and for surface water, this would be any discharge offsite to nearby surface water bodies.

Receptor

The primary receptors are the underlying bedrock aquifer, local wells in the vicinity of the site, groundwater source protection areas, local surface water receptors and water-dependent terrestrial ecosystems such as Special Protection Areas ('SPA's) or Special Areas of Conservation ('SAC's).

In instances where an SPR linkage has been established, the impact assessment matrix table presented in Box 5.4 of the 2008 NRA Guidelines and Appendix C of the IGI Guidelines, and presented in Table 7-3 below, provides a framework for the consistent and transparent assessment of predicted effects across all technical chapters; however, individual assessments are based on relevant guidance and the application of professional judgement.

In taking the sensitivity of the water attribute and the magnitude of the impact, the significance of the effect is assessed. For the purpose of this assessment, effects rated as being "Significant-Moderate" or above are considered to be significant in EIA terms. Effects rated as being "Moderate" are subject to professional judgement in terms of significance, with a

rationale provided for this in the main assessment. Effects identified as less than moderate significance are not considered to be significant in EIA terms.

Table 8-6: Impact assessment matrix

Sensitivity of Receptor	Magnitude of Impact			
	High Adverse	**Medium Adverse**	**Small Adverse**	**Negligible**
Very High	Profound	Profound / Significant	Significant / Moderate	Not Significant
High	Profound / Significant	Significant / Moderate	Slight / Not Significant	Imperceptible
Medium	Significant	Moderate	Slight	Imperceptible
Low	Moderate/ Slight	Slight / Not Significant	Not Significant	Imperceptible

8.3 Receiving Environment

8.3.1 Hydrology

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

8.3.1.1 Surface Waterbodies

The majority of the Site and the northern section of the study area is located within the Upper Shannon 26F WFD catchment, whereas the south of the Site and the southern section of the study area is located within the Boyne 07 WFD Catchment. The north of the Site and the majority of the northern section of the study area is located within the Inny (Shannon)_SC_010 WFD sub-catchment and the Inny_020 WFD river sub-basin. The south of the Site and the majority of the southern section of the study area is located within the Deel (Raharney)_SC_010 WFD sub-catchment and the Lough Lene-Adeel Stream_010 WFD river sub-basin. A portion of the western section of the study area is located within the Inny (Shannon)_SC_020 WFD sub-catchment and the WFD Glore (Westmeath)_010 river sub-basin.

There are several lake waterbodies located throughout the study area, which are presented in Table 8-7. The nearest lakes to the Site are a series of lakes ca. 440m to the northwest of the Site and known as Togher Lough, Goohertys Lough, Bane North (Lough) and Bane South (Lough).

The lake waterbodies which are assessed under the WFD include all lake waterbodies with areal extents over 0.5km^2 or less than 0.5km^2 but located within a protected area. The lakes within the study area which are assessed under the WFD include Doo (Lough), Annagh-White Lough and Ben Lough. All other lakes within the study area are either too small to be included in the assessment or are not located within a protected area.

In the north of the study area, the Rathmea River is located ca. 430m north of the northern Site boundary and flows in a general east-to-west direction from Inishatinny Lough to Naneagh Lough. The Knockbrack 26 Stream is located ca. 1.7km north of the Site boundary and flows in a general west-to-east direction. Both rivers are part of the WFD Inny_020 river waterbody.

In the south of the study area, there are four unnamed streams located ca. 1.3km southwest of the Site boundary and flowing in a general southeast to northwest direction and connects Carrick Lough with Oldtown Lough, an unnamed lake, rusty Lough and the Annagh-White Lough. The Ballany Stream is located ca. 1.63 km south of the Site and flows in a general

northeast to southwest direction and connects Ballany Lough with Ben Lough. These five streams are part of the Lough Lene-Adeel Stream_010 WFD river waterbody.

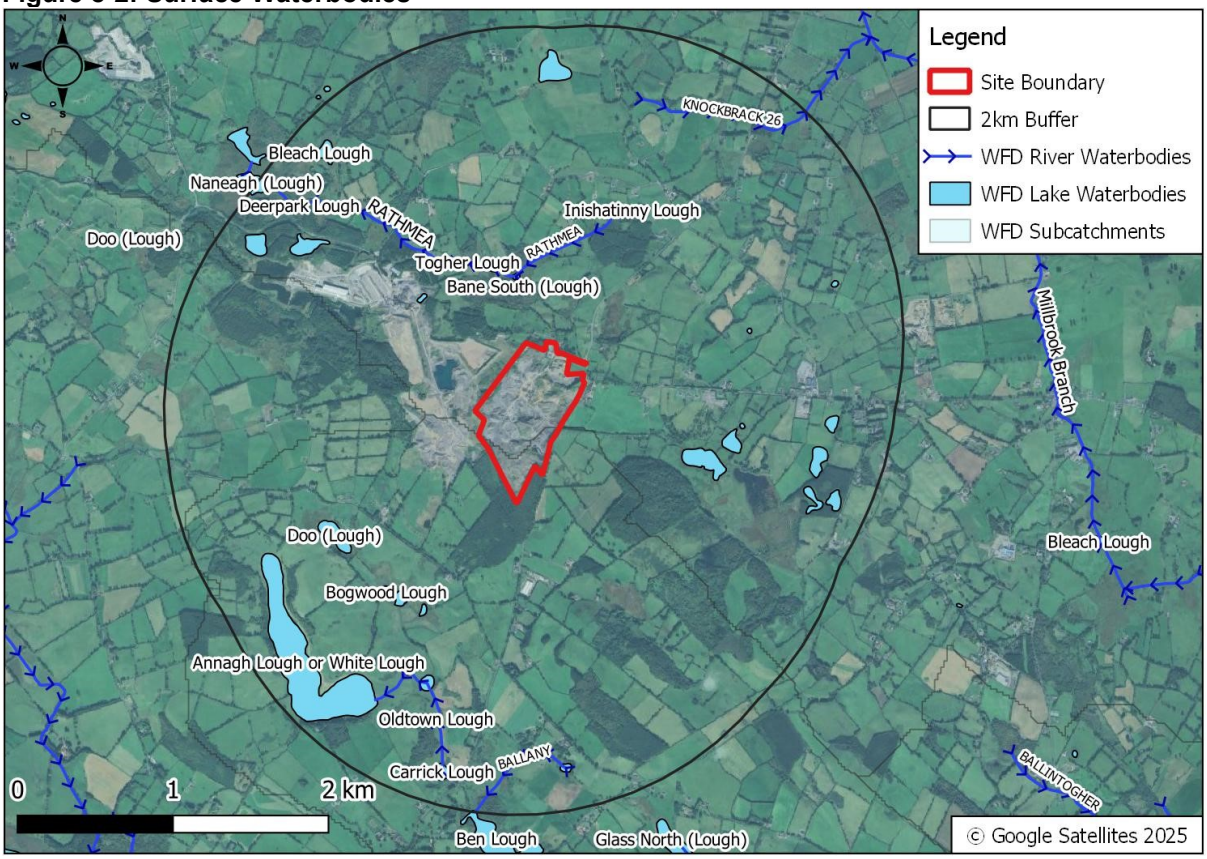
There are no canal waterbodies within the study area.

The surface waterbodies within the study area are summarised in Table 8-7 and presented in Figure 8-2 below.

Table 8-7: Surface Waterbodies Within the Study Area

WFD Catchment	WFD Sub-Catchment	Waterbody Name	Waterbody Type
Upper Shannon (26F)	Inny (Shannon)_SC_010	Bane North (Lough)	Lake
		Bane South (Lough)	Lake
		Bleach Lough	Lake
		Deerpark Lough	Lake
		Goohertys Lough	Lake
		Inishatinny Lough	Lake
		Naneagh (Lough)	Lake
		Togher Lough	Lake
		14 No. unnamed lakes	Lake
		Inny_020	River
Boyne (07)	Deel (Raharney)_SC_010	Oldtown Lough	Lake
		Rushy Lough	Lake
		Annagh Lough or White Lough	Lake
		Ben Lough	Lake
		Ballany Lough	Lake
		Bogwood Lough	Lake
		Carrick Lough	Lake
		Doo (Lough)	Lake
		Puncan Lough	Lake
		2 No. unnamed lakes	Lake
		Lough Lene-Adeel Stream_010	River
	Inny (Shannon)_SC_020	No lake or river waterbodies within this sub-catchment are mapped within the study area.	

Figure 8-2: Surface Waterbodies



There are no hydrological connections identified between any of these surface waterbodies and the Site. Hence, the Site has not had any effect on the hydrological environment.

8.3.1.2 Site Water Use – Surface Water

The water used for processing on the Site is part of a water recycling system and is retained entirely within the Site. There are no discharges off-Site associated with the development. Three settlement ponds and a settlement canal are located within the north-central area of the Site and are part of the water treatment system implemented on the Site. Water is pumped from the settlement ponds to the washing plant, and sediment-laden water from the plant is directed into the settlement canal, which slowly flows by gravity in a winding manner to encourage the settlement of fines out of suspension. The water then flows by gravity to the settlement ponds via an underground pipe. These settlement ponds allow for more sediment to fall out of suspension and settle before the water is recycled and pumped back to the washing plant.

Refer back to Figure 3-1: Primary Site Infrastructure in Chapter 3 of this document for reference on the positioning of the settlement canal and the settlement ponds on the Site.

8.3.2 Hydrogeology

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

8.3.2.1 Bedrock Aquifer

The aquifer potential of a bedrock unit is determined by the potential groundwater yield of that unit, which in turn is determined based on hydraulic characteristics compiled from borehole data throughout the country. The GSI categorises the aquifer bodies into Regionally Important

Aquifers, Locally Important Aquifers and Poor Aquifers. These are then subcategorised to create a total of ten bedrock aquifer categories and two sand and gravel aquifer categories.

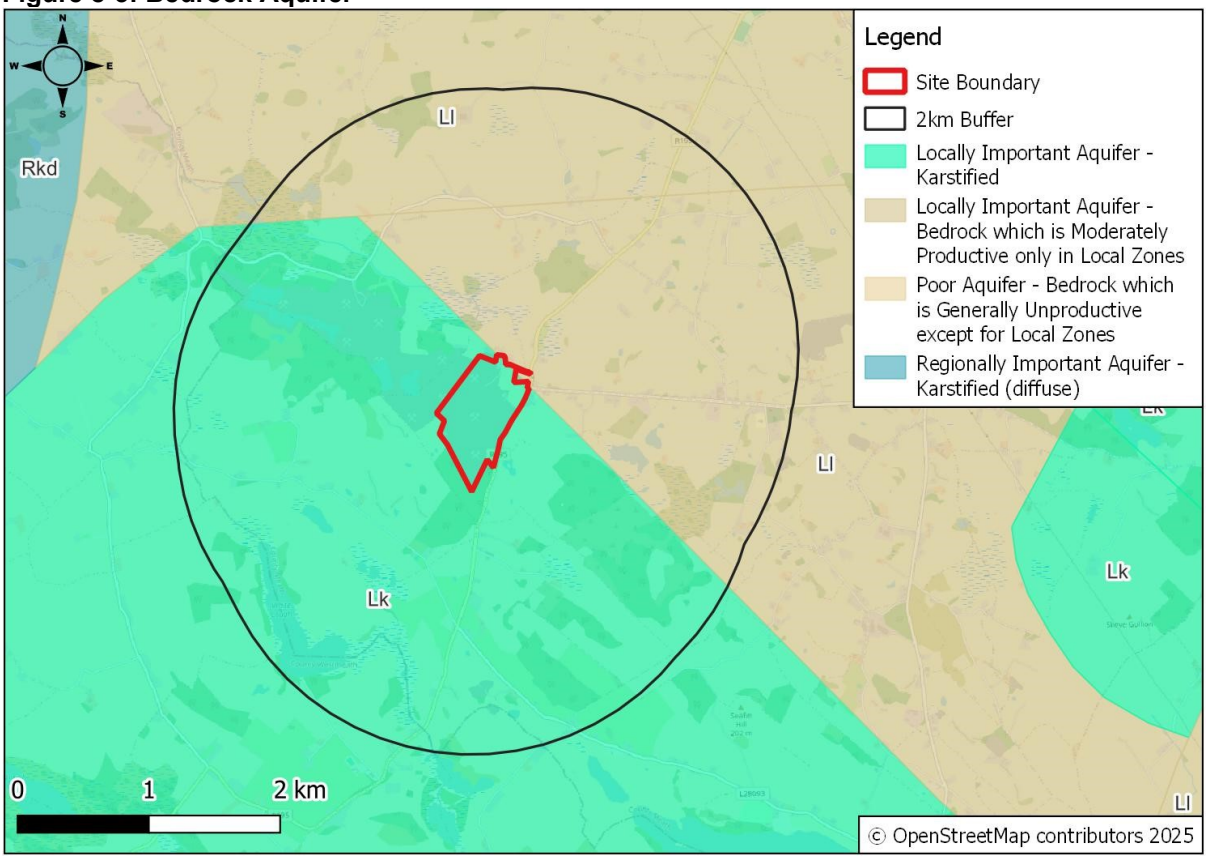
According to the GSI database [74], the majority of the study area is underlain by a locally important bedrock aquifer – karstified ('Lk') which corresponds with the Derravaragh Cherts bedrock unit (Palaeozoic era, Carboniferous period, Mississippian subperiod). This bedrock aquifer lies within the Derravaragh groundwater body (refer to Section 8.3.2.6 for more information). Karstified aquifers are characterised by largely underground drainage with flow through permeable, interconnected conduit zones, high groundwater velocity and low aquifer storage. Karstified aquifers have strong interconnections between surface water and groundwater. According to the GSI database, there is a karst landform known as an enclosed depression along the northern boundary of the Site. This enclosed depression mapped within the Site can be clearly seen in the 2006 – 2012 satellite imagery. However, this area has since been reworked and undergone excavation in correspondence with extraction activities, and hence the feature was not observed during a site walkover. Bedrock was also not observed in this excavated area and so it is assumed that there was no connection between the mapped enclosed depression and the underlying bedrock aquifer.

No karst features were identified in the immediate area of the Site during the site walkover. A review of the OSI 6" historic maps available in the GSI database identified wells and springs located within the study area; however, these were not observed during the site walkover. No springs or wells are recorded within the boundaries of the Site by the GSI, and no significant fractures or fissures were observed within the quarry faces.

There is a locally important aquifer – bedrock which is moderately productive only in local zones ('Ll') to the east and northeast of the Site. There is a sand and gravel aquifer ca. 3.2km northwest of the Site.

The bedrock aquifer map is presented in Figure 8-3 below.

Figure 8-3: Bedrock Aquifer



To enable and assist the aquifer classification, bedrock formations and members were grouped into one of 27 rock unit groups which have similar properties and geological age. Both bedrock aquifers within the study area are part of the Dinantian Upper Impure Limestones rock unit group.

8.3.2.2 Groundwater Vulnerability

Groundwater vulnerability represents the intrinsic geological and hydrogeological characteristics that determine how easily groundwater may be contaminated by activities at the surface. Groundwater vulnerability depends on the quantity of contaminants that can reach the groundwater and the time taken by water to infiltrate to the water table. These factors are controlled by the type of subsoils that overlie the groundwater, the way in which the contaminants enter the geological deposits (whether point or diffuse) and the unsaturated thickness of geological deposits from the point of contaminant discharge.

The groundwater vulnerability map is based on the type and thicknesses of subsoils (sands, gravels, glacial tills (or boulder clays), peat, lake and alluvial silts and clays) and the presence of karst features. Groundwater that readily and quickly receives water (and contaminants) from the land surface is more vulnerable than groundwater that receives water (and contaminants) more slowly and consequently in lower quantities.

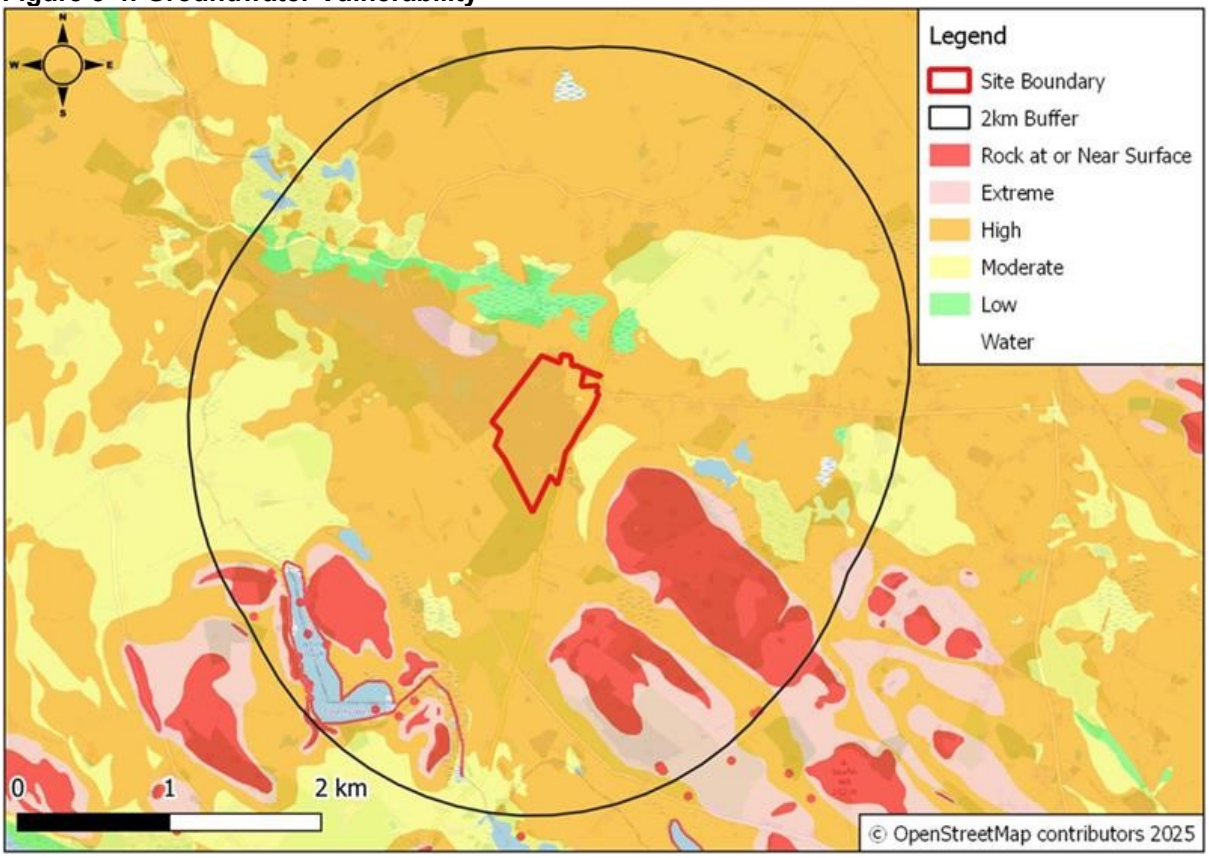
Groundwater is most at risk where the subsoils are absent or thin and in areas of karstic limestone, such as the Site. Because of the close interaction between surface water and groundwater in karstified aquifers, any contamination of surface water would be rapidly transported into the groundwater system, and vice versa.

Based on the GSI maps, the entirety of the Site is classified as having High ('H') vulnerability. However, due to the excavation of the overlying soils and subsoils across the Site and the

exposure of the bedrock in the east of the Site, the groundwater vulnerability may be considered to be at least 'Extreme' across the Site.

Groundwater vulnerability within the study area ranges from Low ('L') to the north of the Site to Rock at or Near Surface or Karst ('X') to the southwest and southeast of the Site. Groundwater vulnerability in the study area directly correlates to soil types and quaternary geology characteristics as seen in Figure 7-3 in section 7.3.4. and Figure 7-4 in section 7.3.5. The zones within the study area classified as having an 'X' vulnerability correlate to exposed or near surface bedrock as well as areas of karst. The zone of low groundwater vulnerability to the north of the Site directly correlates to a region of low permeability peaty soils. Refer to Figure 8-4 below.

Figure 8-4: Groundwater Vulnerability



8.3.2.3 Groundwater Protection and Use

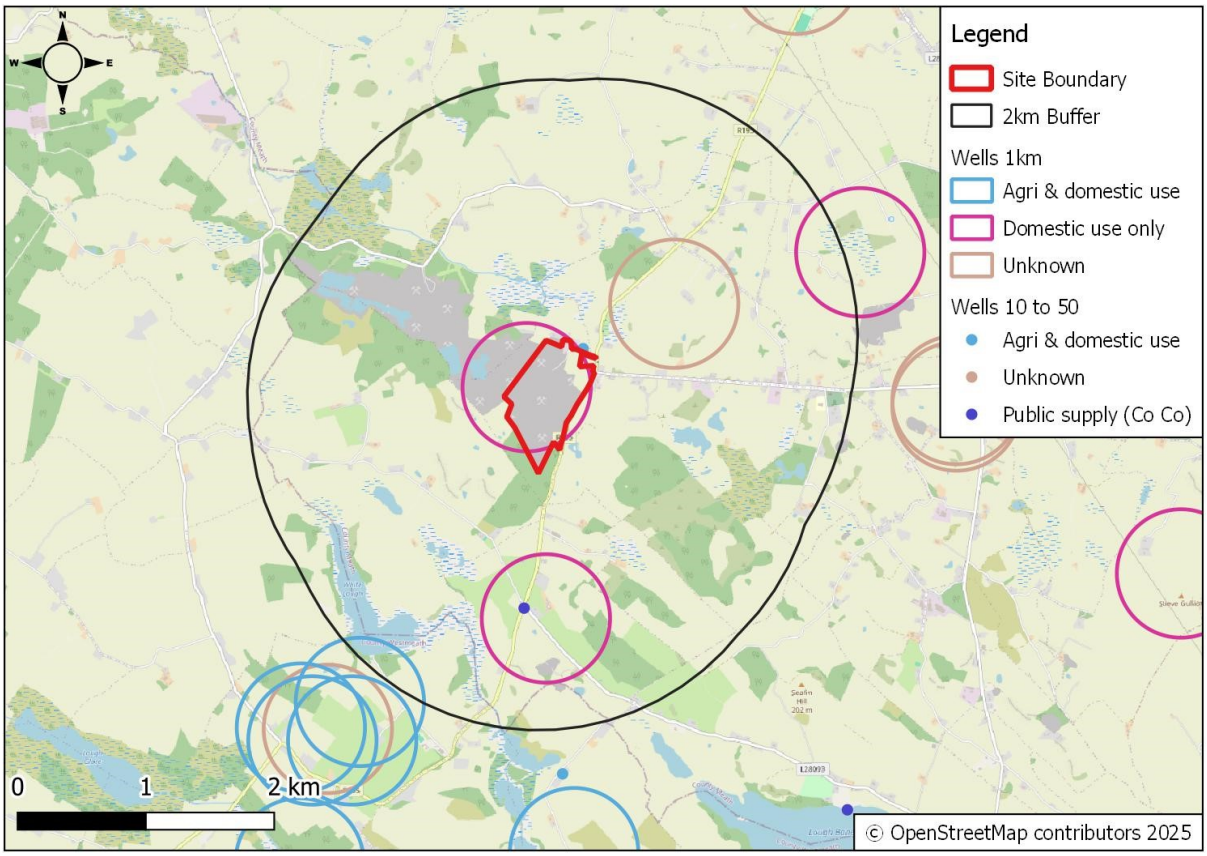
As reported by the EPA and the GSI [75] [74], groundwater sources, particularly public, group scheme and industrial supplies, are of critical importance in many regions. Consequently, the objective of a Source Protection Zone is to provide protection by placing tighter controls on activities within all or part of the source protection area of the supply. Groundwater Source Protection Zones ('SPZs') and Zones of Contribution ('ZOCs') are delineated areas which have been proven to contribute groundwater to a borehole or spring.

The Site is not within a Zone of Contribution / Source Protection Zone for any public or private water supplies, and there are no mapped group water schemes mapped close to the area.

The nearest protected area is the Ballymachugh Public Water Supply Source Protection Area as part of the County Cavan Groundwater Protection Scheme which is located ca. 15km to the northwest of the Site.

The GSI maintains a database of the registered wells and springs throughout the country. The database has a record of four potential abstraction points potentially located within 2km of the Site; refer to Figure 8-5 below for details. These include one borehole and three dug wells which have reported yields ranging from 6.5 m^3/d to 44 m^3/d. The borehole is used for domestic use only.

Figure 8-5: Groundwater Wells and Springs



8.3.2.4 Groundwater Levels and Flow Direction

Groundwater levels measured in the newly installed groundwater monitoring wells (BH01, BH02 and BH03) are shown in Table 8-8 below. Groundwater levels across the Site during the monitoring period, between January 2025 and March 2025, typically varied between approximately 118.21mAOD at BH01 and 122.83mAOD at BH02. BH03 is considered to be artesian as groundwater levels were measured at the top of the borehole casing and hence above ground level in three out of the four monitoring events. Monitoring well locations are shown in Figure 8-6 below and as presented in the Causeway Geotech report in Appendix 7-2.

Based on water levels collected during the 2025 monitoring events, it is concluded that groundwater flows in a general south to north direction across the Site. However, the change in bedrock aquifer in the north of the Site, would act as a barrier to groundwater flow to surface water features located to the north of the Site. Therefore, it is concluded that groundwater underneath the Site is not contributing to baseflow in surface water features within the study area and that there is no hydrogeological connection between groundwater underneath the Site and surface water within the study area.

Figure 8-6: Groundwater Well Locations

Table 8-8: Site Groundwater Level Measurements

Well ID	Elevation Reference*	Total Depth	27/01/2025		04/02/2025		04/03/2025	19/03/2025		
	mAOD	mbtoc	mbtoc	mAOD	mbtoc	mAOD	mbtoc	mAOD	mbtoc	mAOD
BH01	120.88	12.52	2.67	118.21	2.51	118.37	2.52	118.36	2.0	118.88
BH02	129.17	20.52	6.42	122.75	6.34	122.83	6.64	122.53	7.1	122.07
BH03	119.15	10.57	0.21	118.94	0*	119.15	0*	119.15	0*	119.15

Notes:
*Elevation reference is top of casing
0* denotes an artesian well i.e. groundwater piezometric surface level is above ground level.
mAOD: Meters above ordinance datum. mbtoc: Meters below top of casing.

8.3.2.5 Groundwater Monitoring

No historic groundwater monitoring data was available for the Site. Groundwater sampling for BH01, BH02 and BH03 occurred 27th January 2025 by an MOR Environmental competent

geologist with samples sent to Element Ltd, a UKAS and ISO 17025 accredited laboratory. The samples were kept cool, in darkness and sent to Element Ltd. for analysis. In order to maintain sample integrity, a Chain of Custody ('CoC') document was completed to track sample possession from the time of sample collection to the time of analysis.

Sample results were compared to Groundwater Regulations 2010 (S.I. No. 9 of 2010) as amended (S.I. No. 389 of 2011, S.I. No. 149 of 2012, S.I. No. 366 of 2016, S.I. No. 287 of 2022) [91] and Drinking Water Regulations S.I. No. 99 of 2023 [92].

Groundwater samples were tested for the following parameters:

- Physical parameters such as electrical conductivity ('EC') and pH;
- Chemical parameters such as organics, inorganics and dissolved metals;
- Polyaromatic Hydrocarbons ('PAHs'); and,
- Pesticides.

There were no exceedances of groundwater and drinking water General Assessment Criteria ('GAC') from the samples taken at BH01, BH02 and BH03 during the January 2025 monitoring event. Results from the laboratory can be found within Appendix 8-1 of this report.

Past operations at the Site, therefore, have not had an adverse effect in groundwater within the vicinity of the quarry.

8.3.2.6 Groundwater Body ('GWB') Status

2025 EPA Maps [75] places the Site within the groundwater bodies of Tynagh Gravels (IE_SH_G_238) and the Derravarragh GWB (IE_SH_G_077). The Tynagh Gravels GWB corresponds to the gravel deposits within the study area and the Derravarragh GWB corresponds to the underlying bedrock units.

The Tynagh Gravels GWB is assigned a "Good" status under the WFD 2016-2021 monitoring round [89]. The groundwater body risk is currently considered "at risk" of failing to meet the WFD objectives i.e. to achieve and maintain at least 'good' quality status by 2027. There is no GWB description available for this GWB from the GSI.

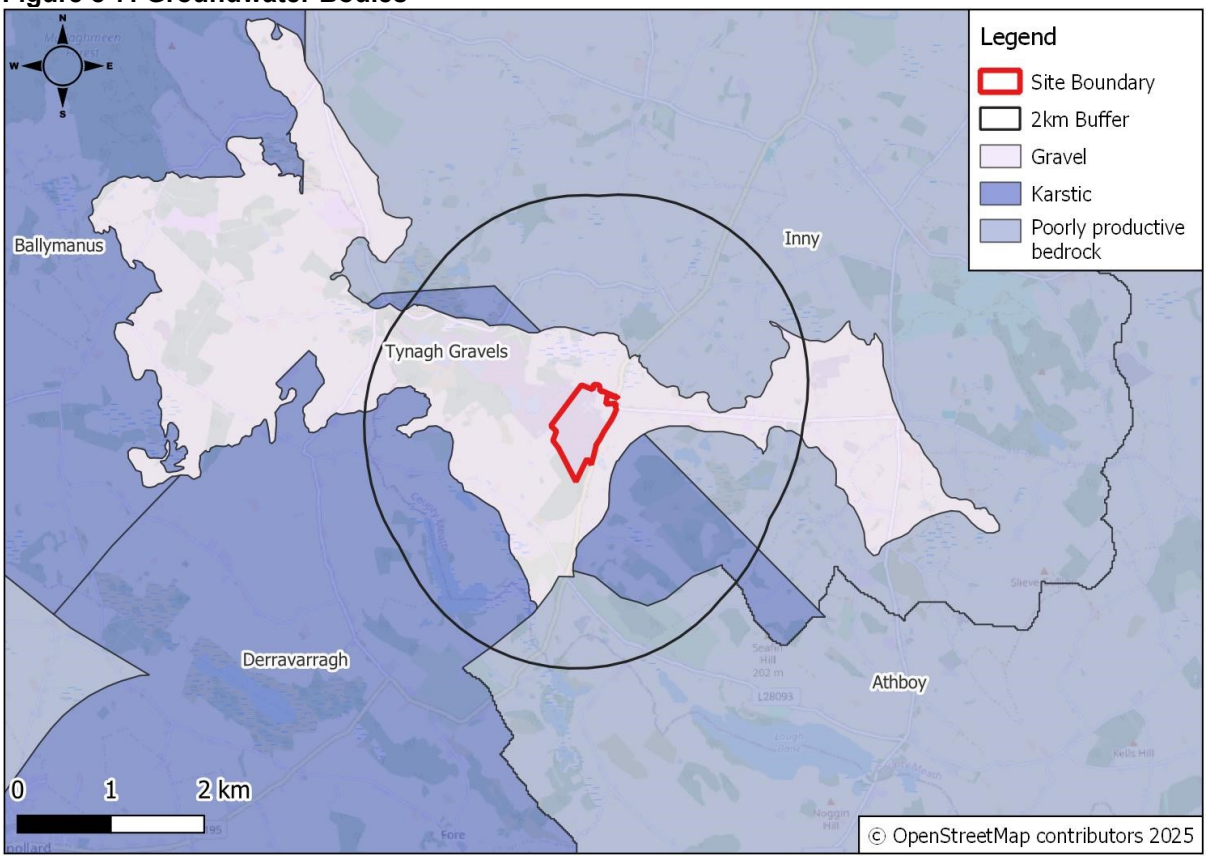
The Derravarragh GWB is classified as having "Good" status under the WFD 2016-2021 monitoring round and considered "at risk" of failing to meet the WFD. The GWB description available from the GSI describes the groundwater flow in the bedrock to be confined to the top 30m of highly weathered layers several meters thick overlying a zone of interconnected fissures. Subsoil thickness is variable above the GWB ranging from no cover at exposed bedrock outcrops to 64m thickness. The GWB is recharged mainly through point recharge mechanisms through karstified features such as swallow holes, and through diffuse recharge mechanisms such as rainfall percolation. Discharge from the GWB is to surface water features such as small springs. Groundwater flow paths are of local scale with some areas having underground connections for flow rates up to 80 m/hr. Flow paths have been documented to cross catchment and river basin boundaries, demonstrating that flow does not always follow the surface water catchment.

Other GWBs within the study area include:

- Inny (IE_SH_G_110) - classified as having "Good" status under the WFD 2016-2021 monitoring round and considered "not at risk" of failing to meet the WFD;
- Ballymanus (IE_SH_G_035) - classified as having "Good" status under the WFD 2016-2021 monitoring round and considered "not at risk" of failing to meet the WFD; and,
- Athboy (IE_SH_G_001) - classified as having "Good" status under the WFD 2016-2021 monitoring round and considered "not at risk" of failing to meet the WFD.

Refer to Figure 8-7 below.

Figure 8-7: Groundwater Bodies



8.3.3 Flood Risk Assessment ('FRA')

The OPW provides information on flood risk throughout Ireland. This includes historical events as well as modelled flood extents for:

- Low probability events i.e., 1-in-1000 chance of occurring or being exceeded in any given year, also known as an Annual Exceedance Probability ('AEP') of 0.1%;
- Medium probability events i.e., 1-in-a-100 chance of occurring or being exceeded in any given year, or an AEP of 1%; and,
- High probability events i.e., 1-in-a-10 chance of occurring or being exceeded in any given year, or an AEP of 10%.

The OPW also produce 'Flood Maps' (surface water) to comply with the requirements of the European Communities (Assessment and Management of Flood Risks) Regulations 2010 to 2015 (implementing Directive 2007/60/EC) for the purposes of establishing a framework for the assessment and management of flood risks. These aim to reduce the adverse consequences for human health, the environment, cultural heritage and economic activity associated with floods.

The Catchment-based Flood Risk Assessment and Management ('CFRAM') programme [90], was a point-in-time study to identify and map the existing and potential future flood hazards and flood risks in the areas at potentially significant risk from flooding. The National Indicative Fluvial Mapping ('NIFM') model produced data for catchments greater than 5 km^2 in areas for which flood maps were not produced under the CFRAM programme. The modelled data is for the present-day scenario and does not take climate change into account.

The GSI has also developed Groundwater Flood Maps as part of the 2016-2019 Groundwater Flood Project in collaboration with Trinity College Dublin ('TCD') and the Institute of Technology Carlow ('IT Carlow'). These maps aid in understanding the deficit of groundwater flood data in Ireland and help to assist stakeholders making informed decisions regarding groundwater risk. Groundwater floods occur when the water stored beneath the ground rises above the land surface.

The Groundwater Flood Probability Maps shows the probabilistic flood extent of groundwater flooding in limestone regions. These maps are focussed primarily (but not entirely) on flooding at seasonally flooded wetlands known as turloughs. It should be noted that the predictive maps are limited to locations where the flood pattern was detectable and capable of being hydrologically modelled to a sufficient level of confidence.

The Winter 2015/2016 Surface Water Flooding map shows fluvial (rivers) and pluvial (rain) floods, excluding urban areas, during the winter 2015/2016 flood event, and was developed as a by-product of the historic groundwater flood map.

8.3.3.1 Surface Water Flooding

A review of these datasets did not show any areas in immediate proximity to the study area which are modelled to be liable to flooding.

A potential flood area from a fluvial flooding event was identified from the NIFM dataset and includes a section of the Inny_020 river waterbody (along the Knockbrack 26) to the north of the Site. This area is identified as having a low to medium probability of fluvial flooding.

The GSI Winter 2015/2016 Surface Water Flooding map shows several small, isolated areas of flooding throughout the study area, which correspond to lakes and marshy areas.

No recurring flood incidents were identified at the Site or within the study area.

8.3.3.2 Groundwater Flooding

The GSI Groundwater Flood Probability Map shows an area around an unnamed lake located ca. 1.8km north of the Site and the area around the Annagh-White Lough, Rushy Lough, Oldtown Lough and Carrick Lough, which are modelled to have a low to high probability of groundwater flooding.

8.3.4 Wastewater

Wastewater for onsite amenities (kitchen, toilets, sinks, etc.) is treated privately onsite. The wastewater is collected through a wastewater pipeline network and directed toward a septic tank and percolation area in the north of the Site.

8.3.5 Potable Water

Potable water used for office facilities, including faucets and toilet facilities, is obtained from a small onsite well in the northern section of the Site.

The water used for site processes is obtained from the recycled water settlement system onsite described in Section 8.3.1.2.

8.3.6 Drainage Water

Surface water run-off from quarry processes, including the wheel wash and screening plant, is collected in the onsite canal settlement system and settlement lagoons located in the centre and the northern section of the Site. Water is pumped from the settlement pond system at the north of the quarry floor to the screening plant in the centre of the Site, which is then collected at the settlement canal and pumped back to the northern settlement pond as part of a recycling system that is retained entirely within the Site. There are no discharges off-Site associated with the development. Water runoff from the screening plant is directed into the settlement

canal which slowly flows by gravity in a winding manner to encourage the settlement of fines out of suspension. The water then flows by gravity to the settlement ponds via an underground pipe. These settlement ponds allow for more sediment to fall out of suspension and settle before the water is recycled and pumped back to the washing plant.

Surface and groundwater water pools in areas of low elevation throughout the Site where it is either pumped via sub pumps and hosing to a higher elevation and leading to the central settlement ponds or allowed to seep through bedrock into the groundwater system naturally by gravity.

8.3.7 Designated Ecological Sites

The Site has two Special Areas of Conservation ('SAC') within a 5km vicinity. White Lough, Ben Loughs and Lough Doo SAC (Code: 001810) is located ca. 0.8km south of the Site and Lough Bane and Lough Glass SAC (Code: 002120) is ca. 2km southeast of the Site. There are no Special Protection Areas ('SPA') within 5km of the Site, the closest being Lough Sheelin SPA (Code: 004065), ca. 9.9km northwest of the Site. Further discussion of the ecological sites in the vicinity of the Site can be found in Chapter 6 of this report.

The groundwater flow measurements collected between January 2025 and March 2025 identified groundwater flow in the underlying bedrock to be in a general south-to-north direction away from these ecological sites. Therefore, under the SPR model, there is no hydrogeological pathway or connection between the Site (source) and these ecological sites (receptors).

8.4 Conceptual Site Model

The conceptual site model ('CSM') relating to the hydrological (surface water) and hydrogeological (groundwater) environment for the Murrens Quarry and study area was developed based on the information presented in Chapter 3 of this rEIAR, information collected from the desk study and site-specific surveys as presented in Section 8.3 of this Chapter.

In summary, the Site is located within different WFD catchments, sub-catchments and river basins, with a general divide in the north and south of the Site and within the Tynagh Gravels and the Derravarragh groundwater bodies. No hydrological or hydrogeological pathway was identified between the Site (source) and the surface water features (receptors) within the study area. Therefore, under the SPR model, there is no connection between the Site and these surface water features.

The Site overlies a locally important aquifer – karstified ('Lk') bedrock aquifer, and the general area is classified as having high groundwater vulnerability. However, due to the nature of the extraction activities, the groundwater vulnerability rating may be considered to be at least extreme ('E').

Groundwater level monitoring determined that groundwater flow across the Site is generally south to north and hence flows away from the protected ecological sites located to the south of the study area. Therefore, there is no hydrogeological connection between the Site and these protected ecological sites.

Results of groundwater quality sampling determined that the water underneath the Site is of good quality, which is in line with the WFD 'good' quality status assigned to the Tynagh Gravels and the Derravarragh groundwater bodies.

8.5 Characteristics & Impact of Development

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

- The impact on the bedrock aquifer underneath the Site from the Development;
- The impact on the groundwater underneath the Site from the Development;

- The impact on surface water downgradient of the Site from the Development; and,
- The release of pollutants from plant and equipment into groundwater and surface water bodies (and subsequent risks posed to human health and the environment).

The Site is mainly an aggregate quarry of ca. 39ha with a screening plant, wheel wash, settlement lagoons and aggregate stockpiles within the centre of the Site. Offices and a maintenance garage are located in the central-eastern portion of the Site. It is considered that once the Restoration Plan has been implemented, the potential for contaminants entering the discharge from the Site will be minimised through the reduced presence of sediment and decreased potential for run-off.

8.5.1 Historic Impacts of the Development

There are no hydrological or hydrogeological connections (pathways) between the Site (source) and the surface water bodies (receptors) mapped within the study area. Hence, under the SPR model, there are no effects identified on the hydrological environment as a result of the Development activities.

Prior to the extraction works, the Site consisted of agricultural fields and pastures, with the primary contaminants of concern being nutrients, pesticides and suspended solids entering the surface water and groundwater bodies. Removal of soils, subsoils and bedrock from the quarry due to historical activities onsite would have had the potential to pose a contamination risk to the groundwater within the underlying bedrock aquifer by directly exposing it to surface activities. However, the groundwater vulnerability map identifies the Site as having 'high' groundwater vulnerability. Hence prior to extraction taking place, this risk was already present to a slightly lesser degree in comparison to post extraction activities. The bedrock aquifer is classified as a locally important aquifer and hence is considered to have 'medium' importance. Groundwater monitoring carried out on the Site indicates that the development activities have not had any long-lasting effects on the groundwater quality. Therefore, the overall magnitude of the impact on the quality of the groundwater within the bedrock aquifer is considered to be 'negligible', which has resulted in an 'imperceptible' overall effect on the quality of the groundwater within the bedrock aquifer.

The nature of the development has resulted in a removal of a small proportion of the aquifer which is classified as an attribute of "medium importance". However, there are no nearby high yielding abstractions, no public water scheme abstractions or water supply source protection areas in connection with the Site. In relation to water usage on the Site, the Development relies on a recycled water treatment system for Site activities and hence such activities have had a 'negligible' impact on the quantity of the groundwater within the bedrock aquifer. This has resulted in an 'imperceptible' effect on the quantity of the groundwater within the bedrock aquifer.

8.6 Mitigation Measures

The Applicant has indicated that mitigation measures completed at the Site were in accordance with the EPA (2006) Environmental Management Guidelines: Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [66], whereby:

- All plant and HGVs used were refuelled onsite, on a concrete plinth which flows into 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 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 an underground waste oil interceptor 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 be 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.

8.7 Cumulative and In-combination Effects

There is potential for cumulative and in combination effects from the Site and surrounding developments.

A quarry operated by B.D. Flood Ltd is located adjacent to the northwest Site boundary. The facility extracts aggregate and stone and produces ready-mix concrete as well as concrete blocks. Any in-combination effects on the quality and quantity of groundwater in the area arising from works associated with the quarries were considered to be 'not significant', as monitoring results from the Site remain within set guidelines criteria.

No other cumulative or in-combination impacts are noted to have occurred as part of this extraction. Hence, any cumulative or in-combination effects on the water environment as a result of the Development are considered to be 'negligible'.

8.8 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. Impacts on biodiversity are assessed in detail in Chapter 6;
- Chapter 7 - Land, Soils and Geology: Impacts 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 no significant impact on the water quality or water quantity, the impact on soils/ bedrock was determined to be imperceptible. These impacts on the geological environment are discussed in Chapter 7; and,
- Chapter 10 – Climate Change: Climate change could lead to intense rainfall which could contribute to flooding. The potential effects associated with climate change on water have been fully considered.

8.9 Indirect Impacts

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

8.10 Residual Impact of the Site

No residual impacts on the hydrological or hydrogeological environment have been identified.

8.11 Monitoring

No groundwater monitoring occurred as part of historical activities. Historical and recent groundwater monitoring and recent groundwater monitoring is discussed above in Section 8.3.2.4. and 8.2.3.5.

8.12 Reinstatement

Not applicable.

8.13 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 abate subsequently. The rEIAR is 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 effects 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 effects on air associated with the Development:

- Department of Environment, Heritage and Local Government ('DEHLG') – Quarries and Ancillary Activities: Guidelines for Planning Authorities (2004) [12];
- Institute of Air Quality Management ('IAQM') - Guidance on the Assessment of Mineral Dust Impacts for Planning [93];
- EPA - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (2006) [72];
- Irish Concrete Federation ('ICF') Environmental Code (2005) [94];
- EPA, Air Quality in Ireland 2013 – Indicators of Air Quality [95];
- EPA, Air Quality in Ireland 2014 – Indicators of Air Quality [96];
- EPA, Air Quality in Ireland 2015 – Indicators of Air Quality [97];
- EPA, Air Quality in Ireland 2016 – Indicators of Air Quality [98];
- EPA, Air Quality in Ireland 2017 – Indicators of Air Quality [99];
- EPA, Air Quality in Ireland 2018 – Indicators of Air Quality [100];
- EPA, Air Quality in Ireland 2019 – Indicators of Air Quality [101];
- EPA, Air Quality in Ireland 2020 – Indicators of Air Quality [102];
- EPA, Air Quality in Ireland 2021 – Indicators of Air Quality [103];
- EPA, Air Quality in Ireland 2022 – Indicators of Air Quality [104];
- EPA, Air Quality in Ireland 2023 – Indicators of Air Quality [105]; and,
- EPA, Air Dispersion Modelling from Industrial Installations Guidance (AG4) (2019) [106].

To determine the potential historical risks associated with dust emissions from the Development, a Dust Risk Assessment ('DRA') was completed by MOR Environmental in accordance with the methodology set out in the *IAQM Guidance on Mineral Dust*. This DRA was completed to provide an estimation of the risks associated with Development and past activities, which would give insight on potential likely and significant impacts (if there were any).

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 Clean Air Strategy

The Department of Communications, Climate Action and Environment ('DCCAE') published the Clean Air Strategy for Ireland [107] in 2023, with the aim to reduce certain specific sources

of emissions that are having the greatest impact whilst also identifying cost-effective approaches to emission reductions [108].

The Clean Air Strategy sets out seven key strategic priorities relating to air quality in Ireland:

- To set the appropriate targets and limits to ensure continuous improvements in air quality across the country to deliver health benefits for all;
- To ensure the integration of clean air considerations into policy development across the Government;
- To increase the evidence base that will help us to continue to evolve our understanding of the sources of pollution and their impacts on health in order to address them more effectively;
- To enhance regulation required to deliver improvements across all pollutants;
- To improve the effectiveness of our enforcement systems;
- To promote and increase awareness of the importance of clean air and the links between cleaner air and better health; and,
- To develop additional targeted / specific policy measures as required to deal with national or local air quality issues.

9.2.1.2 Meath County Council Development Plan 2021-2027

As outlined in the County Development Plan [18], Meath County Council's role in relation to air quality is to promote a reduction in air pollution, through the implementation of relevant legislation and through the provision of advice and guidance on best practice. Air pollution challenges include:

- Transport emissions, primarily from road transport (cars, buses and HGV's) rail, air and shipping;
- Industrial and agricultural emissions;
- Emissions from domestic burning of fossil fuels; and,
- Emissions from fire-house fires, gorse fires, bog land fires etc. Which may result in localised poor air quality.

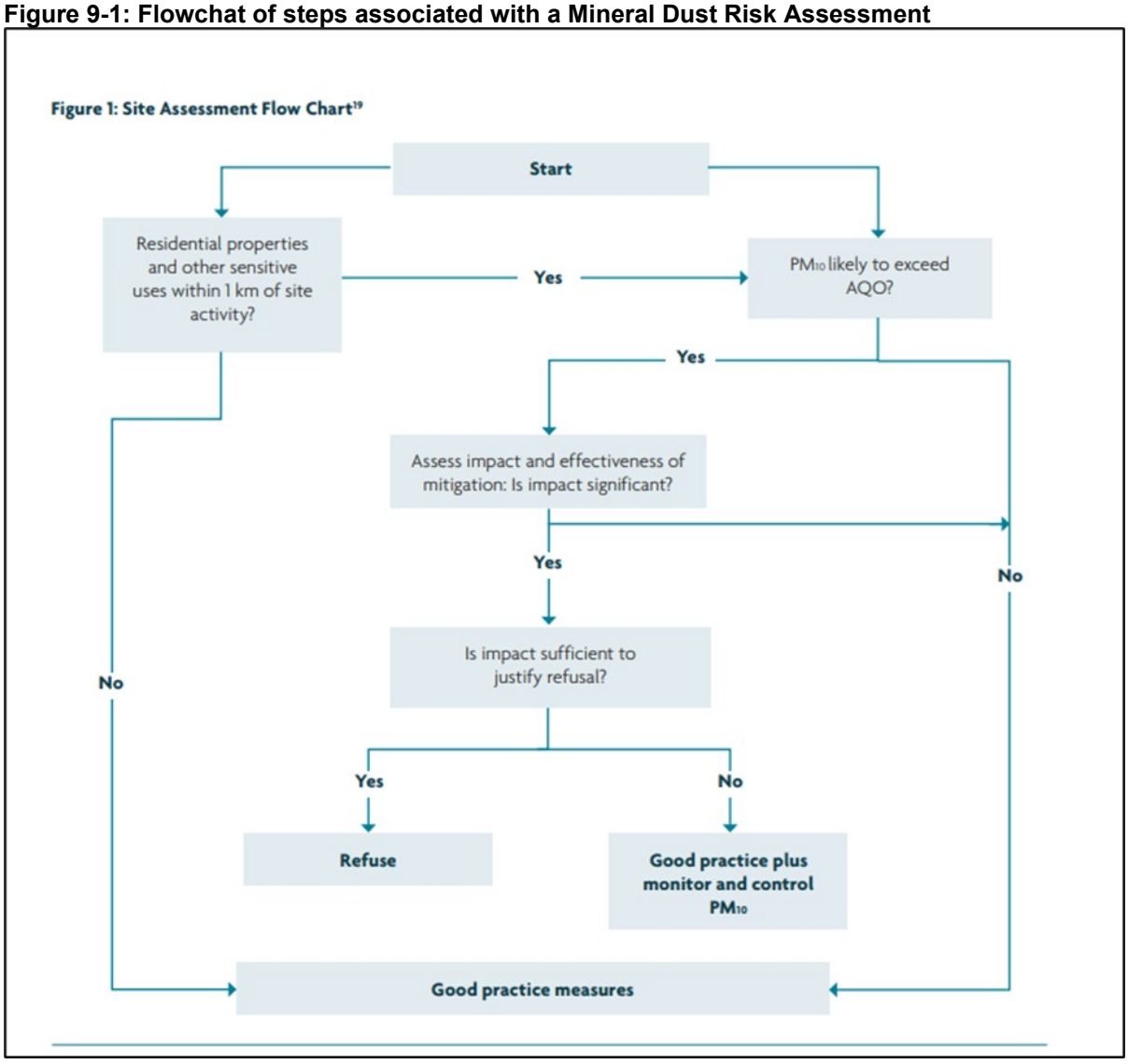
Meath County Council have a specific objective in the county development plan regarding air quality:

- INF OBJ 72 "To support the collation or air quality and greenhouse gas monitoring data in support of a regional air quality and greenhouse gas emission inventory."

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 [109]. A flow chart outlining the various steps associated with the preparation of the mineral dust risk assessment are outlined in Figure 9-1 below [109], with further details provided in Appendix 9-1.

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



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, 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. The TA Luft dust deposition limit value of 350mg/m^2/day (when averaged over a 30-day period), which aligns with EPA - Environmental Management in the Extractive Industry (*Non-Scheduled Minerals*) limits, is typically set as a limit along all site boundaries associated with quarry developments.

The 350mg/m^2/day supported by EPA will be selected as the screening criteria for effects arising from dust deposition on the environment from quarry-related activities.

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 ('CAFÉ') 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 the Air Quality Directive (2008/50/EC) and S.I. No. 180 of 2011 are shown in Table 9-1 below. The AQS is 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 (µg/m^3)	Maximum No of Exceedances Permitted/Annum	Exceedance as %	Measured as
Particular Matter PM_{10}	50	35	90.4th percentile	24-hr mean
Particulate Matter PM_{10}	40	N/A	N/A	Annual mean (calendar year)

The above AQS are applicable to the air quality in the locality of the Site during historical operations as they represent the strictest standards applied across the historical activity. As such, should the Site meet these standards then it shall meet any previous standards.

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 2023 [105] 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 (2013-2024), baseline air quality data between 2013-2024 is shown for the Zone D region. 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 2013-2023

Monitoring Stations	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Castlebar	15	12	13	11.9	11.2	11	16	14	9.8	11.2	9.9
Cobh	-	-	-	-	-	15	13	13	-	-	-
Claremorris	13	10	10	10.1	10.8	12	11	10	9.5	7.9	8.1
Kilkitt	11	9	9	8.1	7.8	9	7	8	7.8	8.5	7.1
Roscommon Town	-	-	-	-	-	12	12	11	10.3	11.2	9.7
Enniscorthy	-	22	18	17.3	-	-	18	15	13.7	15	13.3
Tipperary Town	-	-	-	-	-	-	9	12	12.7	13.9	10.8
Macroom	-	-	-	-	-	-	28	15	14.6	16.1	11.3
Carrick-On-Shannon	-	-	-	-	-	-	-	10	9.4	-	8.9
Birr	-	-	-	-	-	-	-	10	12.2	14.5	13.1
Askeaton	-	-	-	-	-	-	-	7	8.7	9.4	8.4
Cavan	-	-	-	-	-	-	-	9	10.6	11	10
Cobh Carrignafoy	-	-	-	-	-	-	-	-	12	13.2	11.8
Cobh Cork Harbour	-	-	-	-	-	-	-	-	13.4	14.4	11.4
Edenderry	-	-	-	-	-	-	-	-	17.8	17.7	16.3
Longford	-	-	-	-	-	-	-	-	13.9	16	13.1
Mallow	-	-	-	-	-	-	-	-	14.7	13.5	10.5
Killarney	-	-	-	-	-	-	-	-	-	9.1	8.9
Malin Head	-	-	-	-	-	-	-	-	-	-	12.8
Average Zone D	**13**	**13.3**	**12.5**	**11.9**	**9.9**	**11.8**	**14.3**	**11.2**	**11.9**	**12.7**	**10.9**
Average ug/m3	**12.12**										

The maximum concentration recorded in Zone D for PM_{10} was recorded at the Macroom Station (Station 78) 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.32km to the northwest 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. Given the retrospective nature of the assessment, the average of the nine years of available data for Zone D was used (2013-2023). The mean annual concentration of PM_{10} across this period was 12.12µg/m^3.

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 R195 road and local roads;
- Agricultural activities; and,
- Residential dwellings (solid fuel fires etc.) from the nearby town of Oldcastle.

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

The western boundary of the Site is shared with an adjoining quarry development, with an embankment of untouched ground separating the two developments. According to the IAQM guidance this was considered from a cumulative dust effects perspective in section 9.7.

There is one EPA Industrial Emissions ('IE') licenced site within 5km of the Development. The potential for cumulative and in-combination effects between the Development and the IE licenced sites is not likely, primarily due to the distance between the majority of these licensed sites and the Development.

9.3.3 Dust Sensitive Receptors

The activities associated with the Development included 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; and,
- 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 [109].

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. A conservative approach was used in this assessment and as such, receptors were identified within 400m of the Site. Details on these sensitive receptors are shown in Table 9-3 below.

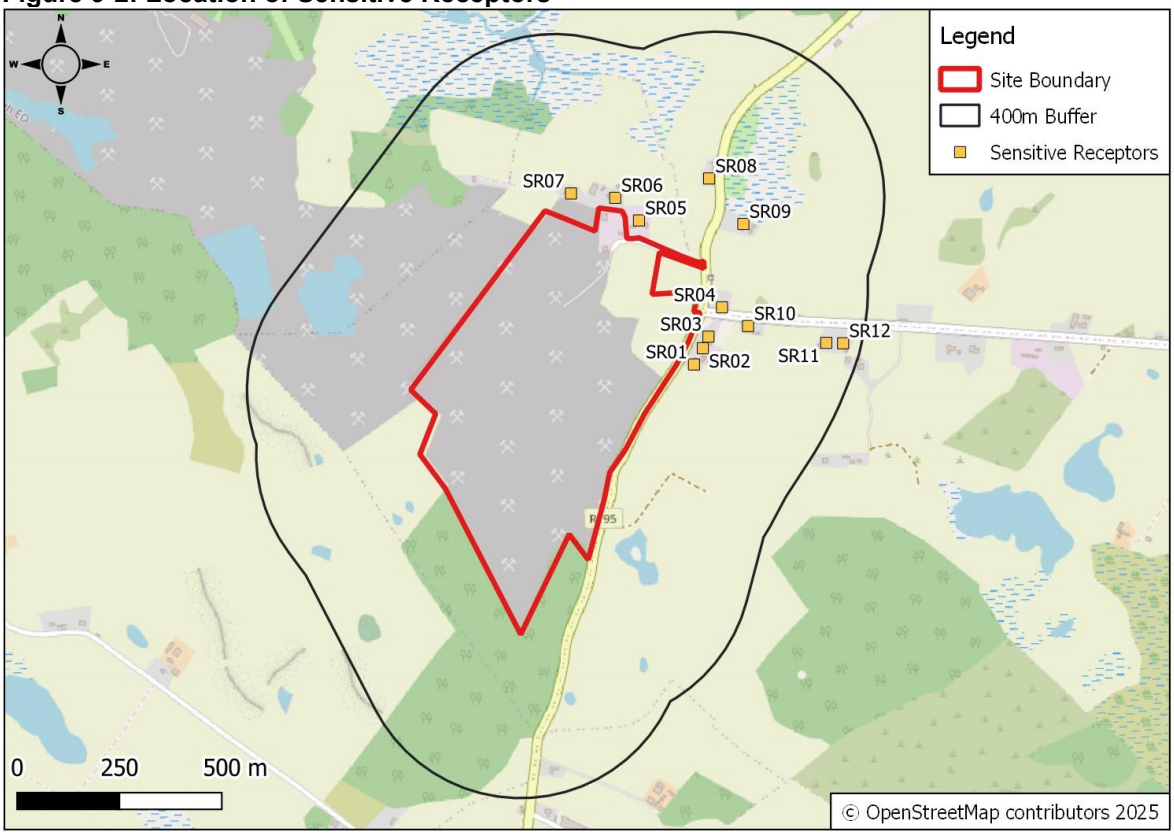
A total of twelve receptors were identified within 400m of dust-generating activities at the Site (SR01-SR12). The sensitive receptors are presented in Table 9-3 below and shown in Figure 9-2 below.

Table 9-3: 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	652854	774806	Residential Dwelling	ca.42m (east)	The terrain between the receptor and source of potential dust generation includes a hedgerow / scrub and road to the east of the Site.
SR02	652875	774846	Residential Dwelling	ca. 39m (east)	The terrain between the receptor and source of potential dust generation includes a hedgerow / scrub and road to the east of the Site.
SR03	652889	774874	Residential Dwelling	ca. 52m (east)	The terrain between the receptor and source of potential dust generation includes a hedgerow / scrub and road to the east of the Site
SR04	652922	774946	Residential Dwelling	ca. 55m (east)	The terrain between the receptor and source of potential dust generation includes a hedgerow / scrub and road to the east of the Site with an additional treeline that acts as a buffer for this receptor.
SR05	652720	775158	Residential Dwelling	ca. 35m (north)	The terrain between the receptor and source of potential dust generation includes a hedgerow / scrub and road to the east of the Site with an additional treeline that acts as a buffer for this receptor.
SR06	652662	775213	Residential Dwelling	ca. 37m (north)	The terrain between the receptor and source of potential dust generation includes a hedgerow / scrub and small field north of the Site.
SR07	652554	775224	Residential Dwelling	ca. 64m (north)	The terrain between the receptor and source of potential dust generation includes a hedgerow / scrub and small forest to the north of the Site.
SR08	652891	775260	Residential Dwelling	ca. 202m (north)	The terrain between the receptor and source of potential dust generation includes a hedgerow / scrub and agriculture fields north of the Site.
SR09	652975	775150	Residential Dwelling	ca. 132m (north)	The terrain between the receptor and source of potential dust generation includes a hedgerow / scrub, road and agriculture fields north of the Site

ID	ITM (Easting, Northing)		Description of Sensitive Receptor	Distance/ Orientation from the Development Boundary (m)	Terrain between Site and Receptor
	E	N			
SR10	652986	774900	Residential Dwelling	ca. 121m (east)	The terrain between the receptor and source of potential dust generation includes a hedgerow / scrub, road and agriculture fields north of the Site.
SR11	653177	774859	Residential Dwelling	ca. 317m (northeast)	The terrain between the receptor and source of potential dust generation includes a hedgerow / scrub and road to the east of the Site with an additional treeline that acts as a buffer for this receptor.
SR12	653218	774858	Residential Dwelling	ca. 357m (northeast)	The terrain between the receptor and source of potential dust generation includes a hedgerow / scrub and road to the east of the Site with an additional treeline that acts as a buffer for this receptor.

Figure 9-2: Location of Sensitive Receptors



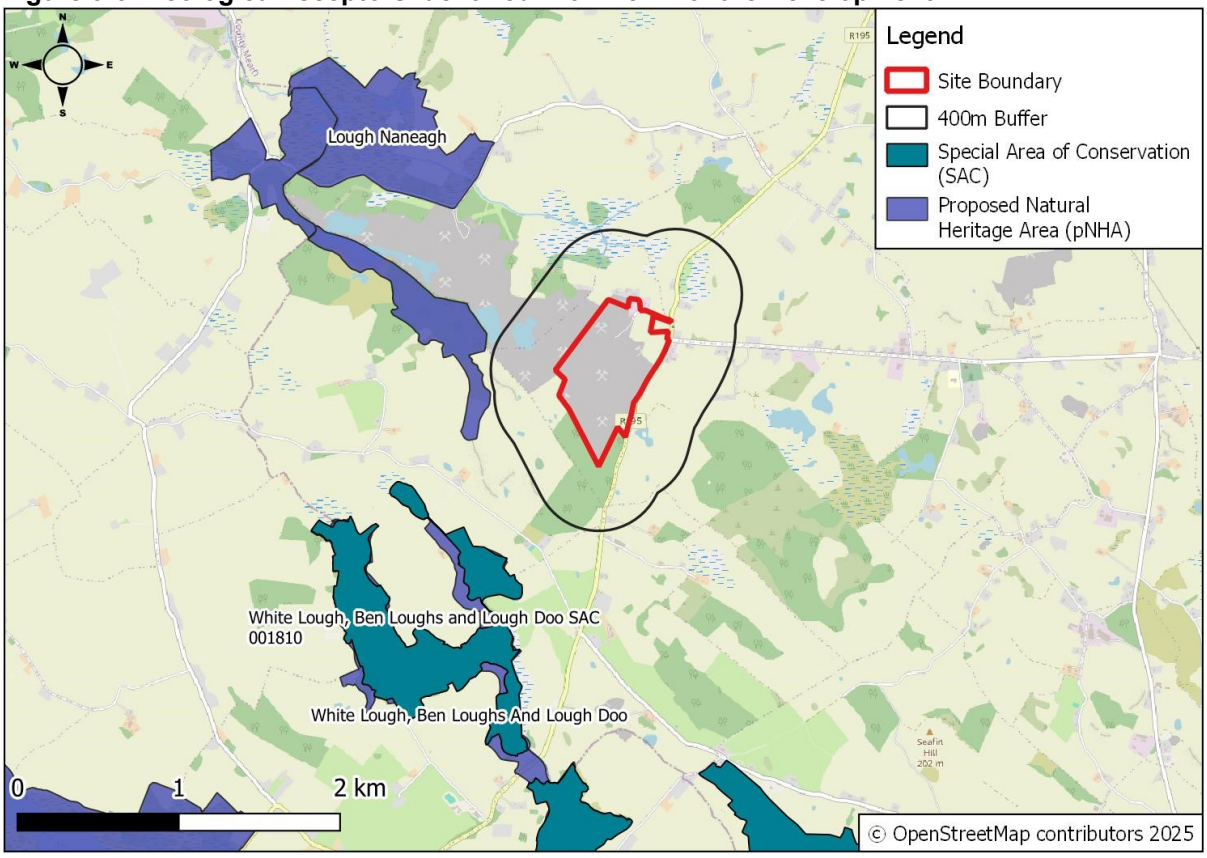
9.3.4 Designated Ecological Receptors

There are no European Designated sites located within 400m of the Development, with the closest proposed Natural heritage Site (Lough Naneagh pNAH) located ca. 440m to the west.

The White Lough, Ben Loughs and Lough Doo ('SAC') is located ca. 800m to the south 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 9-3.

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 9-3: Ecological receptors identified within 5km of the Development



9.3.5 Weather Conditions

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) [109].

The nearest synoptic meteorological station, that provides hourly data, is Mullingar Co. Westmeath. The Mullingar station is located ca. 21.5km to the south 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 9-4 below. Based on data availability at the station, a period of 1990-2024 was utilised to represent meteorological conditions at the Site during operation. Due to its relative proximity to the Site, a windrose utilising data from the Mullingar station is determined to be representative of relative wind conditions. Based on the windrose, receptors to the east and northeast will be exposed to higher levels of dust deposition due to wind speed and direction.

Figure 9-4: Windrose Diagram from Mullingar, Co. Westmeath (1990-2024).

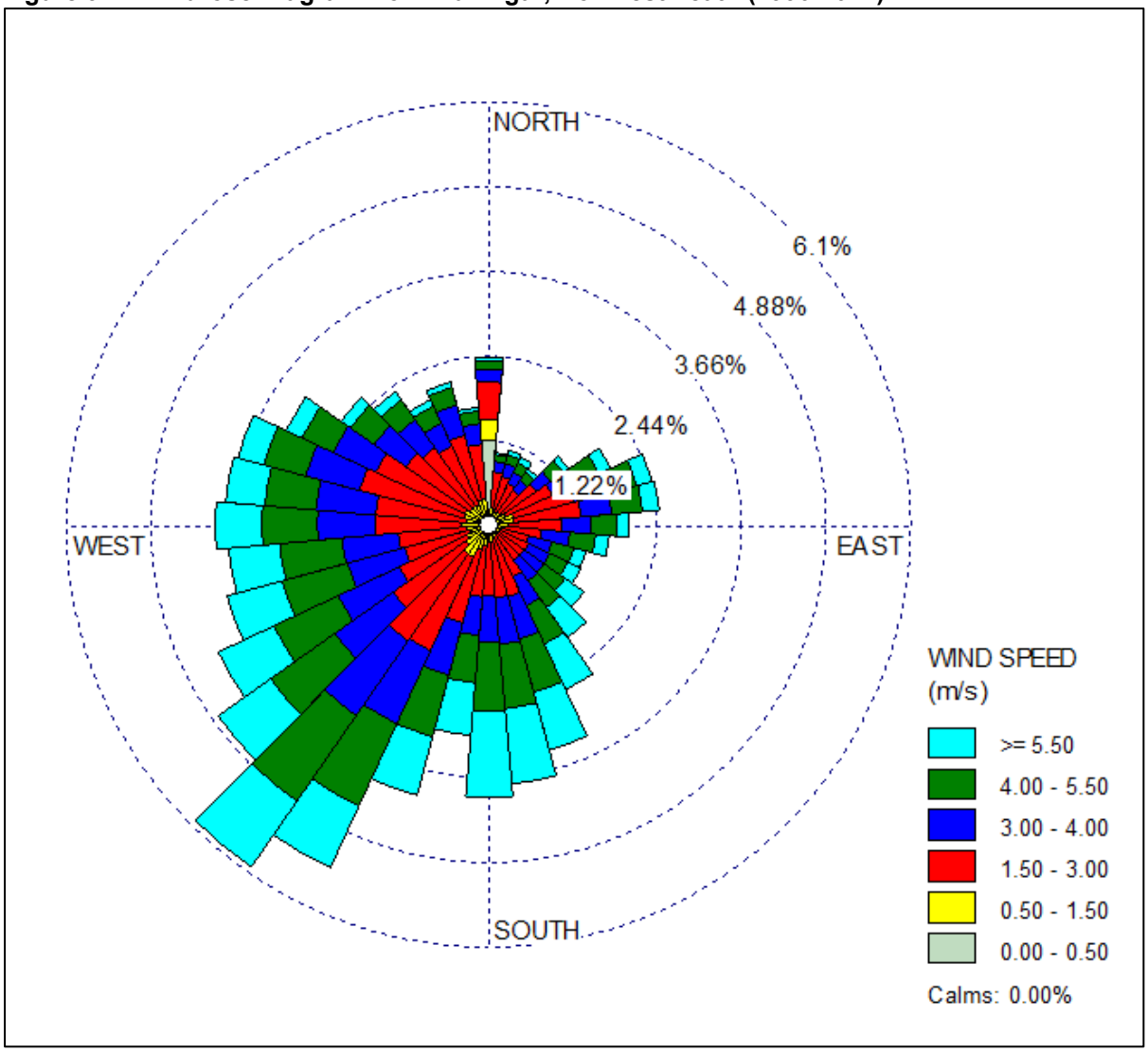


Table 9-4 below summarises the important meteorological variables recorded at the Mullingar station between 2019-2024.

Table 9-4: Meteorological Data at Mullingar, Co. Westmeath (2019-2024)

Year	Total Precipitation (mm)	Average Windspeed (m/s)
2019	1090.6	3.12
2020	1078.9	3.37
2021	980.8	2.97
2022	1001.8	3.14
2023	1158.5	3.12
2024	891.5	3.13

9.4 Characteristics and Potential Effects of the Development

9.4.1 Historical Activities Associated with the Development

The Site has a total area of 39ha (extraction area of 37.5ha), and there is a long history of quarrying associated with the Site. The Site has evidence of pre-1963 origins. The Site has been in possession of the Applicants family since the commencement of works and continues to be in regular use.

The entrance gate to the Site is off the R195 regional road on the east boundary. The Site office and welfare facilities, storage shed, maintenance shed, fuel tanks, and vehicle parking are located in the northern portion of the Site. The extraction area comprises most of the Site. Stockpiles are present throughout the quarry floor, and the settlement canal system is located in the centre of the Site.

The Site generally comprised of an extensive quarry floor with haul routes extending to the screening plant and equipment. The following mobile equipment was operational as part of the Development:

- Dry mobile screening plant;
- Wet semi-mobile screening plant;
- Semi-mobile crushing plant;
- Two Tracked Excavators;
- Two Wheel Loaders; and,
- Two Rock Breakers.

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

9.4.2 Mineral Dust Risk Assessment

Each stage of the historic activities of the Development had the potential to generate fugitive dust (site preparation, Operational Phases and the proposed restoration detailed in section 3.5). 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}).

As per the IAQM Guidelines, 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.

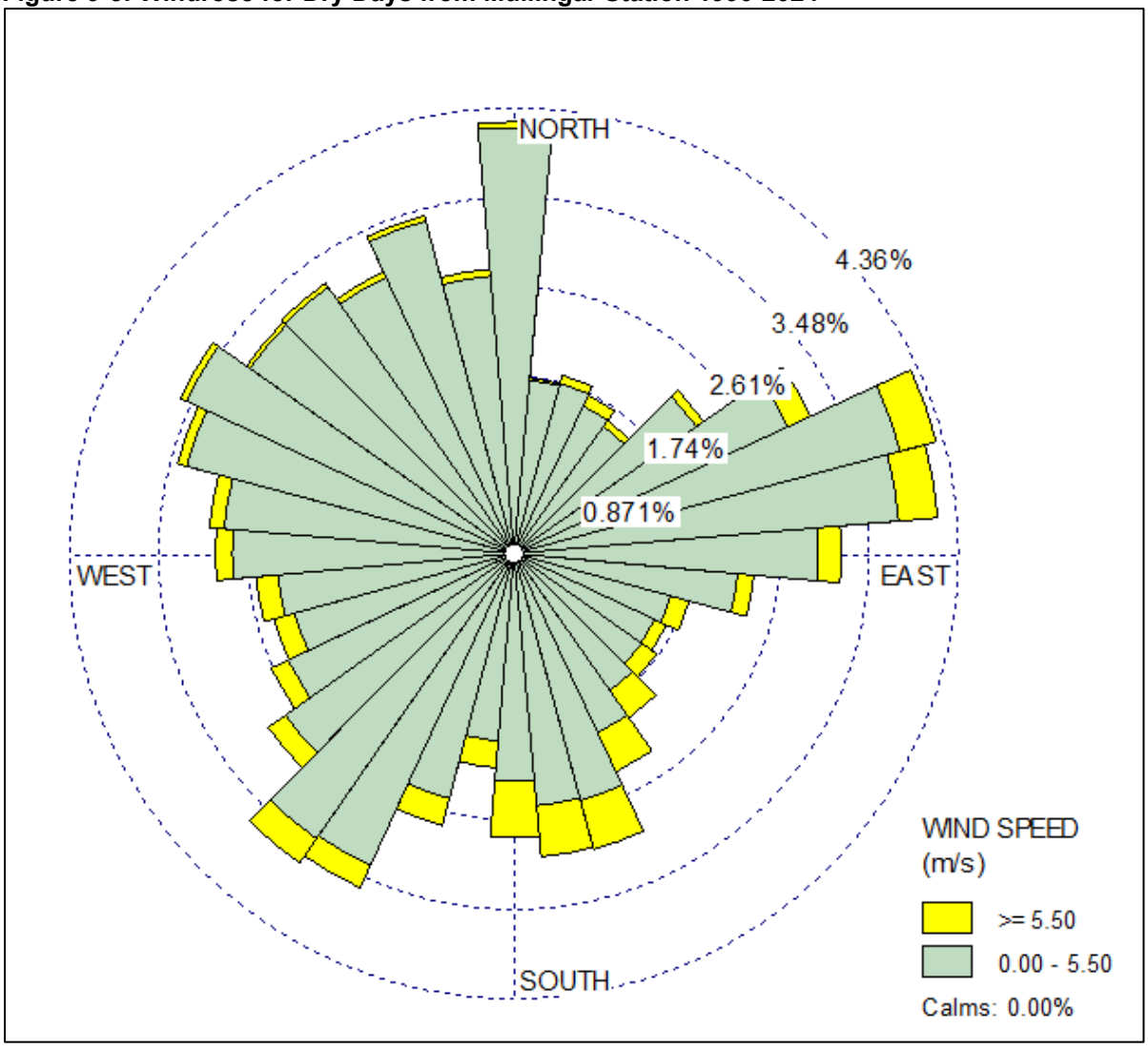
The residual source of emission quantifies how much dust was likely to be generated by the activities performed during the Development (without the implementation of mitigation measures). There have been no historical complaints associated with the Development, and due to the historical number of plant (<10), the historical HGV movements (max 50 HGVs per day) accompanied by the estimated historical annual extraction quantity (ca. >200,000tpa range classified in IAQM guidance) and maximum site extraction area (37.5ha.) an overall residual source emission was assigned the designation "medium" in accordance with the classification criteria outlined in the IAQM guidance as outlined in Appendix 9-1 [109].

To determine the impact on sensitive receptors, it is important to consider how/if the dust was transported, known as the Pathway Effectiveness. 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 five years of Met Eireann data from the Mullingar 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 was most likely to occur. 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 are shown in Figure 9-5 below.

Figure 9-5: Windrose for Dry Days from Mullingar Station 1990-2024



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 9-7 below details these sensitive receptors, and their classification based on the Pathway Effectiveness.

Table 9-5: Pathway Effectiveness for Sensitive Receptors

SR ID (Receptor Sensitivity)	Distance from the Emission Source (Orientation to emission source) [109]	Frequency of wind from the direction of dust source (dry weather) (>5.5m/s)	Pathway Effectiveness
SR01	ca.42m (east) **Close**	0.82% (955 hours) of wind coming from the west and southwest (245-295 degrees). **Infrequent**	**Ineffective**
SR02	ca. 39m (east) **Close**	0.82% (955 hours) of wind coming from the west and southwest (245-295 degrees) **Infrequent**	**Ineffective**
SR03	ca. 52m (east) **Close**	0.91% (1060 hours) of wind coming from the west and southwest (285-295 degrees) **Infrequent**	**Ineffective**
SR04	ca. 55m (east) **Close**	1.09% (1275 hours) of wind coming from the west and southwest (215-265 degrees) **Infrequent**	**Ineffective**
SR05	ca. 35m (north) **Close**	1.3% (1462 hours) of wind coming from the south and southwest (185-235 degrees) **Infrequent**	**Ineffective**
SR06	ca. 37m (north) **Close**	1.8% (2113 hours) of wind coming from the south and southwest (165-215 degrees) **Infrequent**	**Ineffective**
SR07	ca. 64m (north) **Close**	0.2% (336 hours) of wind coming from the south and southwest (315-5 degrees) **Infrequent**	**Ineffective**
SR08	ca. 202m (north) **Distant**	0.72% (849 hours) of wind coming from the west and southwest (205-235 degrees) **Infrequent**	**Ineffective**

SR ID (Receptor Sensitivity)	**Distance from the Emission Source (Orientation to emission source)** [109]	**Frequency of wind from the direction of dust source (dry weather) (>5.5m/s)**	**Pathway Effectiveness**
SR09	ca. 132m (north) **Intermediate**	0.9% (1025 hours) of wind coming from the west and southwest (215-255 degrees) **Infrequent**	**Ineffective**
SR10	ca. 121m (east) **Intermediate**	0.77% (895 hours) of wind coming from the west and southwest (235-275 degrees) **Infrequent**	**Ineffective**
SR11	ca. 317m (northeast) **Distant**	0.5% (605 hours) of wind coming from the west and southwest (255-285 degrees) **Infrequent**	**Ineffective**
SR12	ca. 357m (northeast) **Distant**	0.5% (605 hours) of wind coming from the west and southwest (255-285 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.

Twelve receptors were identified to have a high sensitivity to dust deposition in residential dwellings.

Considering the receptors' distance 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 9-7 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 [109]. The estimation of dust impact risk from this process is outlined in Table 9-8 below.

Table 9-6: Dust Impact Risk for Sensitive Receptors

SR ID	**Residual Source Emission**	**Pathway Effectiveness**	**Dust Impact Risk**
SR01	Medium	Ineffective	Negligible
SR02	Medium	Ineffective	Negligible
SR03	Medium	Ineffective	Negligible
SR04	Medium	Ineffective	Negligible
SR05	Medium	Ineffective	Negligible
SR06	Medium	Ineffective	Negligible

SR ID	Residual Source Emission	Pathway Effectiveness	Dust Impact Risk
SR07	Medium	Ineffective	Negligible
SR08	Medium	Ineffective	Negligible
SR10	Medium	Ineffective	Negligible
SR11	Medium	Ineffective	Negligible
SR12	Medium	Ineffective	Negligible

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.

To identify the magnitude of dust impact on the receptors, the risk of dust impact and the receptor sensitivity were 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 9-9 below.

Table 9-7: Magnitude of Disamenity Effects on Sensitive Receptors

ID	Receptor Sensitivity	Dust Impact Risk	The Magnitude of Dust Effect
SR01	High	Negligible	Negligible Effect
SR02	High	Negligible	Negligible Effect
SR03	High	Negligible	Negligible Effect
SR04	High	Negligible	Negligible Effect
SR05	High	Negligible	Negligible Effect
SR06	High	Negligible	Negligible Effect
SR07	High	Negligible	Negligible Effect
SR08	High	Negligible	Negligible Effect
SR10	High	Negligible	Negligible Effect
SR11	High	Negligible	Negligible Effect
SR12	High	Negligible	Negligible Effect

The estimated magnitude of the dust effect was determined to be "Negligible" 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 that the Applicant has not received a complaint regarding dust.

9.4.3 Ambient Dust Risk Assessment

The IAQM Guidance on Mineral Dust states:

> *"If the long-term background PM_{10} concentration is less than 17µg/m^3 there is little risk that the Process Contribution (PC) would lead to an exceedance of the annual-mean objective…17µg/m^3 is considered to be a suitable screening value for an assessment of annual mean PM_{10} concentrations"*

According to the IAQM Guidance, 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.

Given the retrospective nature of this assessment, the background concentrations of PM_{10} were determined from the 11-year average of PM_{10} concentrations from Zone D stations. Between 2013-2023 the Zone D average was 12.12µg/m^3 as detailed in section 9.3.1.

Table 9-8 below details the Predicted Environmental Concentrations ('PEC') of ambient PM_{10}, which sums the expected process contribution to the background concentrations.

Table 9-8: Predicted Environmental Concentrations of PM_{10} (µg/m^3)

Parameters	PM_{10} Concentrations (µg/m^3)
Maximum Process Contribution*	15µg/m^3
Background Concentrations**	12.12µg/m^3
Predicted Environmental Concentration (PEC)	27.12µg/m^3
Annual Mean Objective*	32µg/m^3
Annual AQS Limit	40µg/m^3

Notes: *taken from the IAQM Guidance [109]. **determined from the 10-year average of Zone D EPA monitoring.

The predicted environmental concentration associated with the Development is 27.12µg/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 [109]. As such, the Development posed little risk of exceeding the annual AQS based on the data above.

9.5 Unplanned Events

From the 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.

The mitigation measures that were followed during the Site Operation of the Development (and will be followed for the Restoration phase activities detailed in section 3.5) are shown in Table 9-9 below.

Table 9-9: Mitigation measures implemented at the Development

General Mitigation Measures for the Development
Design Measures • HGVs used established haul routes, which were regularly maintained; • All HGVs exiting the site used the wheel wash facilities.
Operational Measures • Systems were established to record all potential dust complaints associated with the Development. • Training was provided to Site personnel on dust mitigation measures. • The boundaries of the Development were regularly inspected for potential dust. • Public roads near the Development were regularly inspected for potential dust. • Speed restrictions were applied within the Site (15km/hr.). • Site roads were regularly cleaned and maintained.

The risk assessment found that there was a negligible risk of dust effects 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.

There was potential for a cumulative and in combination effect from disamenity dust from the Development and the activities within the adjacent BD Flood Quarry as this Quarry is located on the lands adjacent to the western boundary of the Development. Due to the limited information available publicly on this Quarry and its historical activities, it was assumed that the quarrying activities occurred within 100m of the Development which is within the IAQM cumulative screening distance (400m) for sand and gravel mineral dust. Therefore, a cumulative mineral dust risk assessment has been carried out to assess any historical cumulative dust risks.

From aerial photographs it appears that quarrying activities occurred in the east, south and north of the BD Flood Quarry lands adjacent to the Site boundary. Dust SRs have remained the same as stated in section 9.3.3 to assess the potential cumulative effects of the Development and the BD Flood Quarry on these SRs.

As per the IAQM Guidelines, 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.

The residual source of emission quantifies how much dust was likely to be generated by the activities performed during the Development and the adjacent BD Flood Quarry (without the implementation of mitigation measures). Previously the Development was assigned a designation of "medium" based on the IAQM classification criteria. As there was limited

information available to the accessor at the time of this assessment regarding the historical BD Flood quarrying activities an overall residual source emission was assigned the designation "largest" in accordance with the classification criteria outlined in the IAQM guidance [109].

To determine the impact on sensitive receptors, it is important to consider how/if the dust was transported, known as the Pathway Effectiveness. 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.

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 9-10 below details these sensitive receptors and their classification based on the Pathway Effectiveness.

Table 9-10: Pathway Effectiveness for Sensitive Receptors

SR ID (Receptor Sensitivity)	**Distance from the Emission Source (Orientation to emission source)** [109]	**Frequency of wind from the direction of dust source (dry weather) (>5.5m/s)**	**Pathway Effectiveness**
SR01	ca.42m (east) **Close**	0.82% (955 hours) of wind coming from the west and southwest (245-295 degrees). **Infrequent**	**Ineffective**
SR02	ca. 39m (east) **Close**	0.82% (955 hours) of wind coming from the west and southwest (245-295 degrees) **Infrequent**	**Ineffective**
SR03	ca. 52m (east) **Close**	0.91% (1060 hours) of wind coming from the west and southwest (285-295 degrees) **Infrequent**	**Ineffective**
SR04	ca. 55m (east) **Close**	1.09% (1275 hours) of wind coming from the west and southwest (215-265 degrees) **Infrequent**	**Ineffective**
SR05	ca. 35m (north) **Close**	1.3% (1462 hours) of wind coming from the south and southwest (185-235 degrees) **Infrequent**	**Ineffective**

SR ID (Receptor Sensitivity)	**Distance from the Emission Source (Orientation to emission source)** [109]	**Frequency of wind from the direction of dust source (dry weather) (>5.5m/s)**	**Pathway Effectiveness**
SR06	ca. 37m (north) **Close**	1.8% (2113 hours) of wind coming from the south and southwest (165-215 degrees) **Infrequent**	**Ineffective**
SR07	ca. 64m (north) **Close**	0.2% (336 hours) of wind coming from the south and southwest (315-5 degrees) **Infrequent**	**Ineffective**
SR08	ca. 202m (north) **Distant**	0.72% (849 hours) of wind coming from the west and southwest (205-235 degrees) **Infrequent**	**Ineffective**
SR09	ca. 132m (north) **Intermediate**	0.9% (1025 hours) of wind coming from the west and southwest (215-255 degrees) **Infrequent**	**Ineffective**
SR10	ca. 121m (east) **Intermediate**	0.77% (895 hours) of wind coming from the west and southwest (235-275 degrees) **Infrequent**	**Ineffective**
SR11	ca. 317m (northeast) **Distant**	0.5% (605 hours) of wind coming from the west and southwest (255-285 degrees) **Infrequent**	**Ineffective**
SR12	ca. 357m (northeast) **Distant**	0.5% (605 hours) of wind coming from the west and southwest (255-285 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.

Twelve receptors were identified to have a high sensitivity to dust deposition, as residential dwellings.

Considering the receptors' distance 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 9-7 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 [109]. The estimation of dust impact risk from this process is outlined in Table 9-11 below.

Table 9-11: Dust Impact Risk for Sensitive Receptors

SR ID	Residual Source Emission	Pathway Effectiveness	Dust Impact Risk
SR01	Large	Ineffective	Low Risk
SR02	Large	Ineffective	Low Risk
SR03	Large	Ineffective	Low Risk
SR04	Large	Ineffective	Low Risk
SR05	Large	Ineffective	Low Risk
SR06	Large	Ineffective	Low Risk
SR07	Large	Ineffective	Low Risk
SR08	Large	Ineffective	Low Risk
SR10	Large	Ineffective	Low Risk
SR11	Large	Ineffective	Low Risk
SR12	Large	Ineffective	Low Risk

The risk of dust impact has been assessed to have been "Low Risk" for all sensitive receptors, as a result of the historical use of the Development.

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 9-9 below.

Table 9-12: Magnitude of Disamenity Effects on Sensitive Receptors

ID	Receptor Sensitivity	Dust Impact Risk	The Magnitude of Dust Effect
SR01	High	Low Risk	Slight Adverse Effect
SR02	High	Low Risk	Slight Adverse Effect
SR03	High	Low Risk	Slight Adverse Effect
SR04	High	Low Risk	Slight Adverse Effect
SR05	High	Low Risk	Slight Adverse Effect
SR06	High	Low Risk	Slight Adverse Effect
SR07	High	Low Risk	Slight Adverse Effect
SR08	High	Low Risk	Slight Adverse Effect
SR10	High	Low Risk	Slight Adverse Effect

ID	Receptor Sensitivity	Dust Impact Risk	The Magnitude of Dust Effect
SR11	High	Low Risk	Slight Adverse Effect
SR12	High	Low Risk	Slight Adverse Effect

The estimated magnitude of the dust effect was determined to be "Slight Adverse Effect" on all sensitive receptors, as a result of the cumulative historical activities associated with the Development and the BD Flood quarry on adjacent lands.

As such, the cumulative and in-combination effect from the BD Flood Quarry activity within the vicinity of the Site was not significant. The accuracy of the findings presented is strengthened, given that the Applicant has not received a complaint regarding dust.

The background concentrations of PM_{10} (or ambient dust) have been considered in Section 9.4.1.3 above. 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 PM10 was warranted in a cumulative sense.

9.8 Interactions with other Environmental Attributes

- Chapter 5: Population and Human Health: Air quality is an important consideration for human health, as potential PM10 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. Climate Change has the potential to impact ecosystems, however, the influence of GHG emissions associated with the Development was shown to be not significant.
- Chapter 13 - Material Assets: Traffic & Transport: Air quality can be impacted by increased traffic volumes. However, changes to traffic volumes as a result of the Development are low, and therefore will not impact local or regional air quality.

9.9 Indirect Effects

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

9.10 Residual Effects

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 effect on air quality from dust is considered to be not significant.

9.11 Monitoring

There has been no monitoring completed at the Site to date. There were no conditions pertaining to this activity.

9.12 Reinstatement

Following on from S261 registration, an after-care plan was created for the whole Site. See section 3.5 for further details.

9.13 Difficulties Encountered

A common difficulty encountered throughout the rEIAR was the issue of attempting to identify potential historic effects 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 abate subsequently. 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 effects 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 effects on climate associated with the Development:

- International Panel on Climate Change: Guidelines for National Greenhouse Gas Inventories; [110]
- IEMA – Environmental Impact Assessment Guide to: Assessing Greenhouse Gases and Evaluating their Significance 2nd Edition (2022) [111];
- Meath County Council Climate Action Plan [112];
- Meath County Council Development Plan 2021-2027 [18]; and,
- Department of Communication, Climate Action and Environment – National Adaption Framework, Planning for a Climate Resilient Ireland [113].

The assessment for climate will utilise existing standards to identify potential sources of GHG emissions 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 [114]. 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. As the Climate Action and Low Carbon Act [115] came into effect in Ireland in 2015 and associated National Carbon Budgets were set in 2021 by the Climate Change Advisory Council the baseline year for the assessment of GHG emissions from the Development will be 2015. GHG emissions prior to this have been scoped out of this assessment. A worst-case scenario in terms of maximum GHG emissions will be assessed from 2015-2023 and presented as an annual quantity assuming peak operation across all years. This is an overestimation to demonstrate no significant effects from the GHG emissions from the Development on Climate in the context of national emissions ceilings and carbon budgets. The quantification of GHG emissions will be estimated in megatonnes of CO_2e.

The potential historical effects of these GHG emissions, associated with the Development, will be determined by following the IEMA guidance, Assessing Greenhouse Gas Emissions and Evaluating their Significance, 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 were no potential historical effects on microclimate, as the processes undertaken did not result in features that would give rise to wind tunnelling or shading outside of the Site. As such, the potential historical effects 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 Meath County Council Development Plan 2021-2027

The Meath County Development Plan 2021-2027 [18] details various aims and objectives relating to Climate. Transport is identified as the main contributor to GHG emissions in the County and Meath County Council is focused on improving road infrastructure and public transport networks.

Climate:

MOV POL 1 - To support and facilitate the integration of land use with transportation infrastructure, through the development of sustainable compact settlements which are well served by public transport in line with the guiding principles outlined in RPO 8.1 of the EMRA RSES 2019-2031.

CS POL 1 -To promote and facilitate the development of sustainable communities in the County by managing the level of growth in each settlement to ensure future growth is in accordance with the Core Strategy and County Settlement Hierarchy in order to deliver compact urban areas and sustainable rural communities.

10.2.1.2 Meath County Council Climate Action Plan 2024-2029

The Meath County Council Climate Action Plan 2024 – 2029 was adopted by the elected members at MCC in 2024 [116]. This was prepared to create a low-carbon and climate resilient County, by delivering and promoting best practice in climate action, at the local level.

The targets of the Meath County Council Climate Action Plan are as follows:

- **Energy Efficiency -** 50% improvement in energy efficiency by 2030;
- **Resilience -** Making Meath a climate-resilient region by reducing the impacts of future climate change-related events;
- **GHG Reduction -** 51% reduction in greenhouse gas emissions by 2030; and,
- **Awareness -** Actively engaging and informing citizens, communities and businesses on climate change.

10.2.1.3 National

In 2023, Ireland's GHG emissions are estimated to be 55.01 million tonnes of carbon dioxide equivalent ('Mt CO_2eq'), which is 6.8% lower (or 4.00 Mt CO_2eq) than emissions in 2022 (59.00 Mt CO_2eq) and follows a 2.0% decrease in emissions reported for 2022. There was a decrease of 3.4% in emissions reported for 2020 compared to 2019, which could be attributed to the COVID-19 pandemic and the strict restrictions on travel and working from home. The 2021 emissions are over 1% higher than pre-pandemic 2019 figures.

The Department of Environment, Climate and Communications recently published its updated Climate Action Plan in 2024 [117] . The objective of the Plan is to enable Ireland to meet its new EU targets under the EU Green Deal to reduce overall carbon emissions by 51% between 2021 and 2030 (compared to 2018 levels) and lay the foundations for achieving net zero carbon emissions by 2050. These legally binding objectives are set out in the Climate Action and Low Carbon Development (Amendment) Act 2021. The Climate Act will support Ireland's transition to net-zero emissions and the achievement of a climate-neutral economy no later than the end of the year 2050. The Plan evaluates every relevant sector: electricity, enterprise, housing, heating, transport, agriculture, waste and the public sector [117].

10.2.1.4 The National Adaption Climate Framework

The National Adaption Climate Framework was developed in 2018, under the Climate Action and Low Carbon Development Act of 2015 (as amended). 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 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 Plans). This will be further discussed in section 10.3.3 below.

10.2.1.5 National Carbon Budget and Sectoral Emissions Ceilings

The National Sectoral Emission Ceilings refer to the total amount of permitted GHG emissions that each sector of the economy can produce during a specific period of time. Under Section 6C of the Climate Action and Low Carbon Development Act (as amended), sectoral emission ceilings outline the maximum GHG emissions that are permitted in different sectors of the Irish economy and commit Ireland to achieve climate neutrality by 2050. The carbon budget programme, which includes three successive 5-year periods of national emission ceilings, is measured in tonnes of CO_2e ('tCO_2e').

Table 10-1: Irelands National Carbon Budget

National Climate Budget	Emission Ceiling for Assessment Periods (tCO_2e)
First Carbon Budget (2021 to 2025)	295,000,000
Second Carbon Budget (2026 to 2030)	200,000,000
Third Carbon Budget (2031 to 2035)*	160,000,000
Fourth Carbon Budget (2036 to 2040)*	120,000,000

*Provisional Budgets.

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 ('IPCC') 2019 refinement of the 2006 publication of *Guidelines for National Greenhouse Gas Inventories* [110], 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; and,
- Scope 3: Other indirect emissions that occur in the value chain.

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

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.

10.2.2.1 Operational Greenhouse Gas Emissions

Scope 1 GHG Emissions

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 a maximum of 16 HGVs per day for 2024 (32 HGV movements including return trips). Although a portion of these HGVs are not owned by the Applicant they have been considered as Scope 1 emissions for the purpose of this assessment.

Based on the information received and taking the baseline year as 2015, potential sources of Scope 1 emissions that were located within the boundary of the Development (between 2015-2023) include:

- 32 HGV vehicles accessing the Site are assumed to be operating on diesel;
- Dry mobile screening plant;
- Semi mobile crushing plant;
- Two Tracked Excavators;
- Two Wheel Loaders; and,
- Two Rock Breakers.

In order to estimate the potential GHG emissions associated with the plant equipment, assumptions were made regarding their operation during the 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. 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 (07:00 to 19:00 Monday to Friday; 07:00 to 14:00 Saturdays) for 303 days per year (excluding Sundays and Public Holidays). For the purpose of this assessment, it is assumed that a working week has 67 hours. This is a gross overestimation as all plant did not run concurrently for 67 hours per week, but this has been assessed in order to demonstrate no significant effects from the Development on Climate and national GHG emissions.

For the 32 HGV movements, it was conservatively estimated that the HGVs would travel 100% laden for 80km one way per day. All HGVs are assumed to travel up to 160km per trip to include the return journey for which they will be 0% laden.

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 2024*'. 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 10-2 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 10-2 below).

Table 10-2: Summary of GHG emission input data

Equipment Type	Fuel Consumption (L/hr)*	Operational Hours per week**	Conversion Factor (kg CO2e/litre)
Dry mobile screening plant	10	67	2.66
Semi mobile crushing plant	14	67	2.66
Tracked Excavators*	36	67	2.66
Wheel Loaders*	68	67	2.66
Rock Breakers*	40	67	2.66
No. of HGV vehicles	**Distance Travelled per HGV (km/day)**	**Load**	**Conversion Factor ($kgCO_{2e}$ per km)**
32	160	100% (80km) 0% (80km)	**100% Laden =** 0.98 **0% Laden =** 0.64

Values for the operation of 2x plant

****** based on a 67 hour operating week***

Scope 2 GHG Emissions

According to the description of the activities relating to the Development and the information provided by the Applicant, power onsite was obtained from electricity and this is used to power the lighting onsite and heat the office cabins. Electricity is also used to power the wet semi-mobile screening plant. Total electricity use per annum was obtained from Electric Ireland bills supplied by the Applicant which provided kWh of use per year, so an annual average was calculated and used for this assessment. Conversion factors provided by Electric Ireland state that in 2023 the average CO_2 emissions associated with their electricity was 234gCO_2/kWh.

Scope 3 GHG Emissions

The only Scope 3 type emissions associated with the Development are GHG emissions from employee transport to and from the Site.

Currently and since 2015, there have been nine people employed for both on-site operations and truck drivers primarily from the local area. With regards to LGV vehicle movements, the Central Statistics Office calculated that an average worker would travel 16.8 kilometres in 2022. As a conservative estimate 17km per day (34km round trip) was used in the assessment. Therefore, it was assumed that every vehicle used onsite will travel ca. 17km for each movement. [116]. It was assumed that all LGVs were fuelled by petrol.

10.3 Receiving Environment

10.3.1 Baseline Climate

Ireland's climate is primarily driven by ocean influences, mainly the Atlantic, resulting in maritime climate conditions. This results in relatively warm summers and mild winters. The wettest months of the year typically occur between November and January. The prevailing wind direction is from the southwest, contributing heavily to the wet weather experienced in the spring and warmer temperatures in the summer.

Typically, the climate is weather data averaged over a 30-year period to determine long-term trends in important variables such as temperature, precipitation and wind speed. The period of 30 years is considered long enough to smooth out year-to-year variations. Met Eireann has compiled a set of climate averages for the period 1991 to 2020 [118].

The closest station that has a 30-year average of variables produced is the Clones meteorological station, located ca. 46km north of the Site. However, this station was closed in 2007/2008 and therefore does not contain 2-years of analysis from the reference period (1991-2020). The closest station to the Site that has a complete data set is Dublin Airport which is located ca. 70km southwest of the Site.

Table 10-3 below summarises the climate data for the Dublin Airport station.

Table 10-3: Climate averaged data from the Dublin Airport station (1991-2020)

Variable	1991-2020 Average
Mean Temperature (°C)	9.7
Precipitation (sum of monthly means in mm)	772.5
Mean wind speed (kn)	10.5
Mean number of days with gale force winds	7.8

According to Met Eireann's Climate Average Report, which compares the 1961 to 1990 averages to the 1991 to 2020 averages, the following is noted:

- Annual mean air temperature for Ireland has increased by approximately ca. 0.7°. Spring showed the highest increase (0.8°C), whilst winter showed the smallest increase (0.6°C);
- Annual average rainfall has increased by approximately 7% between the two periods. The greatest increase was seen in the west and north of the country;
- The 30-year average annual distribution of rainfall shows a typical west-to-east decline in the number of rain days and wet days, with east and southeast regions experiencing the lowest number of wet days; and,
- The average annual number of very wet days observed over the period 1991 to 2020 shows that these events are more frequent in the west of the country than in the eastern and midland regions.

10.3.2 Extreme Weather Events

According to the Climate Adaption Plan from Meath County Council (Chapter 10 of the CDP), the main climate hazards that are likely to impact County Meath are:

- Mean temperatures are set to increase up to 1.7 °C by 2060, with the largest changes expected in the East of Ireland;
- In the extremes, the hottest summer days could be up to 2.6 °C warmer, with peak winter temperatures increasing 3.1 °C by 2060;
- Extended dry periods in the summer set to increase between 12 – 40% by 2060; and,
- Frequency of heavy rainfall events set to increase by 20%.

A review of the Meath County Council Climate Adaption plan identified nine severe weather events in the county, during the period 2010-2023. These weather events include extreme rainfall, severe flooding, severe cold spells and increased summer temperatures resulting in droughts. Some of the major events registered as national major weather events including numerous storm events (Emma is 2018, Ophelia in 2017, Storm Desmond and Storm 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, Collinstown. In December 2015, Collinstown weather station recorded 251.8mm monthly precipitation, which was a 197% increase on the 3-year average. This period of high rainfall was driven by the occurrence of Storm Desmond and Storm Frank.

10.3.3 Baseline Greenhouse Gas Emissions

According to the EPA, annual GHG emissions for Ireland for 2023 are estimated to be 55.01 million tonnes of carbon dioxide equivalent (Mt CO2eq). In 2015 the annual GHG emissions for Ireland were estimated to be 60,411(Mt CO2eq) [119].

The sectors relevant to GHG emissions associated with the historical use of the Development are Transport and Energy Industries. Transport currently accounts for approximately 21.4% of Ireland's GHG emissions, with road transportation accounting for 96% in total [120]. Table 10-4 below details the CO_{2e} emissions for Transport for the period associated with the Development (2015-2023). Lower GHG emissions were experienced in 2020 omitted due to the COVID-19 pandemic.

Table 10-4: National Emissions for Road Transportation between 2015-2023

Year	CO2e (Mt)
2015	11.31
2016	11.75
2017	11.62
2018	11.76
2019	11.75
2020	9.79
2021	10.43
2022	11.15
2023	11.18
Average CO_{2e}(Mt) 2015-2023	**11.36**

Note: 2024 Road Transport GHG emissions were not available at the time of this assessment.

Transport emissions ranged between a maximum of 11.76Mt of CO_{2e} in 2018 to a minimum 10.43Mt in 2021. The reduced emissions in 2020 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 was used for this assessment (excluding GHG emissions in 2020), which was 11.36Mt of CO_{2e} (2015-2023).

Energy Industries currently accounts for approximately 14.3% of Ireland's GHG emissions, with Public Electricity and Heat Production accounting for 94% in total [103]. Table 10-5 below details the CO_{2e} emissions for the Energy Industry for the period associated with the Development (2015-2023).

Table 10-5: National Emissions for Energy Industry between 2015-2023

Year	CO2e (Mt)
2015	11.95
2016	12.67
2017	11.87
2018	10.56
2019	9.31
2020	8.67
2021	10.19
2022	10.00
2023	7.85
Average CO_{2e}(Mt) 2015-2023	**10.34**

Note: 2024 Electricity Use GHG emissions were not available at the time of this assessment.

Energy Industry GHG emissions ranged between a maximum of 12.67Mt of CO_{2e} in 2016 to a minimum 7.85Mt in 2023. The average CO_{2e} emissions associated with electricity use was used for this assessment, which was 10.34Mt of CO_{2e} (2015-2023).

10.4 Characteristics and Potential Effects of the Development

Due to the retrospective nature of the rEIAR the GHG emissions assessed in this chapter are concerned with the Operational Phases associated with the Development between 2015-2023. As a worst-case scenario, all plant used during this period been included and presented as an annual quantity of GHG emissions for the years 2015-2023. As there are no national carbon budgets pre-2021 the total emissions between 2021-2023 from the Development will be presented in the context of the First National Carbon Budget (2021-2025). Transport GHG emissions will be considered in the context of historic national transport emissions presented in section 10.3.3 and electricity use emissions have been considered in the context of historic national electricity use emissions presented in section 10.3.3.

10.4.1 Emissions of Greenhouse Gases

To determine potential direct contributions of GHG emissions associated with the Development, a conservative estimation of the operating regime of the plant equipment was used, as discussed in section 10.2.2 above. Table 10-2 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 Government Conversion Factors 2024 were used, as described in section 10.2.2.1 above. These emission factors were based on the assumed annual fuel consumption of the plant equipment and the estimated CO_2e for the movement of HGVs travelling outbounds for 80km laden and the return trip of 80km unladen. Table 10-6 below

displays the potential Scope 1 GHG emissions associated with the Development for a typical year of activity.

Table 10-6: Calculation of CO2e for plant and equipment (Scope 1 GHG emissions)

Plant Name	Annual Fuel Consumption (L/year*)	Conversion Factor for Mineral Diesel (Total kg CO_{2e})	Tonnes of CO_{2e} per year	Mt of CO_{2e} per year
Dry screening plant	33,633	2.66	89.46	0.00009
Crusher	47,086	2.66	125.25	0.00013
Tracked Excavators	121,079	2.66	322.07	0.00032
Wheel Loaders	228,704	2.66	608.35	0.00061
Rock Breakers	134,532	2.66	357.86	0.00036
Number of HGVs per day	**Distance Travelled per trip (km)***	**Conversion Factor (100% laden, 0% laden)**	**Tonnes of CO_{2e} per year**	**Mt of CO_{2e} per year**
32	160	100% Laden = 0.98 0% Laden = 0.64	1256.60	0.00126
Total Scope 1 CO_{2e} (Mt) for a worst case year	**0.00276**			

***Typical operating year of 303 days as the quarry did not operate on public holidays and Sundays**

Based on a typical operating year associated with the Development (2015-2023), Scope 1 GHG emissions from the plant and HGV movements were estimated to be 0.00276Mt of CO_{2e}. Over the course of the assessment period (2015-2023), this equates to a total of 0.00276Mt of CO_{2e} per annum, based on the known plant and equipment list provided for the operational year.

Scope 2 GHG emissions consist of historical electricity use onsite as shown below in Table 10-7. Average annual electricity use was based on annual usage obtained from Electric Ireland bills.

Table 10-7: Calculation of annual electricity usage CO2e (Scope 2 GHG emissions)

Electricity Usage (Annual Average) kWH	Conversion Factor for g CO2e/Kwh	Tonnes of CO2e per year	Mt of CO2e per year
127,100	234	29.74	0.000029
Total Scope 2 CO_{2e} (Mt) average per annum	**0.000029**		

Based on a typical operating year associated with the Development (2015-2023), Scope 2 GHG emissions from electricity use were estimated to be 0.000029Mt of CO_{2e} per annum.

Scope 3 GHG emissions comprise only of employees travelling to and from the Site. Table 10-8 displays the potential Scope 3 GHG emissions associated with the Development for a typical year of activity.

Table 10-8: Calculation of CO2e for LGVs (Scope 3 GHG emissions)

Number of LGVs per day	Distance Travelled (km/yr)*	Conversion Factor for Mineral Diesel (Total kg CO_{2e})	Tonnes of CO_{2e} per year	Mt of CO_{2e} per year
9	34	0.16	1.6946	0.0000017
Total Scope 3 CO_{2e} (Mt) average per annum	0.0000017			

***Typical operating year of 303 days as the quarry did not operate on public holidays and Sundays**

Table 10-9 below shows the estimations of CO_{2e} produced as a result of the historic transport associated with the Development (Scope 1 HGVs and Scope 3 employee vehicles) described in the context of the national GHG emissions for the Road Transportation. This follows the IEMA Guidance on assessing GHG emissions [114].

Table 10-9: Contributions of the Development to Total Historic Transport– GHG Emissions

Transport CO2eq/yr - Development (Mt)	CO2e – Average Road Transportation (2015-2023)(Mt)	% of contribution from the Development per year
0.001258	11.36	0.011%

Based on the annual average GHG emissions attributed to Road Transportation between 2015-2023 (11.36Mt of CO_{2e}), the Development contributed approximately 0.011% of the emissions per annum.

Based on the assessment of GHG emissions associated with HGV & LGV movements, the effects of the Development on GHG emissions within the Irish transport sector are determined as 'not significant', in the context of historic emissions.

Table 10-10 below shows the estimations of CO_{2e} produced as a result of the historic electricity use associated with the Development (Scope 2 GHG emissions) described in the context of the national GHG emissions for the Energy Industry (section 10.3.3). This follows the IEMA Guidance on assessing GHG emissions [114].

Table 10-10: Contributions of the Development to Total Historic Electricity Use– Scope 2 GHG Emissions

Electricity Use CO2eq/yr - Development (Mt)	CO2e – Average Energy Industry (2015-2023)(Mt)	% of contribution from the Development per year
0.000029	10.34	0.0003%

Based on the annual average GHG emissions attributed to the Energy Industry between 2015-2023 (10.34Mt of CO_{2e}), the Development contributed approximately 0.0003% of the emissions per annum.

Table 10-11 below shows the estimations of all GHG emissions per annum produced as a result of the historic operations associated with the Development described in the context of the First National Carbon Budget.

Table 10-11: Contributions of the Development per annum to the First National Carbon Budget

Total CO_{2eq} - Development (Mt) per year	First National Carbon Budget (2021-2025) (Mt)	% of contribution from the Development (per year)
0.00279	295	0.0009%*

*percentage presents one year of GHG emissions from the Development in the context of the First National Carbon Budget 295Mt of CO_2e.

10.4.2 Climate Change Adaption

Due to the retrospective nature of this assessment, climate change adaptation could have only occurred over the period of activity. Therefore, adaption measures are not required to be assessed.

10.4.3 Unplanned Events

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

10.5 Mitigation Measures

Given the relatively small activity, due to its nature, size, location and intensity of operations, mitigation measures were not considered to be required.

10.6 Cumulative and In-combination Measures

As discussed throughout this chapter, the assessment boundary of this GHG emissions assessment took into account the Scope 1, 2 and 3 emissions anticipated as a result of the Development. The GHG emissions presented in section 10.4 above represent a cumulative assessment of the Development in the context of national and sectoral emission ceilings up to 2030.

10.7 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 no overall effect on national GHG emissions and, in turn, climate change that can impact human health;
- Chapter 6 - Biodiversity: Climate Change has the potential to effect ecosystems; however, the influence of GHG emissions associated with the Development was shown to be imperceptible; and,
- Chapter 14 - 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 effect on climate as a result of the vehicles associated with the Development. The effects were determined to be imperceptible.

10.8 Indirect Effects

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

10.9 Residual Effects

The effects on national GHG emissions as a result of the historical and current operation of the Development was classified as 'imperceptible'.

10.10 Reinstatement

Not Applicable.

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 abate subsequently. 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 effect 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 operational and restoration noise associated with the Development;
- Assess the likely significant effects 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 [12];
- EPA 2006, Environmental Management Guidelines, Environmental Management in the Extractive Industry (Non-Scheduled Minerals), 2006 [72];
- SI No 140/2006 Environmental Noise Regulations 2006 [121];
- Acoustics and Noise Consultants ('ANC') Guidelines (Greenbook) Environmental noise measurement guide 2013 [122];
- Institute of Environmental Management & Assessment ('IEMA') Guidelines for environmental noise impact assessment, 2014 [123];
- ISO 1996-1:2016 Acoustics - Description, measurements and assessment of environmental noise - Part 1: Basic quantities and assessment procedures 2003 [124];
- ISO 1996-2:2017 Acoustics - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels [125];
- NRA Guidelines for the treatment of noise and vibration in National Road Schemes, 2004 [126];
- NRA Good practice guidance for the treatment of noise during the planning of National Road schemes, March 2014 [127];
- Smith, Peterson and Owens Acoustics and Noise Control, 1996 [128];
- World Health Organization's ('WHO') Night noise guidelines for Europe [129];
- WHO Guidelines for Community Noise [130];
- Meath County Development Plan 2021 -2027 [18];
- Meath Noise Action Plan 2024- 2028 [131];
- Aggregate Levy Sustainability Fund ('ALSF'): Sustainable Aggregates Theme 1 - Reducing the environmental effect of aggregate quarrying: Dust, noise and vibration, year unknown [132]; and,

- Irish Concrete Federation ('ICF') 2005, Environmental Code, Second Edition, October 2005. [133]

As the application occurred from the 1990s to the present day, there is no Site clearance or construction phase works associated with the Development. This chapter assesses noise effects that have arising from the Development through 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 full glossary of acoustic 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 Meath County Council Development Plan 2021-2027

The Meath County Development Plan 2021-2027 [18] details the following policy relating to noise, relevant to the Site:

"Extractive Industry DM OBJ 64:

> *All applications for extractive industry development shall comprehensively address the following criteria as part of a pre-application discussion and/or planning application proposal:*
>
> *Impact on existing local communities with regard to but not limited to noise, vibration and subsidence."*

11.2.1.2 Meath County Council Noise Action Plan (2024-2028)

Regarding the extractive industry, the Meath County Council Noise Action Plan states:

> *"Regulation of extractive industries requires Local Authorities to find a balance between facilitating economic growth, creating employment and protecting the natural landscape and local population from unwanted effects of heavy industry. The County Development Plan makes provisions to support extractive industries where it does not unduly compromise the environmental quality of the county. The influence on environmental quality is judged on a number of factors, including noise. Proposals for new developments in particular are required to address the noise impact on local communities in detail in planning proposals. See DM OBJ 62."*

Further details in relation to noise from quarries are outlined under DM Objective 64 of the County Development Plan, as outlined above in section 11.2.1.1.

11.2.2 Quarries and Ancillary Activities

The Department of Environment Heritage and Local Government ('DoEHLG') 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.''*

11.2.3 Criteria Noise Impact

The limits outlined here are derived utilising best practices, 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 the 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 Operational Site-Specific Noise

The best guidance for quarry noise control issued by the EPA [72], DoEHLG [12] and by the Irish Concrete Federation [94] detail recommended noise limits of:

- Daytime (i.e. 08:00 to 20:00) $L_{eq,1hr}$ 55dB(A); and,
- Night-time (i.e. 20:00 to 08:00) $L_{eq,1hr}$ 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.

11.2.3.2 Site Associated Road Traffic

The R195 regional road on the east boundary is the primary transport route for HGVs accessing and egressing the Site. 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 Site during the period of the Development was higher than the existing traffic movements from the Site. Historical HGV movements were max 50HGVs per day, while the current movements of HGV are 35HGVs. Furthermore, quarry traffic was, and continues to be, constrained to operational daytime hours, removing any associated road traffic noise during the night-time period.

Traffic movements have been included in the noise model.

11.2.4 Noise Modelling

Noise modelling was carried out using iNoise version 2024 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 In developing the model all operational sources are deemed on for the full daytime period, i.e., it is calculated as being 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, GeoDirective Data and Bing Aerial Photography.

Based on this research, NSRs were identified in the locality and are shown in Figure 11-1 and described in Table 11-1. MOR Environmental 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

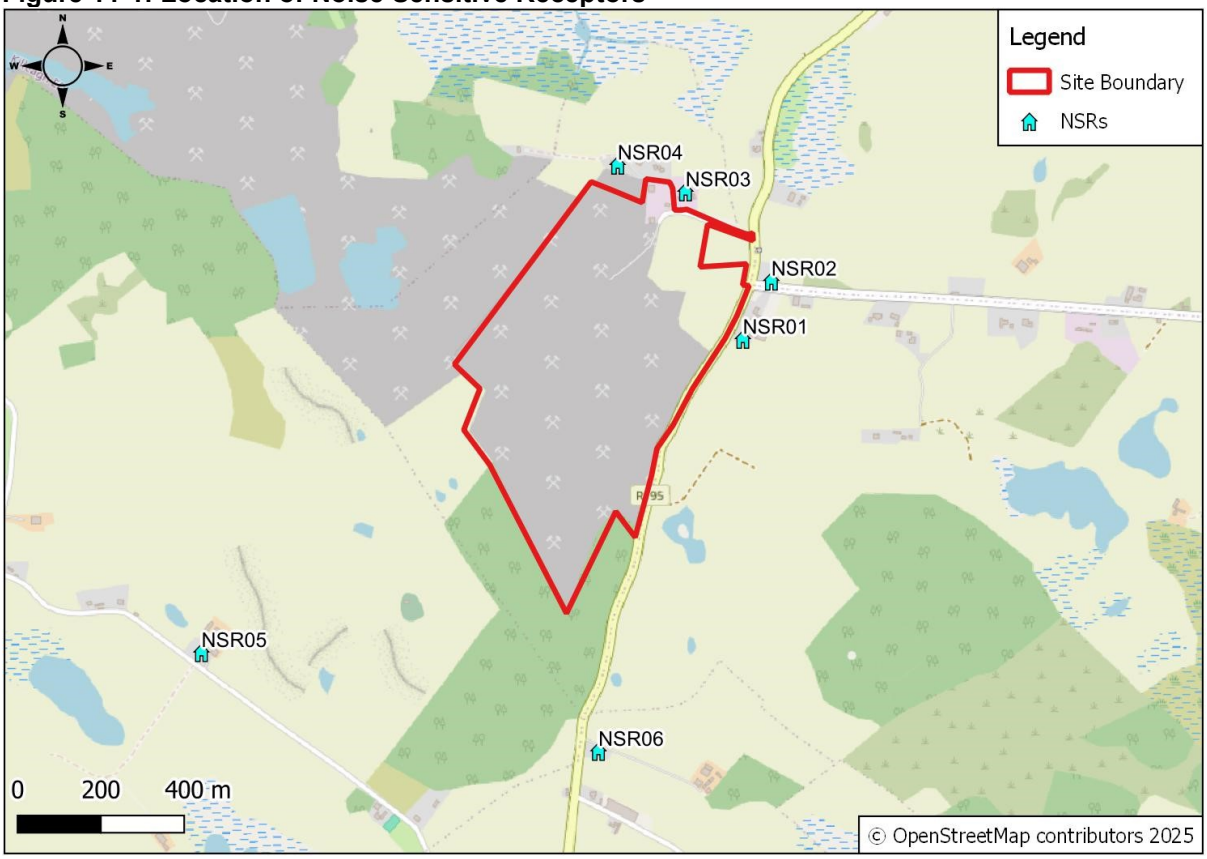


Table 11-1: Identification of NSRs

ID	ITM (Easting, Northing)		Location Relevant to Site	Distance from Site Boundary (m)
	E	N		
NSR01	652854	774807	Proxy for dwellings located to the east of the Site.	ca. 42m
NSR02	652923	774946	Proxy for dwellings located to the east of the Site.	ca. 55m
NSR03	652717	775160	Dwelling located to the north of the Site.	ca. 31m
NSR04	652554	775224	Dwelling located to the north of the Site.	ca. 64m
NSR05	651555	774056	Dwelling located to the south of the Site.	ca. 824m
NSR06	652508	773819	Receptor located to the southeast of the Site.	ca. 337m

11.3.1 Baseline Ambient Acoustic Assessment

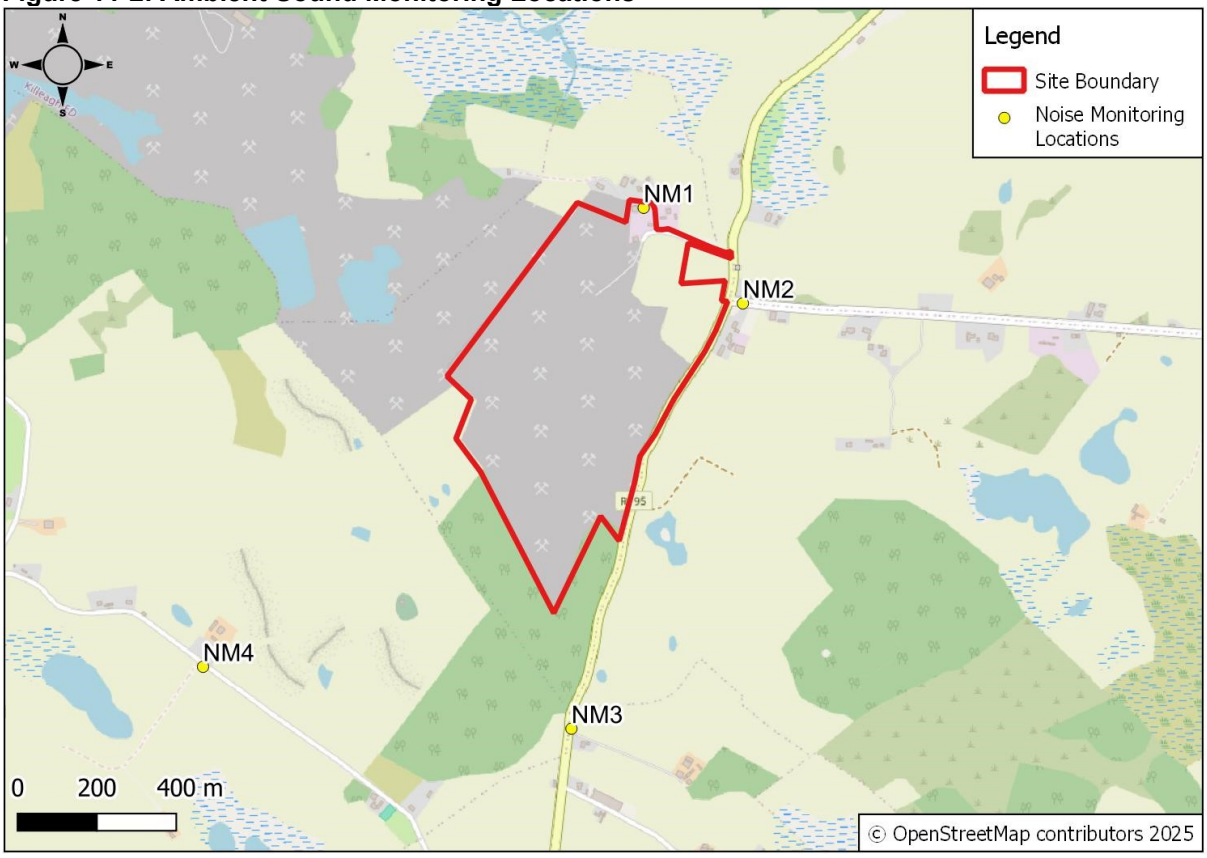
11.3.1.1 Characterisation of the Ambient Acoustic Environment

A baseline acoustic survey was carried out by MOR Environmental on 27th November 2024. The results are presented in Table 11-2 below, and the sound monitoring locations are presented in Figure 11-2 below.

Table 11-2: Noise Monitoring Locations

Monitoring Location ID	Easting (ITM)	Northing (ITM)	Description of Locality
NM1	652658	775169	Located within the Site, at the northern boundary.
NM2	652908	774928	Located east of the Site ca. 20m off the R195, positioned off local road L6818.
NM3	652476	773857	Located southeast of the Site, on the grass verge of regional road R195.
NM4	651548	774013	Located south of the Site, on verge of local road L68182.

Figure 11-2: Ambient Sound Monitoring Locations-



The closest meteorological synoptic station is Mullingar, Co. Westmeath, ca. 23km south of the Site. The summary of the Met Éireann weather data from this synoptic station on the 27th November 2024 of the monitoring event is shown in Table 11-3 below. Hourly data is presented in Appendix 11-3.

Table 11-3: Met Éireann Summary for Synoptic Weather Station

Date	Rainfall (mm)	Max Temp °C	Min Temp °C	Mean Wind Speed (knots)	Maximum Gusts (if >34 knots)
27/11/2024	0.0	3.4	-4.1	2.1	--

The summary results from the noise monitoring event are shown in Table 11-4. The time duration 'T' for each monitoring event, unless otherwise stated, were:

- 30 minutes during the daytime.

Attended measurements were taken twice at each location. This provides 60 minutes of data per location during daytime periods.

Frequency charts, along with images from each of the monitoring locations, are included in Appendix 11-4.

Table 11-4: Ambient Daytime Sound Levels 27th November 2024

Location	Start Time	$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)	$L_{A10,T}$ (dB)	L_{AFmax} (dB)	Description
NM1 Run 1	27/11/2024 11:23	40	32	43	57	Birdsong dominant. Faint off-site noise(W). Site noise from trucks passing at office. Wind speed: 0-1m/s
NM1 Run 2	27/11/2024 11:55	38	32	41	56	Birdsong dominant. Faint off-site noise (W). Site noise from trucks passing at office. Wind speed: 0-1m/s
NM2 Run 1	27/11/2024 12:32	55	35	55	77	R195 Traffic dominant. R195 5-minute traffic count 12:33-12:38= 8 car passes. Tractor pass on one occasion. Truck pass on four occasions. Site reversing alarms on multiple occasions (W). Wind speed: 0-1m/s
NM2 Run 2	27/11/2024 13:03	56	36	57	82	R195 Traffic dominant. R195 5-minute traffic count 13:03-13:08= 6 car passes. Truck pass on two occasions. Site reversing alarms on multiple occasions (W). Wind speed: 0-1m/s
NM3 Run 1	27/11/2024 15:16	66	38	63	88	R195 Traffic dominant. R195 5-minute traffic count 15:24-15:29= 8 car passes. Truck pass on two occasions. Tractor pass on one occasion. Reversing alarms, hammering farmyard property (S). Wind speed: 0-1m/s
NM3 Run 2	27/11/2024 15:47	68	41	69	88	R195 Traffic dominant. R195 5-minute traffic count 15:54-15:59= 8 car passes. Truck pass on seven occasions. Reversing alarms, hammering farmyard property (S). Wind speed: 0-1m/s
NM4 Run 1	27/11/2024 14:06	55	30	42	85	Birdsong audible throughout. Tractor pass on nearby road highly audible on one occasion. Distant reversing alarms off-site (NW). Wind speed: 0-1m/s

Location	Start Time	$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)	$L_{A10,T}$ (dB)	L_{AFmax} (dB)	Description
NM4 Run 2	27/11/2024 14:37	57	29	46	88	Birdsong audible throughout. Car passes on the nearby rural road on four occasions. Tractor pass highly audible on one occasion. Distant reversing alarms off-site (NW). Wind speed: 0-1m/s

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 vehicle movements; and,
- Transport - traffic noise from local road movements.

Generally, higher levels of ambient acoustic sound were found at NM3 due to the frequent movement of vehicles near the SLM. NM2 and NM4 recorded higher levels of ambient noise due to traffic passes on the local roads. NM1, located on the northern boundary of the Site, recorded the lowest sound levels, with notable events consisting of occasional HGV movements in or out of the Site

Monitoring location NM1 recorded $L_{Aeq,\ 30min}$ values ranging from 38dB to 40dB. Monitoring locations NM2 and NM4 recorded $L_{Aeq,\ 30min}$ values ranging from 55dB to 57dB. Monitoring location NM3 recorded $L_{Aeq,\ 30min}$ values ranging from 66dB to 68dB.

The background ambient acoustic environment as $L_{A90,30\ min}$ ranged from 29dB to 32dB at monitoring locations NM1 and NM4, with the background ambient acoustic environment as $L_{A90,30\ min}$ ranging from 35dB to 41dB at monitoring locations NM2 and NM3.

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 Site.

11.4 Characteristics and Potential Effects of Development

Historically, within the Site, aggregates were extracted using conventional excavator and shovelling methods, which fragmented the rock to manageable sizes. Plant and machinery operated at the quarry consisted of tracked excavators and dumps trucks which transported material. Ancillary plant such as a tractor and bowser were deployed when required.

Processing consists of the breaking of the excavated 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-loading shovels and a variety of crushers and screeners.

Currently, work at the Site has been restricted until this application for substitute consent is brought into compliance and further authorised for prospective development.

The activities assessed in this chapter are concerned with the Operational and Restoration Phases associated with the Site. These sources of historical noise and the potential likely effects that would have occurred at NSRs are distinctly different and, therefore, have been discussed separately.

11.4.1 Operational Phase Noise

Historically, within the Site, processing included primary crushing and primary screening, along with stockpiling, utilising mobile plant.

Table 11-5 below presents typical sound pressure ($L_{Aeq,T}$) values for plant utilised within the Site as part of the operational phase of the Development.

Table 11-5: Operational Sound Pressure Levels

Plant	Description	Sound Pressure L_{Aeq} at 10m
HGVs	Trucks In	89
HGVs	Trucks Out	83
Tracked Excavator	Tracked Excavator	93
Screening Plant	Semi-mobile screen-stockpiles	81
Screening Plant	Semi-mobile Crushing Plant	80
Loading Shovel	Wheeled loader	90
Pump (Washing Plant)	Pump	68
Screening Plant (Washing Plant)	Screening Plant	72
Rock Breakers	Rock breakers	93

As part of this assessment, a noise model using specialist acoustic software iNoise version 2024, 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 11-5 above, are supplied in Table 11-6 below and displayed in Figure 11-3 below.

The results are compared against the EPA and DoEHLG recommended limits for daytime. The results presented in Table 11-6 are located at 1.5m height, as the quarry only operated during daytime periods. The results predict an unlikely scenario where all the equipment is working simultaneously.

Table 11-6: Predicted Operational Noise Emissions

NSR	Predictor Output $L_{Aeq,1hr}$ (dB)	EPA & DoEHLG L_{Aeq} Limit (dB)	Compliant
NSR01	49	55	Yes
NSR02	52		Yes
NSR03	56		No
NSR04	53		Yes
NSR05	34		Yes
NSR06	41		Yes

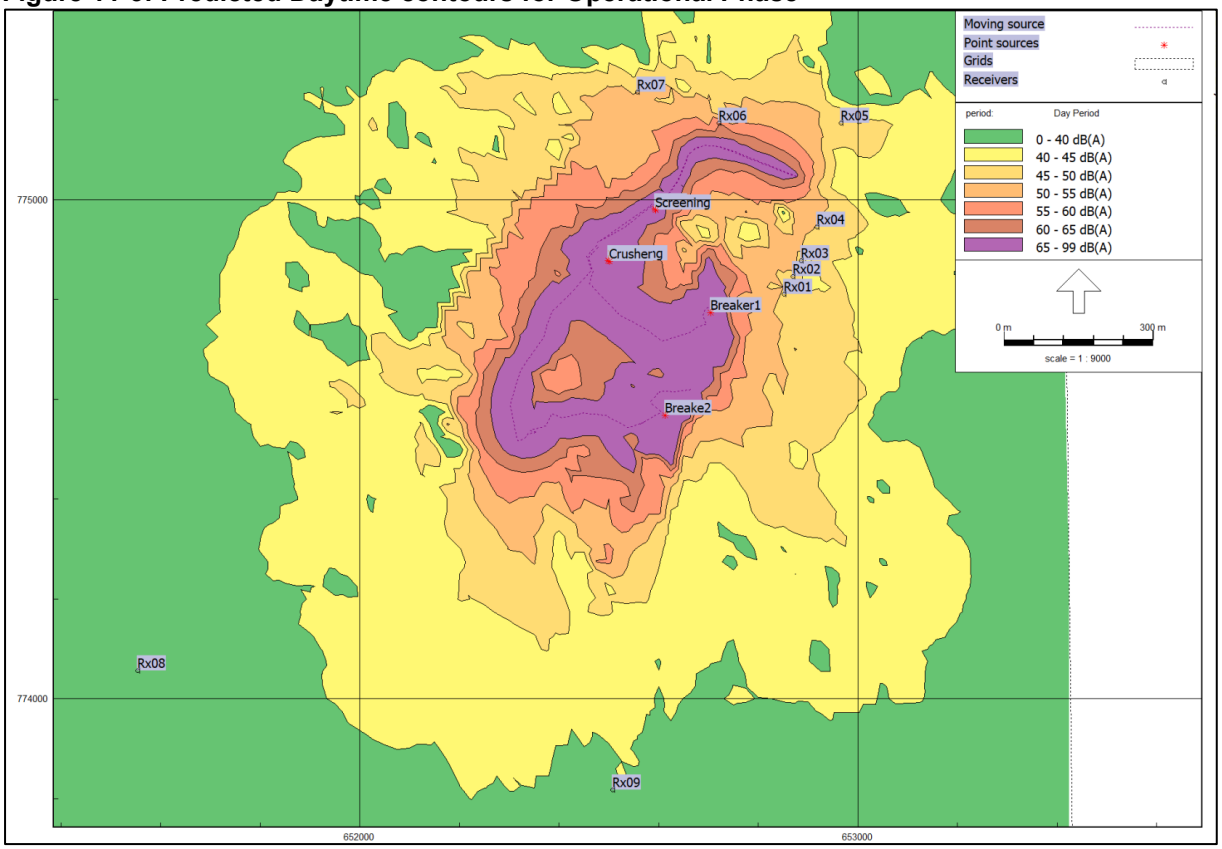
One noise-sensitive receptor ('NSR'), designated as NSR03, is anticipated to experience a site-specific noise level of 56 dBA, which exceeds the noise nuisance criteria by 1 dB, as outlined in Section 11.2.3 above. This exceedance reflects the worst-case scenario, assuming 50 heavy goods vehicles ('HGVs') access and egress the Site in each direction. No complaints were raised to the Site and this phase of activity has decreased with typical HGV loads departing the Site below 20 vehicles.

The remaining NSRs were predicted to be below noise nuisance criteria as typically specified Section 11.2.3.

The noise presented in the ambient survey in Section 11.3.1 include the plant used in the Operational phase located in the Site. All monitoring locations recorded that the traffic was dominant from the surrounding traffic roads.

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



11.4.2 Restoration Phase

Noise during the restoration of the Site will be associated with the following:

- Clearance of all stockpiles; and,
- Tree planting and seeding.

This phase of the Development will be a low-intensity and short-term activity associated with the final works within the Development; as such, typically, this stage of works is assessed similarly to construction works.

This activity will require minimal plant, consisting of an agricultural tractor to spread seeds, a bulldozer and an excavator. In addition, the restoration of the Site will require the removal of mobile plant, and the dismantling of the fixed plant system. This will require the use of skilled personnel and either a crane or mobile platform. The sheds and buildings in the northern section of the Site are deemed to have a future use beyond the quarry and will be left in situ. Table 11-7 below gives typical sound pressure ($L_{Aeq,T}$) values for plant utilised in quarry restoration sites for each of the steps.

Table 11-7: Restoration Sound Pressure Levels

Equipment ID	Plant	BS5228 Reference	Sound Pressure $L_{Aeq,T}$ at 10m
1	Tractor	C.4. 74	71
2	Excavator	C.2.02	77
3	Bulldozer	C.2.01	75
4	Crane	C.4.38	78
5	HGVs (removing stockpiles)	C.10.18	83
6	Loading Shovel (filling HGVs)	C.9.07	90

The following standard noise equation, to evaluate the sound pressure (Lp2) at a distance r2, from a known sound pressure (Lp1) at a distance r1 was used to predict noise values at the NSRs:

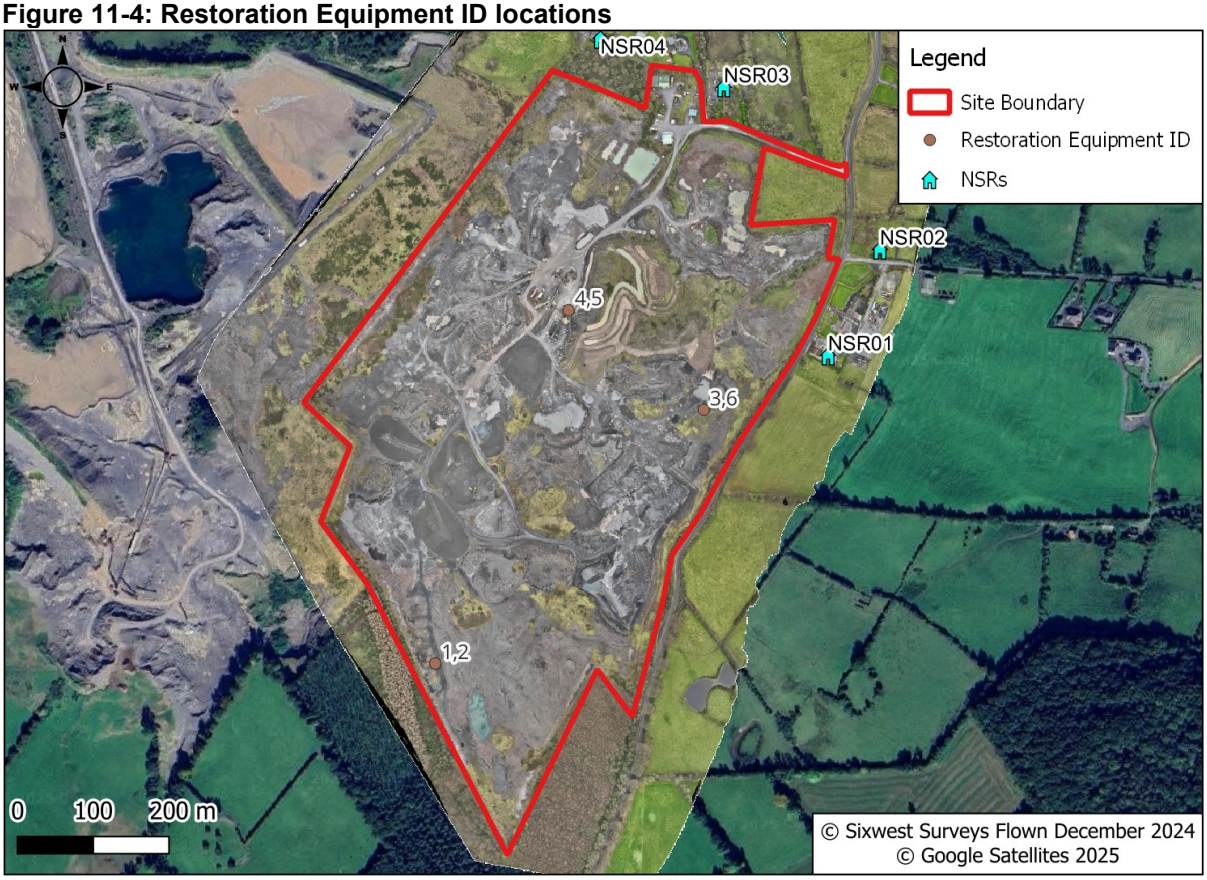
$$Lp2 = Lp1 - 20\log10(\frac{r2}{r1})$$

Where:

- Lp is the sound pressure (LAeq) in dB; and,
- r is the distance.

Plant and equipment on and around the Site will be mobile during the Restoration Phase. The main locations of each piece of equipment, as presented in Table 11-7 above, are shown in Figure 11-4 below.

Figure 11-4: Restoration Equipment ID locations



The predicted site-specific emission from the Development during the restoration phase are presented in Table 11-8.

Table 11-8: Predicted Site-specific emission for the Restoration Phase

NSR ID	Predicted Site Specific Sound Pressure Level at NSR Facade $L_{Aeq,T}$ dB
NSR01	65
NSR02	61
NSR03	59
NSR04	58
NSR05	49
NSR06	52

The highest predicted site-specific emissions from the Development during the restoration phase at the closest NSR, NSR01, is calculated to be 65dB. Closure / Restoration Phases, due to the similarities in activities and the short duration of the works, are typically rated against the Construction limits, as the closure will see the end of the site operations. In this case, all of the NSRs will experience a sound pressure level below the typical 65dB limit prior to mitigation.

This is a worst-case scenario where all the equipment listed in Table 11-7 is working simultaneously for an hour. It is unlike that scenario that would occur.

Plant and equipment will be operating at distinct tasks around the Site, where noise emissions 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 to NSRs were calculated from the closest boundary.

The Development will not introduce new sound characteristics, nor will the restoration project present sound qualities typically deemed to be objectionable, such as tonal or clearly impulsive / impact sounds.

Based on the assessment, the predicted impact during restoration is deemed to be slight medium-term effect on a local basis prior to mitigation.

11.5 Mitigation Measures and/or Factors

To date, no records of noise complaints have been received by the applicant as a result of activities associated with the Development. However, a review of mitigation measures in place during the history of the Development, and as may be required during closure and restoration, are presented below.

11.5.1 Previous Mitigation Measures Noise

Plant operating hours were from 07:00 to 19:00, Monday to Friday and 07:00 to 14:00 on Saturdays. No quarrying activities took place on Sundays or Public Holidays.

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.

11.5.2 Future 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 Population and Human Health: 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 Biodiversity: Noise can influence fauna through the disturbance of animals. Impacts on specific have been outlined in this chapter where relevant.

Chapter 14 Material Assets Traffic and Transport: Noise and traffic are closely linked. The potential effects from noise arising from traffic associated with the Site have formed an integral part of the assessment.

11.7 Indirect Effects

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

11.8 Residual Effects

The residual noise effect, 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 to the wider environment.

The Development has been modelled to show that it complied with noise limits for the operation phase. No likely significant effect is present based on the assessment undertaken for the historic and current activities on the Site.

11.9 Monitoring

There was not any monitoring related to 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.

11.10 Reinstatement

The restoration of the Site has been fully assessed above in terms of the likely acoustic effect to NSRs from the plant and the activities required.

11.11 Difficulties Encountered

A common difficulty encountered throughout the rEIAR was the issue of attempting to identify potential historic effects 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 abate subsequently. 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.

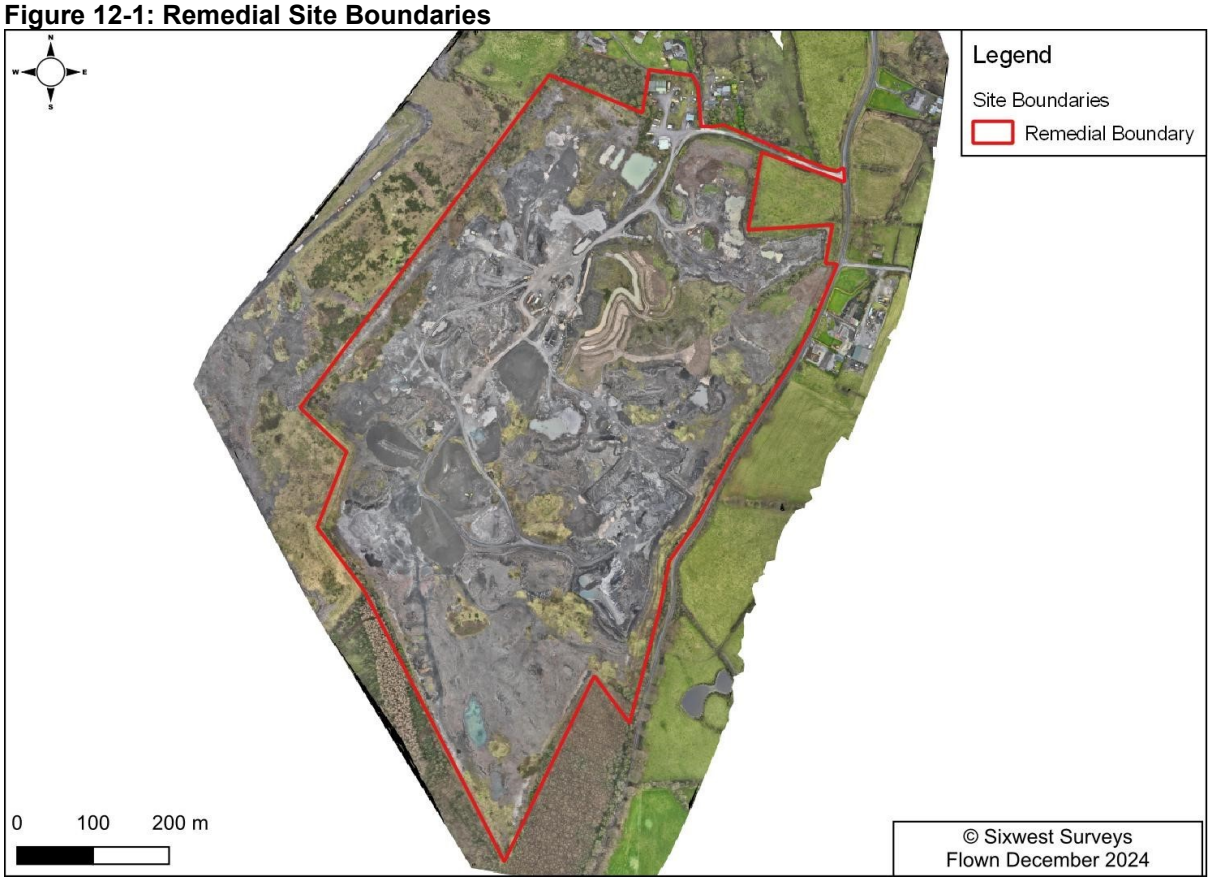
Where relevant, this rEIAR therefore utilises best practice in risk assessment and prediction to characterise likely impacts based on the information known regarding the Development.

12 LANDSCAPE AND VISUAL

This Remedial Environmental Impact Assessment Report ('rEIAR') has been prepared to accompany a substitute consent application for an existing quarry known as Murren's Quarry, south of Oldcastle, County Meath. The remedial Landscape and Visual Impact Assessment ('rLVIA') was prepared by Macro Works Ltd.

The Applicant operates a soft rock quarry, known as Murrens Quarry, south of Oldcastle in County Meath. The quarry is recognised as having pre-1963 origins. The Site lies in the townland of Murrens, Oldcastle, Co Meath (ITM 652523 774771), covering an area of 39ha. This assessment relates to the land used for excavations and processing of aggregate, along with adjoining lands integral to the operations within the Site. The full extent of the remedial boundary is shown in Figure 12-1 below and henceforth is referred to as 'the Site'. The extraction activities which occurred within the Site are henceforth referred to as the 'Development'.

Figure 12-1: Remedial Site Boundaries



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.

12.1 Methodology

12.1.1 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:

I. *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition 2013, (UK Landscape Institute and Institute of Environmental Management and Assessment– [134] - hereafter referred to as the 'GLVIA';

II. Environmental Protection Agency ('EPA') publication 'Guidelines on the Information to be contained in Environmental Impact Reports (2022) [7];

III. EPA Advice Notes on Current Practice in the Preparation of Environmental Impact Statements [8]; and,

IV. Meath County Development Plan, 2021-2027 [18].

It should, however, be noted that there is no specific guidance in relation to rEIAR or rLVIA reports. This is specifically addressed in Section 12.2.2.

12.1.2 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 the effects of a development on the landscape as a resource in its own right. It 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 into account both physical impacts on the terrain and landcover and the consequences of these for landscape character.

12.1.3 Visual Impact

Visual Impact Assessment relates to assessing the 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 due to 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).

12.1.4 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 rLVIA assesses the effects of the Development *which have occurred to date*, and any that are *still occurring*. For this rLVIA, the assessment of landscape and visual effects is carried out on the previously existing receiving environment.

I. A desktop study to establish an appropriate study area, relevant landscape and visual designations in the Meath County Development Plan 2021-2027, 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;

II. 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;

III. 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;

IV. 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 on baseline material that does not include previous viewpoint photography.

12.1.5 Landscape Assessment Criteria

This part of the rLVIA provides an assessment of how the introduction of the proposed development will affect the physical features and fabric of the landscape and then how the proposals influence landscape character with reference to published descriptions of character and an understanding of the contemporary character of the landscape as informed through desktop and site studies.

When assessing the potential landscape effects of the development, the value and sensitivity of the landscape receptor is weighed against the magnitude of impact to determine the significance of the landscape effect. The criteria outlined below are used to guide these judgements.

12.1.5.1 Landscape Sensitivity

The sensitivity of the landscape to change is the degree to which a particular setting can accommodate changes or new elements without unacceptable detrimental effects on its essential characteristics. In accordance with GLVIA3, the sensitivity of a landscape receptor (Landscape Character Area or feature) is derived from combining judgements in relation to its susceptibility to change and its value. The judgement reflects such factors as its quality, value, contribution to landscape character and the degree to which the particular element or characteristic can be replaced or substituted. Landscape Sensitivity is classified using the following criteria set out in Table 12-1 below.

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 the 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 a 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.

12.1.5.2 Magnitude of Change – Landscape

The magnitude of change is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed development and, to a lesser extent, the duration and reversibility of that effect. The magnitude takes into account whether there is a direct physical impact resulting from the loss of landscape components and/or a change that extends beyond the immediate setting that may have an effect on the landscape character. Table 12-2 below outlines the criteria used to inform this judgement.

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 a 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.

12.1.6 Visual Impact Assessment Criteria

This part of the rLVIA provides an assessment of how the introduction of the proposed development will affect views within the landscape. It, therefore, needs to consider:

- Direct impacts of the proposed development upon views through intrusion or obstruction;
- The reaction of viewers who may be affected, e.g. residents, walkers, road users; and,
- The overall impact on visual amenity.

It has been deemed appropriate to structure the assessment around a series of representative viewpoint locations. All viewpoints are located within the public domain and are representative of views available from main thoroughfares and pedestrian areas within the vicinity of the proposed development. The selected viewpoints are considered to be comprehensive in communicating the variable nature of the visual effects.

When assessing the potential visual effects of the development, the sensitivity of the visual receptor is weighed against the magnitude of the visual impact to determine the significance of the visual effect. Criteria outlined below are used to guide these judgements.

12.1.6.1 Sensitivity of Visual Receptors

As with landscape sensitivity, the sensitivity of a visual receptor is categorised as Very High, High, Medium, Low, and Negligible. Unlike landscape sensitivity, however, 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 the viewer is engaged in and whether this heightens their awareness of the surrounding environment.

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 viewpoint location.

12.1.6.2 Susceptibility of Visual Receptors to Change

In accordance with GLVIA3, visual receptors most susceptible to changes in views and visual amenity are:

I. "*Residents at home;*

II. *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;*

III. *Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience;*

IV. *Communities where views contribute to the landscape setting enjoyed by residents in the area;*

V. *Travellers on road rail or other transport routes where such travel involves recognised scenic routes and awareness of views is likely to be heightened".*

VI. *Visual receptors that are less susceptible to changes in views and visual amenity include;*

VII. *"People engaged in outdoor sport or recreation, which does not involve or depend upon appreciation of views of the landscape; and,*

VIII. *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".*

12.1.6.3 Values attached to Views

The value attached to a view is determined by considering the following:

I. *Recognised scenic value of the view (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;*

II. *Views from within highly sensitive landscape 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 landscape around them;*

III. *Primary views from residential receptors. Even within a dynamic city context, views from residential properties are an important consideration in respect of residential amenity;*

IV. *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;*

V. *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;*

VI. *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;*

VII. *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;*

VIII. *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;*

IX. *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;*

X. *Rarity or uniqueness of the view. This might include the noteworthy representativeness of a certain landscape type and considers whether the receptor could take in similar views anywhere in the broader region or the country;*

XI. *Integrity of the landscape character. This looks at the condition and intactness of the landscape in view and whether the landscape pattern is a regular one of few strongly related components or an irregular one containing a variety of disparate components;*

XII. Sense of place. This considers whether there is a special sense of wholeness and harmony at the viewing location; and,

XIII. 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, and no relative importance is inferred by the order of listing.

It is recognised that a viewer's interpretation and experience of the landscape can have preferential and subjective components. Where relevant, judgements are made on those elements of the landscape that are considered to contribute more prominently and positively to the visual landscape resource as well as those elements that contribute negatively. Overall sensitivity may be a result of a number of these factors or a strong association with one or two in particular.

12.1.7 Magnitude of Change – Visual

The magnitude of change is again a product of the scale, extent, or degree of change that is likely to be experienced as a result of the proposed development. This is directly influenced by its 'visual presence / prominence', as experienced by visual receptors in the landscape. These terms are somewhat quantitative in nature and essentially relate to how noticeable or 'dominant' the proposal is within a particular view. Aside from the obvious influence of scale and distance, a development's visual presence is influenced by the extent and complexity of the view, contextual movement in the landscape, the nature of its backdrop, and its relationship with other focal points or prominent features within the view. It is often, though not always, expressed using one of the following terms: Minimal; Sub-dominant; Co-dominant; Dominant; Highly dominant. Criteria used to inform judgements are provided in Table 12-3 below.

Table 12-3: Magnitude of Change – Visual

Criteria	Description
Very High	Complete or very substantial change in view, dominant, involving complete or very substantial obstruction of existing view or complete change in character and composition of baseline, e.g., through removal of key elements.
High	A major change in the view that is highly prominent and has a strong influence on the overall view. This may involve the substantial obstruction of existing views or a complete change in character and composition of baseline, e.g. through removal of key elements or the introduction of new features that would heavily influence key elements.
Medium	Moderate change in view: which may involve partial obstruction of existing view or partial change in character and composition of baseline, i.e., pre-development view through the introduction of new elements or removal of existing elements. Change may be prominent but would not substantially alter scale and character of the surroundings and the wider setting. View character may be partially changed through the introduction of features which, though uncharacteristic, may not necessarily be visually discordant.
Low	Minor change in baseline, i.e. pre-development view - change would be distinguishable from the surroundings whilst composition and character would be similar to the pre change circumstances.
Negligible	Very slight change in baseline, i.e. pre-development view - change would be barely discernible. Composition and character of view substantially unaltered.

12.1.8 Significance of Effect

The significance of a landscape or visual effect is based on a balance between the sensitivity of the receptor and the magnitude of change and is categorised as Profound, Substantial, Moderate, Slight, or Imperceptible. Intermediate judgements are also provided to enable an effect to be more accurately described where relevant. 'No Effect' may also be recorded as appropriate where the effect is so negligible it is not noteworthy.

The significance category judgement is arrived at using the Significance Matrix as a guide. This applies the principle of significance being a function of magnitude weighed against sensitivity but employs slightly different terminology that avoids the potentially confusing use of the term 'significant' (as recommended by GLVIA3 Statement of Clarification 1/13 [135].

Indicative criteria descriptions used in relation to the significance of the effect category are presented in Table 12-5.

Table 12-4: 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.

Table 12-5: Indicative significance of effect criteria descriptions

	Landscape	**Visual**
Profound	There are notable changes in landscape characteristics over an extensive area or a very intensive change over a more limited area.	The view is entirely altered, obscured or affected.
Substantial	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the landscape. There are notable changes in landscape characteristics over a substantial area or an intensive change over a more limited area.	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the visual environment. The proposal affects a large proportion of the overall visual composition, or views are so affected that they form a new element in the physical landscape.

	Landscape	Visual
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends. There are minor changes over some of the area or moderate changes in a localised area.	An effect that alters the character of the visual environment in a manner that is consistent with existing and emerging trends. The proposal affects an appreciable segment of the overall visual composition, or there is an intrusion in the foreground of a view.
Slight	An effect which causes noticeable changes in the character of the landscape without affecting its sensitivities. There are minor changes over a small proportion of the area or moderate changes in a localised area or changes that are reparable over time.	An effect which causes noticeable changes in the character of the visual environment without affecting its sensitivities. The affected view forms only a small element in the overall visual composition or changes the view in a marginal manner.
Imperceptible	An effect capable of measurement but without noticeable consequences. There are no noticeable changes to landscape context, character or features.	An effect capable of measurement but without noticeable consequences. Although the development may be visible, it would be difficult to discern resulting in minimal change to views.

It is important that the likely effects of the proposals are transparently assessed and understood in order that the determining authority can bring a balanced, well-informed judgement to bear when making a planning decision.

As such, whilst the significance matrix and criteria provide a useful guide, the significance of an effect is ultimately determined by the landscape specialist using professional judgement and also in the context of occasionally using hybrid judgements to account for nuance.

Effects assessed as 'Substantial' or greater (shaded cells) are considered to be the most notable in landscape and visual terms and may be regarded as 'Significant', albeit it is important to note that this is not a reflection on their acceptability in planning terms.

12.1.9 Quality of Effect

In addition to assessing the significance of landscape and visual effects, the quality of the effects is also determined. Within this rLVIA, effects are described as negative/adverse, neutral, or positive / beneficial, and the following criteria has been used to guide these judgements.

- Positive / beneficial - A change which improves the quality of the environment, enhancing the existing view / landscape;
- Neutral - No effects or effects that are imperceptible, within normal bounds of variation e.g. will neither detract from nor enhance the existing view / landscape;
- Negative / adverse - A change which reduces the quality of the environment, detracting from the existing view / landscape.

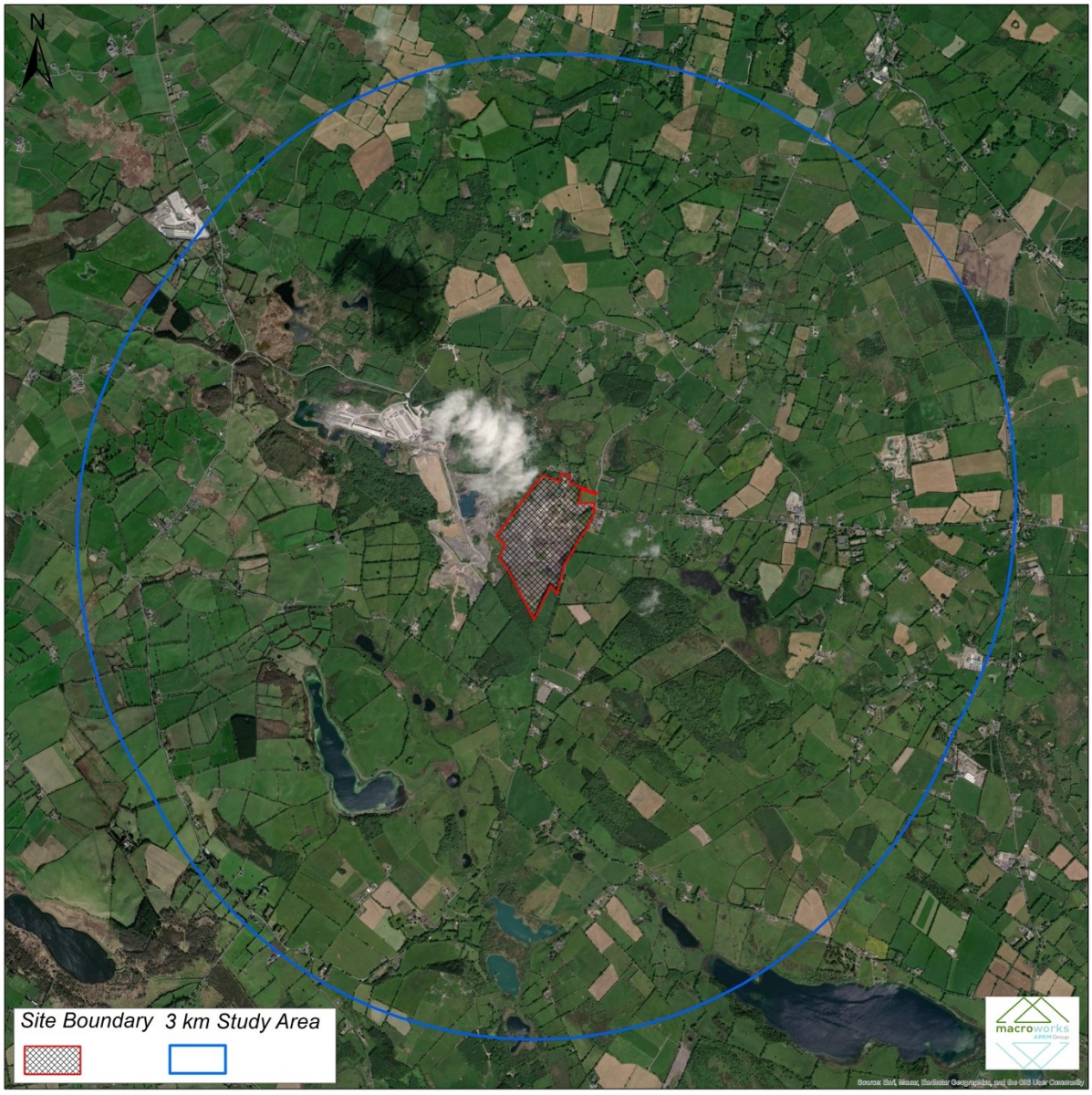
In the case of mineral extraction developments within rural and semi-rural settings, the landscape and visual change brought about by the change to the landform is seldom considered to be positive / beneficial. Effects in these contexts are generally considered to be adverse in nature or neutral, where the effect has little influence on the landscape/views.

12.1.9.1 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 Site will be used, in this instance. See figure 12-2 below.

Figure 12-2: rLVIA Study Area



12.1.10 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. Aside from the current Meath CDP, the only previous plans available online are the 2013-2019, and 2007-2013 iterations, all three of which are reviewed in Section 12.3.1.

12.2 Receiving Environment

The baseline environment is defined as the landscape prior to the commencement of the unauthorised quarrying activities. 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.

12.2.1 Planning Policy

The Meath CDP 2021-2027 is the current CDP and will be addressed in Section 12.3.1.1 below. The only other County Development Plans which are available online are the 2013-2019 Meath County Development Plan and 2007-2013 Development Plan. Where possible and applicable, comparisons will be made between the current and immediately preceding CDPs to examine how landscape and visual policy has altered over the last decade, as well as any known changes to designated landscape value.

12.2.1.1 Meath County Development Plan ('CDP') 2021-2027

Landscape Character

A landscape character assessment was carried out in 2007 and has been incorporated within the Meath CDP 2021-2027. It divides the county into four main Landscape Character Types '(LCT'). These are described as *"generic areas of distinctive character which may occur in several places across the County… similar in terms of overall characteristics although the condition and quality of their individual components may vary."*

The quarry development is located within the "Hills and Upland Areas" LCT which is described as follows:

> *"Although Meath is not blessed with dramatic peaks, hills and uplands are a prominent feature of the County, particularly in the north west. From the tops of these hills panoramic views of the lowland landscapes of Meath and adjacent counties are gained. The hills also act as orientating features."*

A number of general recommendations are given in relation to this Landscape Character Type. The most relevant points include:

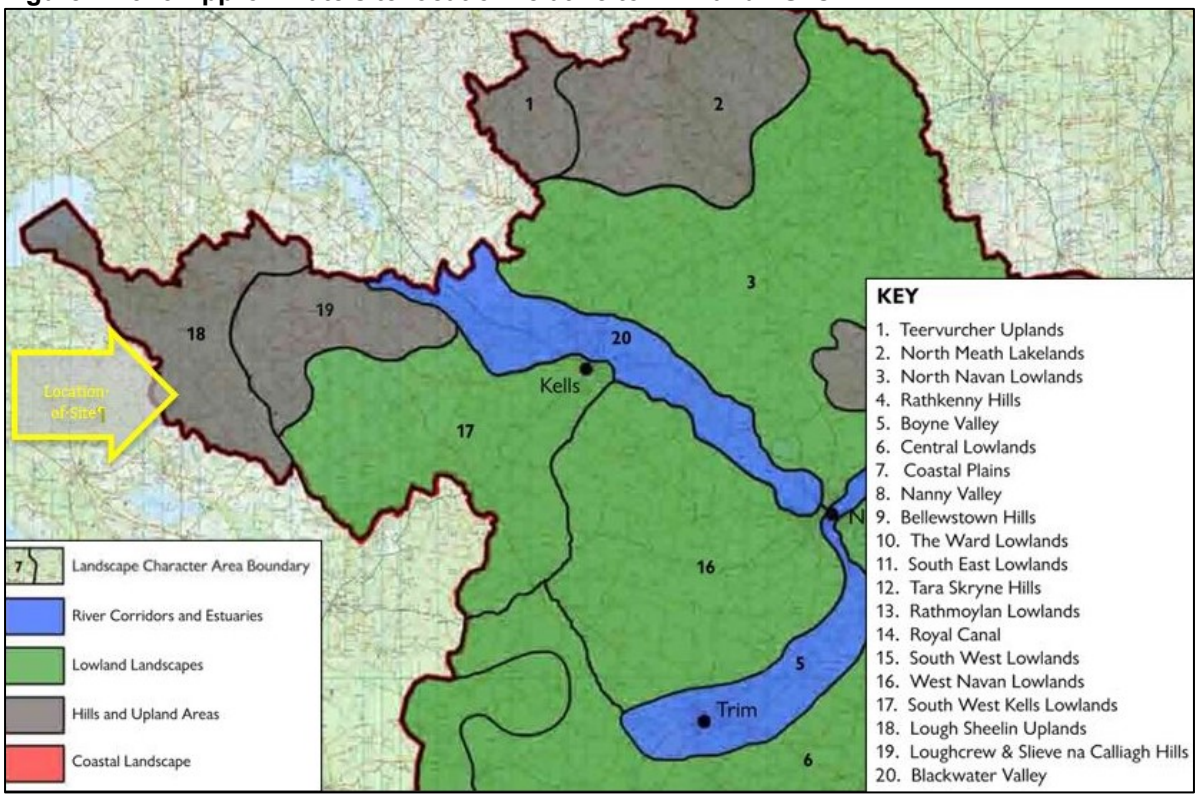
- *To have due regard to the positive contribution that views across adjacent lowland areas and landmarks within the landscape make to the overall landscape character.*
- *To respect the remote character and existing low-density developments in these LCTs.*
- *To continue and encourage the improved management of field boundaries such as hedgerows and stone walls and hunting copses/ wooded copses.*

The LCTs are then sub-divided into a further 20 geographically distinct Landscape Character Areas ('LCAs') (Table 12-1). The Site falls within Landscape Character Area 18, the Lough Sheelin Uplands. The Lough Sheelin Uplands are identified as having 'High' Landscape Value: 'High' Landscape Sensitivity (Figure 12-3 and Figure 12-4 below, obtained from Meath CDP LCA Map 1), and 'Regional' Landscape Importance. It is described as follows:

> "Although remote and detached from major settlements, this LCA is rich with visible historic evidence of longstanding use and settlement. Perhaps most

importantly this LCA forms the setting for the Loughcrew Hills on which there are a range of passage tombs dating from around 3000BC. There are other prehistoric and pre-Christian sites in the area as well as Anglo-Norman castles and 18th Century estate farms."

Figure 12-3: 3 Approximate site location relative to LCA and LSTs



The key characteristics of the LCA are broken into different subheadings, including its geology, land use, and ecology. The presence of both "*past and present quarrying sites*" is noted as one of the principal land uses in the area. It is mentioned as having been an important factor in the geology of the area, helping in the creation of *"a complex landform of hills, lakes and enclosed valleys that restrict long range views in many instances."*

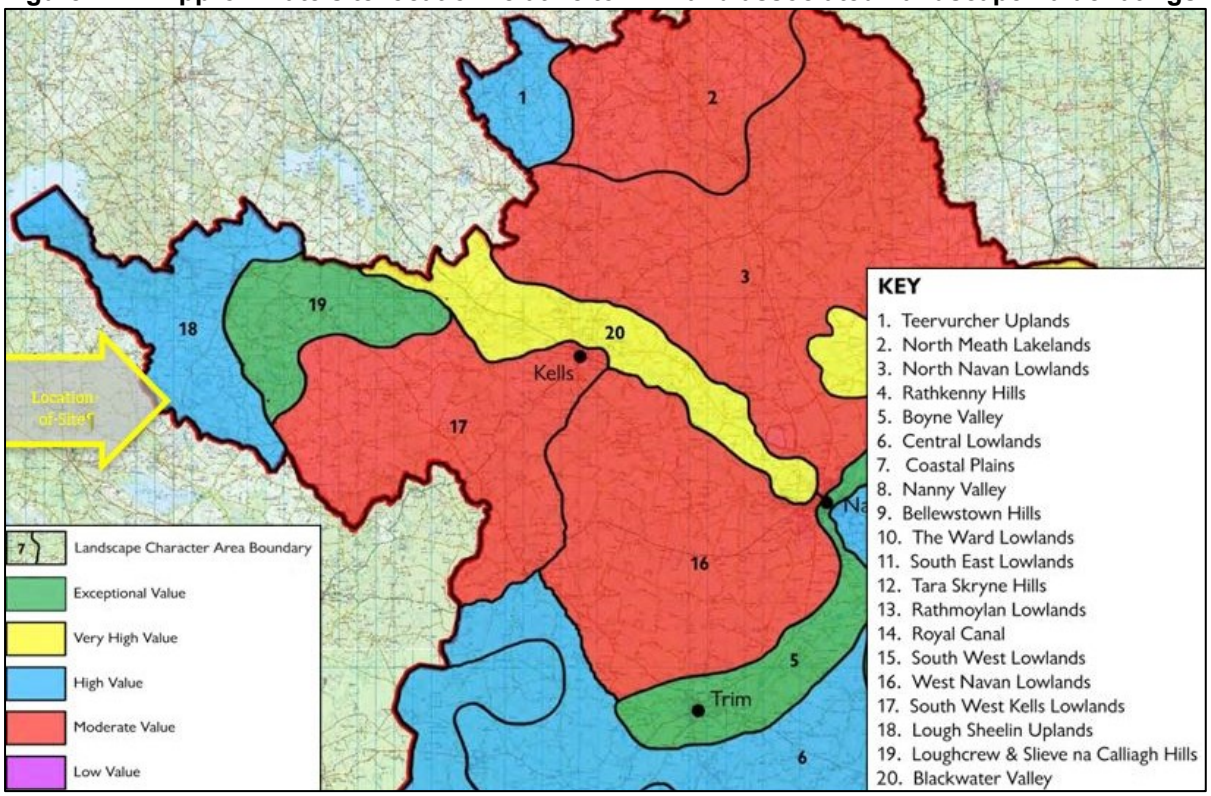
In terms of the listed 'Forces for Change' for the LCT, none pertain to quarrying and/or extractive activities.

As noted in its description, the Lough Sheelin Uplands LCA lies adjacent to LCA 19 – Loughcrew and Slieve na Calliagh Hills. This LCA is considered to be of 'Exceptional' Landscape value and of National / International importance due to the Loughcrew Passage Tombs dating from around 3000 BC. Murren's Quarry lies some 6km southwest of the Loughcrew Passage Tombs.

Recommendations specific to this LCA include:

- *Have regard to the importance of this LCA as the setting for the Loughcrew Hills (LCA 19) by conservation of the diverse rural landscape and sensitive location and design of new development;*
- *Compliment sensitive location of any new development with the preservation of the rich patchwork of historic features that demonstrate longstanding human use of this LCA; and,*
- *New development in the countryside should be of a low density and small scale and use vernacular materials and styles to fit with the landscape character.*

Figure 12-4: Approximate site location relative to LCA and associated Landscape Value ratings.



12.2.1.2 Meath County Development Plans 2007-2013 and 2013-2019

As previously noted, a landscape character assessment was carried out in 2007 and has been incorporated within the current Meath County Development Plan as well as the two previous County Development Plans (2007-2013 and 2013-2019), which are available online. As such, there have been no changes to the landscape character assessment during this timeframe.

12.2.2 Conclusion

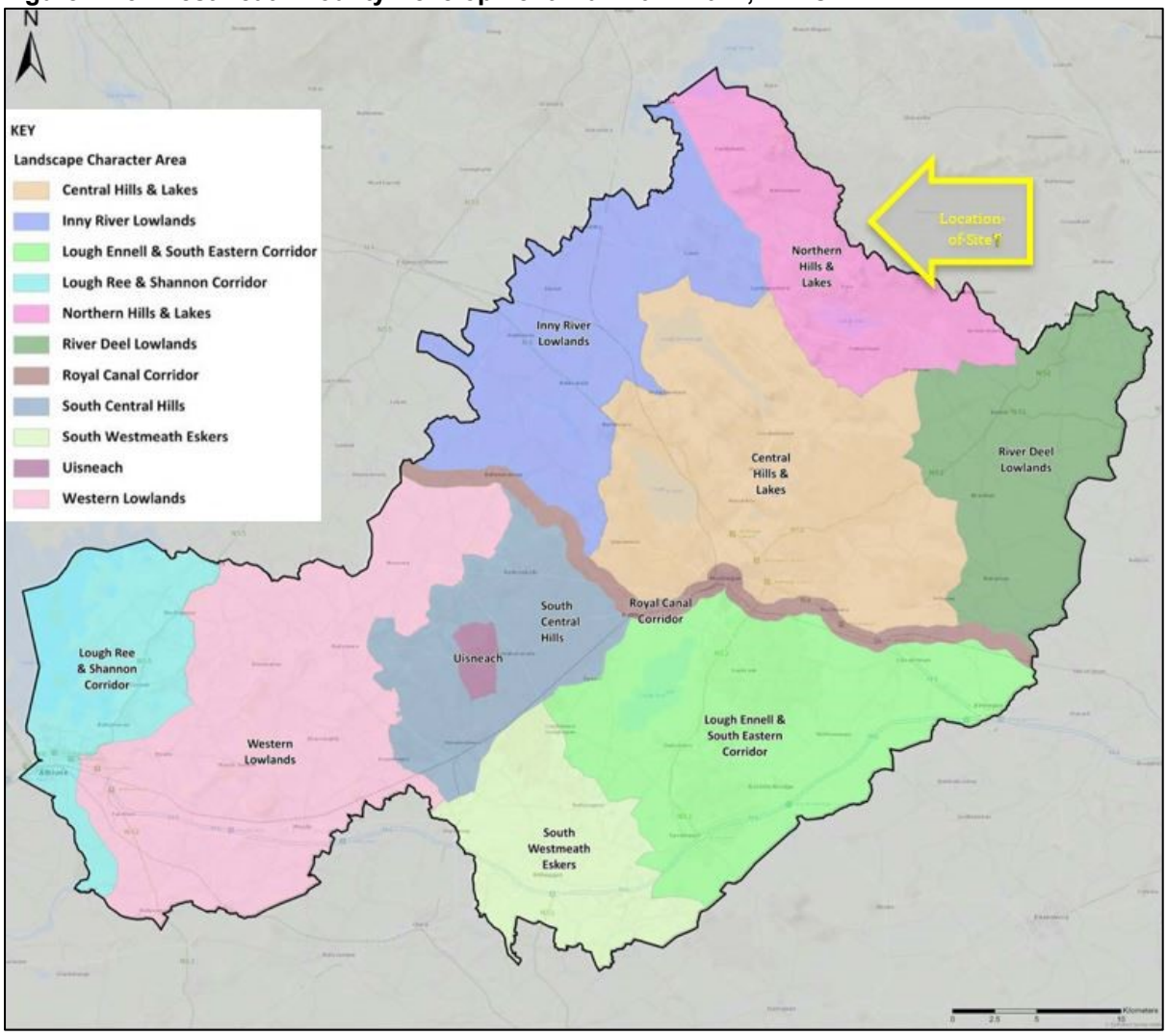
In summary, the essence / intent of the previous CDPs are consistent with that shown in the current CDP.

12.2.2.1 Westmeath County Development Plan ('CDP') 2021-2027

The southwestern portion of the study area falls within County Westmeath. A Landscape Character Assessment was carried out for inclusion in the Westmeath County Development Plan 2021-2027 [136]. The LCA is described as "*a tool for identifying the features that give a specific area its 'sense of place' and also provides policy recommendations relating to each landscape type*." The study area falls within the Northern Hills and Lakes LCA (Figure 12-5 below). This is described as;

> *"prominent hills topped with chert or cherty limestone with enclosed lakes and areas of peat deposits, mostly fen. A rural landscape of particularly high scenic quality containing a number of lakes with several preserved views, Lough Lene Area of High Amenity and Fore Special Heritage Area"*

Figure 12-5: Westmeath County Development Plan 2021-2027, LCAs



Some general policies regarding landscape character include:

- *Protect the distinctiveness, value and sensitivity of County Westmeath's landscapes and lakelands by recognising their capacity to sustainably integrate development;*
- *Conserve and enhance the high nature conservation value of the Landscape Character Areas in order to create/protect ecologically resilient and varied landscapes; and,*
- *Require that development is sensitively designed, so as to minimise its visual impact on the landscape, nature conservation, archaeology and groundwater quality*

12.2.2.2 National Parks & Wildlife Service ('NPWS')

The nearest Special Area of Conservation ('SAC') is that of White Lough, Ben Loughs and Lough Doo SAC, approximately 1km southwest of the site at its nearest point which straddles the border with County Westmeath. Lough Naneagh Proposed Natural Heritage Area ('pNHA') is located to the west of the site, which encompasses the majority of the neighbouring quarry.

12.2.3 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 Meath Character Assessment describes the landscape's 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 surroundings at a more granular level. The present-day landscape is described first, followed by a consideration of changes that are likely to have occurred over the rLVIA period since the Development.

12.2.3.1 Site and Immediate Surroundings (present-day)

The landform of the site is heavily influenced by historic extraction activities, which have resulted in heavily modified terrain that contrasts with the surrounding hills and ridges in the immediate vicinity of the site. The site is primarily comprised of exposed bedrock, with the main processing area located centrally, along with the settlement canal. The site entrance is located in the northernmost corner, onto the regional road R195.

Beyond the site itself, the terrain in the immediate surrounds is characterised by a gently undulating landform intersected by several small loughs, the nearest of which is located approximately 350m to the north of the site. A large area of coniferous forestry can be found along the southern boundary of the site, while a large stand of mixed and deciduous forestry is located to the east. In terms of land use, the Site is the principal single land use within its immediate context. The surrounding landscape is predominantly cloaked in a patchwork of pastoral farmland, bound by networks of intervening hedgerow vegetation, which are a mix of clipped and mature tree-lined hedgerows, the latter being most evident in the landscape immediately east of the site.

The R195, which passes along the eastern boundary of the Site, is the most notable linear land use within the study area, connecting Oldcastle to the north and the settlement of Castlepollard to the southwest. While there is a low density of built development in the immediate context of the site, a small number of individual dwellings are located along the R195, the closest of which are to the immediate east of the site. The more notable agglomeration of rural dwellings occurs further to the east, along a local road towards the settlement of Drumone.

Figure 12-6: Landscape context in the immediate vicinity of the site

12.2.3.2 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 ca. 1995. As can be discerned from Figure 12-7 below, the excavated quarry has clearly grown in size considerably since 1995, with the aerial maps highlighting noticeable changes to the site throughout these years.

The aerial maps indicate that, prior to its inclusion as part of the Development, much of the surrounding 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.

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 Site 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 12-7: Historic Landscape Context of the Site and its immediate surrounds (ca. 1995 – 2014)

12.2.3.3 Wider Study Area (Present-day)

The landscape of the wider study area is very similar to that of the immediate study area. It is located in quite a remote part of County Meath, with the closest centre of population being that of Oldcastle, ca. 5.5km to the north. The landform consists of rolling hills and enclosed valleys interspersed with small lakes. The area consists of a mixture of land uses, primarily small-scale pastoral agriculture, medium-sized tracts of coniferous forestry, and both past and present quarry sites. The physical geography of this area is greatly shaped by the quarrying activity. The R195 is the most notable linear land use within the study area, connecting Oldcastle to the north and the settlement of Castlepollard to the southwest. The roadway

passes along the eastern boundary of the site. There is a very low density of built development across the wider study area.

Beyond the study area, to the east, the Loughcrew Passage Tombs can be found. They are located at a distance of over ca. 6km from the Site.

12.2.3.4 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 the small settlement of Drumone, approximately 3km to the east of the site, and along the local road connecting Drumone with the R195.

12.2.4 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. The Meath CDP identifies one scenic view within the study area at Moylagh Castle. The view is identified as being from a local road east of the R195 looking southwest towards the castle ruins and is deemed to be of local significance.

There are no recognised walking trails or scenic routes within the study area. The closest public walking trail is located at Mullaghmeen Forest, some 5km to the northwest of the Development and outside of the study area. While the scattering of small lakes found across the study area are generally not publicly accessible, they constitute a source of visual amenity for local residents and people passing through the area. The largest of these lakes, White Lough, is located ca. 1.6km to the southwest of the site along the Westmeath county border and can be accessed by the public.

Six viewpoints captured during fieldwork will be used for the visual impact assessment and are shown on the viewpoint map. See Figure 12-8 below.

Figure 12-8: Viewpoint Location Map

Viewpoint Locations:

I. **VP1** Regional road R195 along eastern boundary of site;

II. **VP2** Junction between R195 and L68185 (quarry entrance);

III. **VP3** R195, north of site;

IV. **VP4** Local road, northwest of site;

V. **VP5** Local road, south of site; and,

VI. **VP6** Moylagh Castle, scenic view from local road to east of R195.

12.3 Assessment of Effects

12.3.1 Landscape Effects

12.3.1.1 Landscape Sensitivity

Site and Immediate Vicinity

The site and its immediate vicinity are predominately characterised by the existing extractive land use. Indeed, much of the landform within the Site is comprised of large areas of extracted materials and spoil. There are some localised areas of vegetation; however, for the most part, this is a highly modified landscape context shaped by years of extraction. The existing machinery within the Site also generates a strong anthropogenic character, whilst the tones and textures of the extracted materials contrast strongly with the more typical tones and textures found throughout the neighbouring pastoral landscape. To the north and east, the more typical pastoral landscape remains, whilst to the west is another large quarry and to the south a block of commercial conifer forestry.

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, the landscape sensitivity of the site is considered Low due to its heavily modified nature, whilst beyond the site context to the east and north, where the landscape presents with more typical rural qualities, the landscape sensitivity is deemed Medium-low.

Wider Landscape

The wider study area, where the Development represented a smaller and less influential feature of the overall landscape fabric, was and is characterised by a much-modified, intensively managed pasture in mostly small fields across low, rolling countryside. Elsewhere, there are sections of commercial conifer plantations, human settlements and some relatively small loughs. There was some degree of a pleasant pastoral aesthetic within this landscape, likely enjoyed by locals and passers-by, despite there being no scenic designations present.

Regarding the degree of perceived naturalness within the wider landscape, the nearest SAC is that of White Lough, Ben Loughs and Lough Doo SAC, ca. 1km southwest of the site at its nearest point. In addition to this, the Lough Naneagh pNHA is located to the west of the site, which encompasses the majority of the neighbouring quarry.

On balance, the sensitivity of the landscape within the wider study area was deemed to be Medium-low with some localised areas of higher sensitivity.

12.3.1.2 Effects which have occurred - Site and Immediate Vicinity

Magnitude of Change

The magnitude of change is diminished by the fact that the quarry was an established feature prior to 1995. However, as can be discerned from **Error! Reference source not found.**. The e xcavated quarry area has more than doubled in size since 1995, and thus, there has been a marked intensification of development during this period. Indeed, surrounding areas of pastoral land have been converted to a much more anthropogenic land use. The intensification of development is also highlighted further by the introduction of new and larger plant equipment during this time, which would have been more visible from the surrounding landscape and, thus, would have had an effect on the surrounding landscape character.

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 existing quarry pre-1995 and the perceived intensification of development would also have also been further exacerbated as the neighbouring quarry was expanding at a similar rate.

However, it should be noted that 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. Indeed, much of the clearest visibility of the site occurs from its immediate surroundings, with parts of the immediate surrounding landscape fully screened from the Site. 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.

12.3.1.3 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 more modestly scaled in comparison to its existing scale and extent and would have been more discreetly located as it was well setback from the local and regional road corridors. 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. Indeed, as with many quarries, they are contained in the base of a manmade, hollowed-out depression and are relatively well screened, or at least obscured, by surrounding vegetation patterns and intervening landforms. 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 outlined 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.

12.3.1.4 Effects which are occurring

Magnitude of Change

In the context of the existing quarry, the ongoing works are a continuation of quarrying processes that have been happening at the quarry since the 1960s. The activities at the site are typical of most quarry operations and include the extraction of aggregates, processing, grading, washing and short-term storage of the material. There will also be movement of HGVs going to and from the site and movement of machinery within the site boundary. 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. These effects do not extend beyond the immediate site context where the daily quarrying activities are more noticeable.

12.3.2 Visual Effects

12.3.2.1 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 Site 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. There are some surrounding loughs that will present a more notable sense of scenic amenity, albeit at a localised scale.

Views of the working agricultural landscape are generally pleasant in terms of its rolling pastoral aesthetic and 'green', settled working character. The network of hedgerows and vegetation throughout contributes to some sense of naturalness. Overall, the sensitivity of visual receptors within the more typical working landscape tends to range between Medium and Medium-low, with those of a Medium sensitivity representing more open expansive views across the wider landscape.

Owing to multiple factors set out in the baseline sections (refer to section 12.3.3), in combination with the relative proximity of receptors to the Site and one another, these receptors are deemed to be of Medium-low visual sensitivity.

Table 12-6: Viewpoint Locations

Viewpoint	Description
VP1	Regional road R195 along eastern boundary of site
VP2	Junction between R195 and L68185 (quarry entrance)
VP3	R195, north of site
VP4	Local road, northwest of site
VP5	Local road, south of site
VP6	Moylagh Castle, scenic view from local road to east of R195

Viewpoint Assessment

The viewpoints (See section 12.3.4) are described below, under the headings 'Existing view', 'Visual Receptor Sensitivity', Magnitude of Change' (which has occurred) and 'Significance of Effect'.

VP1 – Regional Road R195 along the eastern boundary of the Site:

Figure 12-9: Viewpoint 1

Existing view

This is a view from the Regional Road R195 along the eastern boundary of the site. This view is representative of three dwelling houses that are located along this section of the road overlooking the site. Through a break in the winter hedgerow vegetation, the northern portion of the site is clearly visible. A low embankment rises to the rear of the hedgerow, partially obscuring the view into the lower part of the site. Where the hedgerow is more established, the view into the site is reduced.

Visual Receptor Sensitivity

The visual receptor sensitivity is deemed Medium-Low.

Magnitude of Change

As is evidenced by the historic aerial imagery, the site has expanded eastwards since 1995. A patchwork of agricultural fields which would have provided some distance between the R195 and the site have subsequently been consumed by the quarry. As a result, the extent of the quarry now reaches as far as the road. Over time, the visual presence of the quarry will have become more prominent for the three dwelling houses located directly across the road.

It is worth noting that this view has been captured at a break in the hedgerow vegetation. Where the hedgerow is fully established, views into the site from here are greatly reduced, although glimpses of the mounds of extracted material can be seen through the hedge line.

Thus, the magnitude of change is deemed High-medium.

Significance of Effect

The significance of the visual effect is Moderate. The quality of the effect is considered Negative.

VP2 – Junction between R195 and L68185 (Quarry entrance):

Figure 12-10: Viewpoint 2

Existing view

This is a view from the current quarry entrance facing south across the site. There is a clear view of the quarry grounds and earthworks associated with extraction. Heavy machinery can be seen in the background of the image. The field in the foreground of the image has largely been left untouched by excavation activity.

Visual Receptor Sensitivity

The visual receptor sensitivity is deemed Medium-Low.

Magnitude of Change

As is visible in the aerial photography, the quarry has expanded north since 1995. As such, its visual presence in this view would have increased in the intervening years. However, the quarrying activity remains set back from the road through the retention of a small field at the north-eastern corner of the site. A small stretch of existing hedgerow has been retained, visible to the right of the image, which aids in obscuring some of the quarrying activity behind it. An embankment has been created along the southern extent of this field, which partially obscures some of the site.

As this viewpoint is located at the quarry entrance, this road and the R195 it connects onto would have seen an increase in vehicle movements when the extractive operations were taking place, with HGVs entering and exiting the site. The increased intensity of vehicles along this local road would generate some localised visual effects. Nonetheless, the quarry facility was a well-established feature in this local landscape context prior to the retrospective period being assessed, and therefore, movements of HGV would not be uncommon here.

Thus, the magnitude of change is deemed High-medium.

Significance of Effect

The significance of the visual effect is Moderate. The quality of the effect is considered Negative.

VP3 –R195, north of site:

Figure 12-11: Viewpoint 3

Existing view

This is a view along the R195, some 400m from the northern extent of the site. The view is representative of the surrounding local community receptors. The view to the south captures the undulating terrain of the surrounding area and is contained at a short distance by a low ridge within an agricultural field. The canopy of several mature trees along the northern extent of the site are visible above the ridgeline.

Visual Receptor Sensitivity

The visual receptor sensitivity is deemed Medium-low.

Magnitude of Change

Due to intervening terrain and vegetation, the quarry is not visible from here. Nonetheless, as the quarry entrance opens onto the R195, this road would have seen an increase in vehicle movements when the extractive operations were taking place, with HGVs entering and exiting the site. Thus, whilst the quarry itself is not visible, the increased intensity of vehicles along this local road would generate some localised visual effects. Nonetheless, the quarry facility was a well-established feature in this local landscape context prior to the retrospective period being assessed, and therefore, movements of HGV would not be uncommon here.

Thus, the magnitude of change is deemed Low-negligible.

Significance of Effect

The significance of the visual effect is Slight-imperceptible. The quality of the effect is considered Neutral-negative.

VP4 – Local road, northwest of the Site:

Figure 12-12: Viewpoint 4

Existing view

This is a view along a local road to the northwest of the site. The view is representative of the surrounding local community receptors, with a number of individual residential dwellings located along this stretch of road. The view is contained at a medium distance by intervening layers of mature hedgerow and small pockets of forestry. The quarry facility is not visible. Otherwise, a pleasant view of the distant hills is afforded here.

Visual Receptor Sensitivity

The visual receptor sensitivity is deemed Medium.

Magnitude of Change

The site is not visible from here due to the intervening landform and mature vegetation. Thus, the magnitude of change is deemed Negligible.

Significance of Effect

The significance of the visual effect is Imperceptible. The quality of the effect is considered Neutral.

VP5 – Local road, south of the Site:

Figure 12-13: Viewpoint 5

Existing view

This is a view along a local road to the south of the site. The view is representative of the surrounding local community receptors, with a number of individual residential dwellings

located along this stretch of road. The view from the road is contained by intervening layers of mature hedgerow and small pockets of forestry. The quarry facility is not visible from here.

Visual Receptor Sensitivity

The visual receptor sensitivity is deemed Medium.

Magnitude of Change

The site is not visible from here due to the intervening landform and mature vegetation. Thus, the magnitude of change is deemed Negligible.

Significance of Effect

The significance of the visual effect is Imperceptible. The quality of the effect is considered Neutral.

VP6 – Moylagh Castle, scenic view from local road to east of R195:

Figure 12-14: Viewpoint 6

Existing view

This is a scenic view identified in the current Meath County Development Plan, taken from the local road at the base of Moylagh Castle, approximately 1.45km from the Development at its nearest point. The view is situated on a relatively elevated position and offers a clear view towards the southwest. The view is representative of the amenity and heritage feature of Moylagh Castle, as well as surrounding local community receptors, with a number of individual residential dwellings located along this stretch of road. The view from the road is largely contained at a medium distance by intervening layers of mature hedgerow and small pockets of trees. The quarry facility is not visible from here.

Visual Receptor Sensitivity

The visual receptor sensitivity is deemed High-medium.

Magnitude of Change

The site is not visible from here due to the intervening landform and mature vegetation. Thus, the magnitude of change is deemed Negligible.

Significance of Effect

The significance of the visual effect is Imperceptible. The quality of the effect is considered Neutral.

Summary of Visual Effects

The visual change generated by the Development has been assessed relative to the likely visual impact of the landscape during the remedial period (1995-present day), using five

viewpoints from the surrounding area. Two of the five selected viewpoints were afforded views of some aspect of the Site.

These viewpoints were VP1 & VP2, both located just beyond the boundary of the site. Between them, they represented the most open and accessible views of the Site that can be attained from receptors within the study area. The most notable aspect of visual change here relates to the intensification of development towards surrounding receptors, which would have resulted in a notable increase in the visual prominence of the Development. Thus, both representative views were classified with a residual significance of the visual effect of Moderate. In the remaining viewpoints, no views of the Site could be attained, albeit some of the secondary activities of the quarry, such as the movement of HGVs to and from the site, would have generated some very localised visual effects. Indeed, the remaining viewpoints resulted in a 'Slight-imperceptible' and 'Imperceptible' visual impact magnitude.

In summary, whilst the Development would have been visible from some local receptors, with the boundary of the Development slowly encroaching on the landscape context throughout the remedial period being assessed, for the most part, large parts of the surrounding landscape would have limited or no view of the proposed development. Indeed, whilst the current quarry facility represents a notable single land use, the perceived scale and extent of development and surrounding receptors are heavily diminished as the site is often well screened by a combination of surrounding landform and intervening screening.

12.3.2.2 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.

Thus, the historic activities of extraction, processing, grading, washing, and short-term storage have continued within the Site. This represents a continuation of activities which are already ongoing.

Overall, the continuation of production operations on the site are considered to result in a residual significance of visual effect no greater than 'Moderate' as highlighted at VP1 and vp2 above, albeit for the most part, the Site will be heavily and in some cases fully screened, resulting in a residual significance of effect of 'Slight-imperceptible or 'Imperceptible' and are of a Negative-neutral quality.

12.3.3 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." [135].*

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. The principal cumulative effect relates to a large quarry facility to the northwest of the Site, which has been well established prior to the remedial period being assessed. Indeed, the neighbouring quarry was of a much larger scale than the quarry being assessed and has also expanded by a notable scale during the remedial period, as noted in **Error! Reference s ource not found.** above. Over the remedial period, both quarries have expanded to meet at the northern extent of the Development, now appearing as one large quarry facility. In terms of landscape impacts, the cumulative landscape effect is notable as the quarries now present as the single most prominent land use within this local landscape context. However, the overall scale and extent of the two quarries is not as apparent in terms of the cumulative visual effect.

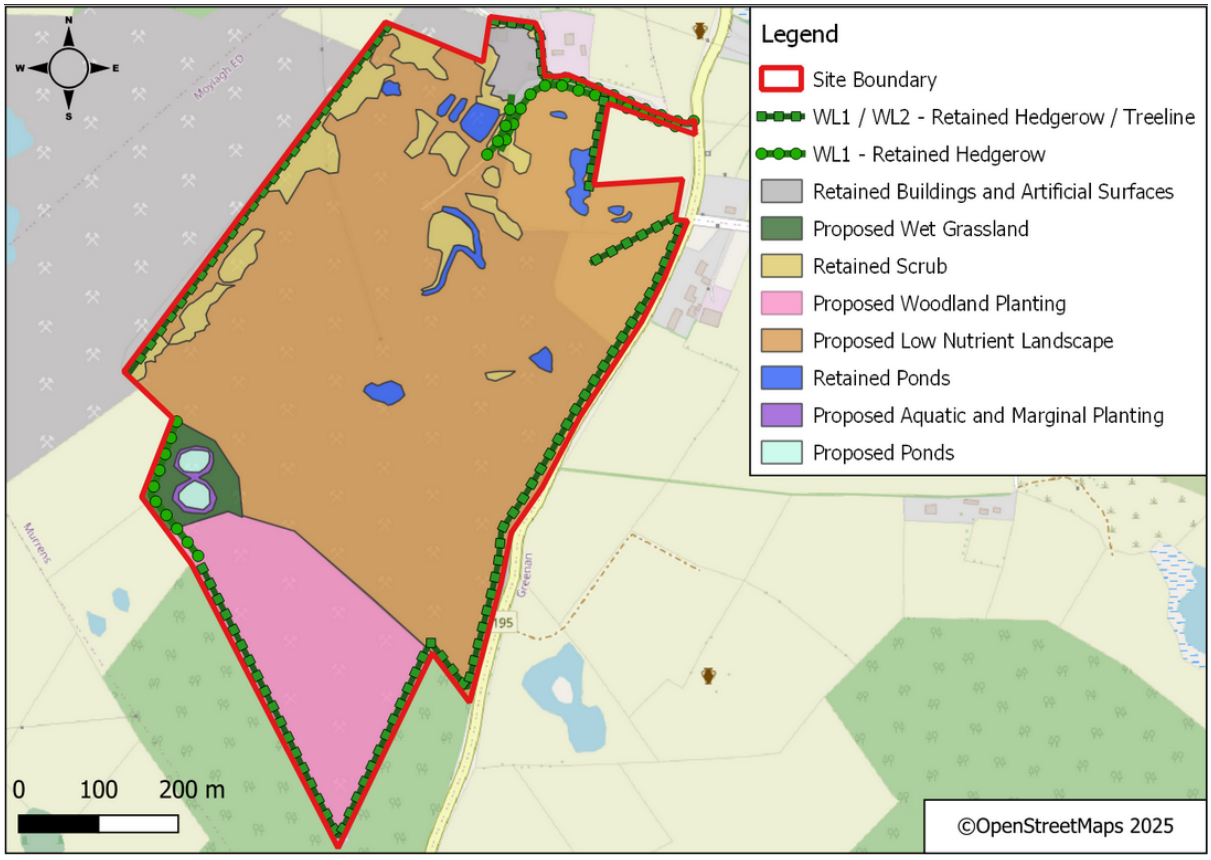
In fact, there are very limited opportunities to afford any combined visibility of the two developments.

On balance of the above, it is considered that the Development has contributed to a notable cumulative landscape effect in relation to the neighbouring quarry to the northwest. However, the cumulative visual effect is not as apparent. Overall, whilst there has been a marked cumulative increase in quarrying activities within the study area in the remedial period being assessed, it is not considered that the development will generate significant cumulative effects, especially considering it is the smaller of the two quarry developments.

12.4 Reinstatement

The proposed reinstatement measures are included in **Error! Reference source not found.** below. The majority of the Site is proposed to be reinstated as a low nutrient landscape with woodland planting located along the southern boundary of the Site. Localised areas of aquatic and marginal planted and proposed ponds are also to be situated along the southern boundary of the Site, whilst hedgerows and treelines along the Site perimeter will also be retained. It should also be noted that any stockpiles of material stored onsite will also be used for restoration purposes. Overall, once fully restored, the proposed development will generate some localised positive effects and enhanced the Site and surrounding landscape ecological values.

12-15 Proposed Reinstatement Measures



12.5 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 abate subsequently.

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 rEIAR, commissioned by MOR Environmental on behalf of the client, addresses the effects, if any, on the archaeological, architectural and cultural heritage of the Site and the surrounding area because of quarrying carried out by the applicant on land located in the townland of Murrens Quarry, County Meath.

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 in order to identify the likely context, character, significance and sensitivity of the known or potential cultural heritage, including architectural and archaeological aspects, using an appropriate methodology ([8], [7]). It consists of the following study stages:

- Baseline Studies; and,
- Assessment of the Site.

The criteria and definitions for describing effects set out below is drawn from the 2022 EPA Guidelines (see Table 13-1 below).

Table 13-1: Description of Effects

Quality of Effects	Positive A change which improves the quality of the environment.
	Neutral No effects or effects that are imperceptible, within normal bounds or variation or within the margin of forecasting error.
	Negative/adverse Effects A change which reduces the quality of the environment.
Significance of effects	Imperceptible An effect capable of measurement but without noticeable consequences.
	Not significant An effect which causes noticeable changes in the character of the environment but without noticeable 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 & emerging trends.
	Significant effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant effects An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.
	Profound effects An effect which obliterates sensitive characteristics
Describing extent & context of effects	Extent Describe area size, number of sites & population proportion affected by an effect.
	Context Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions.
Describing probability of effects	Likely effects The effects can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.

	Unlikely effects The effects can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing duration, frequency of effects	Momentary effects Effects lasting from seconds to minutes.
	Brief effects Effects lasting less than a day.
	Temporary effects Effects lasting less than a year.
	Short-term effects Effects lasting one to seven years.
	Short-term effects Effects lasting seven to fifteen years.
	Long term-term effects Effects lasting fifteen to sixty years.
	Permanent effects Effects lasting over sixty years.
	Reversible effects Effects that can be undone, for example through remediation or restoration.
	Frequency of effects Describe how the effect will occur.
Describing types of effects	Indirect effects Impacts on the environment which are not a direct result of the project.
	Cumulative effects The addition of minor or significant effects, including effects of other projects, to create a larger more significant effect.
	'Do Nothing Effects' The environment as it would be in the future should the project not be carried out.
	'Worst case' effects The effects arising from a project where mitigation measures substantially fail.
	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 Degree of environmental change occurring after mitigation measures take effect.
	Synergistic effects Where the resultant effect is of greater significance than the sum of its constituents.

13.2.1 Baseline Study

The baseline study research has been undertaken in two phases, the paper study phase and subsequently the field assessment phase.

13.2.1.1 Paper Study

The first phase comprised a paper survey of all available archaeological, historical and cartographic sources. This involved the following:

- A collation of existing written and graphical information to identify the likely context, character, significance and sensitivity of the known or potential cultural heritage, archaeological and structural resource using appropriate methodology;
- A detailed investigation of the archaeological and historical background of the Site, the landholding and the surrounding area extending 1km from the Site boundary (Figure 13-1). This area was examined using information from the following:
    - Record of Monuments and Places ('RMP') of County Meath;
    - The Sites and Monuments Record;
    - The CDP including the Record of Protected Structures;

  - The National Inventory of Architectural Heritage;
  - Aerial photographs;
  - Excavation reports;
  - Cartographic and
  - Documentary sources.

- The CDP: is the statutory plan detailing the development objectives/policies of the relevant local authority. The plan includes objectives and policies, relevant to this assessment, i.e. regarding cultural heritage;
- The National Inventory of Architectural Heritage ('NIAH') - is a state initiative under the administration of the Department of Culture, Heritage and the Gaeltacht and established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999. The purpose of the NIAH is to identify, record, and evaluate the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage. NIAH surveys provide the basis for the recommendations of the Minister for Culture, Heritage and the Gaeltacht to the planning authorities for the inclusion of structures in their Record of Protected Structures ('RPS');
- The Record of Monuments and Places - was established under section 12 (1) of the National Monuments (Amendment) Act, 1994 and provides that the Minister shall establish and maintain a record of monuments and places where the Minister believes there are monuments, such record to be comprised of a list of monuments and relevant places and a map or maps showing each monument and relevant place in respect of each county in the State. The associated files contain information of documentary sources and field inspections where these have taken place. Note, although the Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023 was signed into law by the President on October 13, 2023, the part of the act superseding the Record of Monuments with the Register of Monuments had not been commenced at the time this assessment was prepared. This assessment uses the Record of Monuments and Places, which were still in force at the time the assessment was completed;
- The Sites and Monuments Record - is maintained by the Department of Housing, Local Government and Heritage and contains information on Recorded Monuments and additional unprotected sites that have been identified since the Record of Monuments was issued;
- Aerial photographs – record cropmarks, soil marks and earthworks that may not have been previously detected;
- Cartographic Sources - this includes seventeenth-century mapping as well as the 1st and 2nd editions of the Ordnance Survey six-inch maps; and,
- Documentary Sources – provide more general historical and archaeological background.

The second phase involved a field inspection of the Site.

13.2.1.2 Field assessment

A field inspection of the Site was carried out on the 6th of February 2025 to identify and assess any known archaeological sites and previously unrecorded features and portable finds within the Site.

13.2.2 Assessment of the Development

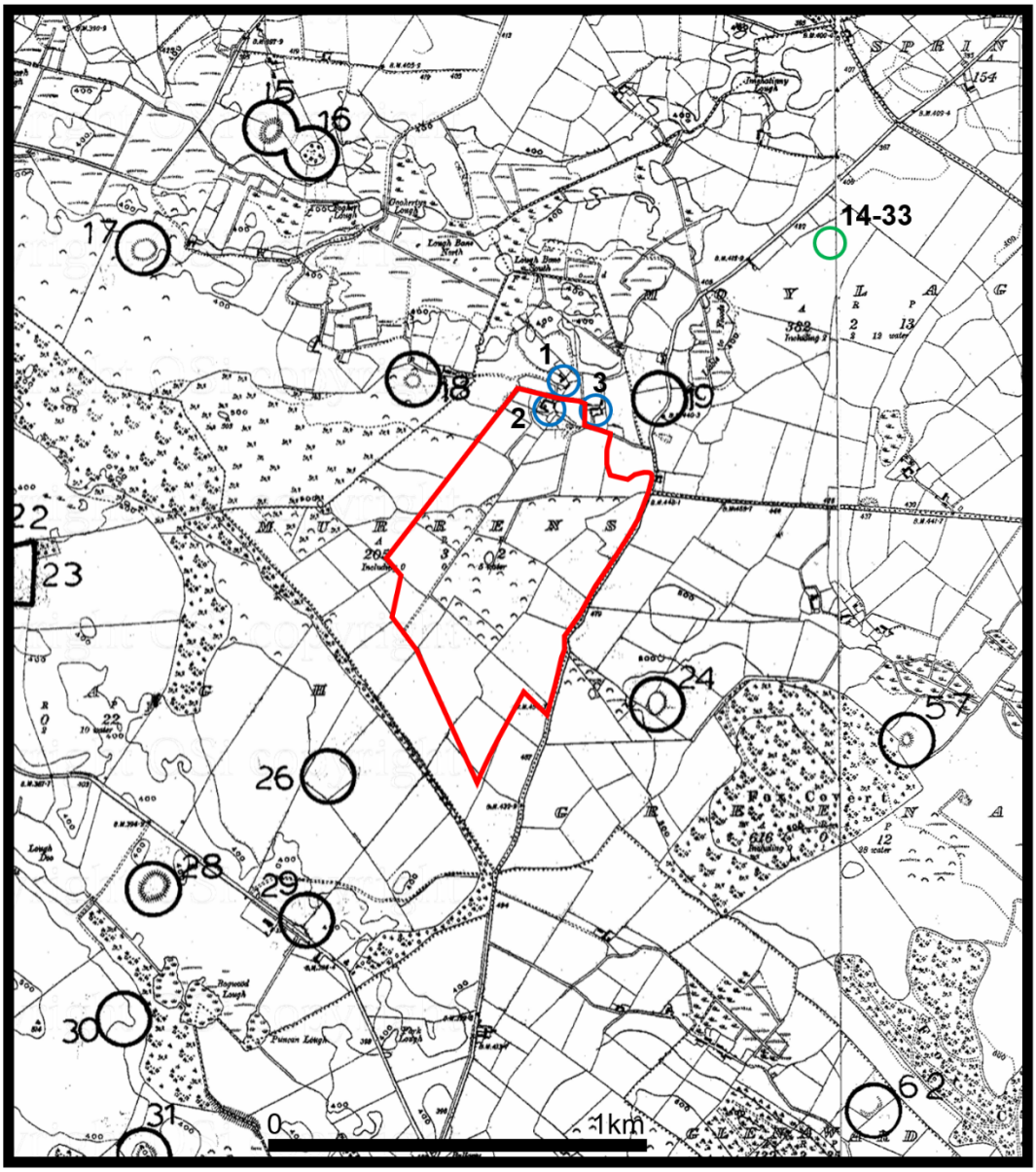
An impact assessment and mitigation strategy have been prepared. An impact assessment is undertaken to outline potential adverse effects that the development may have had or is having on the cultural resource. At the same time, a mitigation strategy is designed to avoid, reduce or offset such adverse effects.

Extracts from the Record of Monuments and Places for County Meath are presented on a map of the local area around the site in Figure 13-1. RMP sites included on the Records of Monuments and Places statutory mapping are identified by black circles and undesignated buildings in the vicinity of the Site with blue circles. The Site is shown with a red line.

13.2.3 Guidelines

The report format and some of the descriptions of effects are based on the Guidelines on the Information to be contained in the Environmental Impact Assessment Report, published by the EPA in May 2022.

Figure 13-1: The Study Area Superimposed On The Sites And Monuments Record.



13.3 Review and Findings

13.3.1 The Landscape

The Site is located in the townland of Murrens, Co. Meath, on OS Six Inch sheet No. 14, ca. 6km to the southwest of the town of Oldcastle and west of the R195 road. The soil of the area is a Rathowen series fine loamy drift with limestones with a substrate of drift with limestones [137].

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 Murrens, the civil parish of Moylagh and the barony of Fore. Note the original spellings of placenames recorded in the source material are retained in the text.

13.3.2.1 The Prehistoric Period

The nature of prehistoric activity in the study area is unclear as there are no prehistoric sites or finds known from the area.

13.3.2.2 The Early Medieval Period

In the early medieval period, the barony of Fore formed part of the Kingdom of Caille Follamain, ruled by a branch of the southern Ui Neill descended from Colman Becc, who died about AD 587. The centre of the Kingdom was at Kells, and the earliest King Tuathal mac Mael Tuile was recorded here in AD 718. Five kings of Caille Follamain are recorded between AD 851 and 1017 ([138], 203). Settlement in the early medieval period is indicated by enclosed farmsteads known as ringforts. There are a number in the study area in Baltrasna (ME014-015, ME014-016, ME014-017, ME014-018), Moylagh (ME014-019----), Annagh (ME014--022----; ME014-025---), Glenaward (ME14-062---) and Greenan (ME14-O24---) townlands as well as a number of undated enclosures that indicate substantial settlement in the study area in the early medieval period.

13.3.2.3 The Medieval Period

In 1172 King Henry II granted the Kingdom of Meath to Hugh de Lacy to hold as King Murrough O Melaghlin, King of Meath, had held it ([139], 52). In 1241 Hugh de Lacy's son, Walter de Lacy, died without a male heir and Meath was partitioned between his two granddaughters. The manor of Fore, containing the study area, went to de Geneville Lord of Trim husband of Maud de Lacy ([139], 187). The process of medieval 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. Hugh de Lacy's motte castle was situated in his Demesne manor Fore which is now in Co. Westmeath 4km to the south of the study area. 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 known within the study area and there does not appear to have been any Norman settlement.

13.3.2.4 The Later Medieval Period

The fifteenth century was characterised by the decline of Anglo-Norman power in Ireland which had been ebbing since the early fourteenth century. Part of the response to this was the construction of masonry Tower Houses which sprang up after King Henry VI introduced a building subsidy of £10 in 1429 ([140]). Annagh Castle (ME014—02701-), to the south-west of the Site, is probably the remains of the Tower House that housed the lord of the study area.

13.3.2.5 The Post-medieval Period

The Down Survey and Civil Survey ([141]) record that in 1641 Murrens (called Thomasbrydstowne) was held by Thomas Kearnan, but by 1670 was in the hands of Humphrey Rogers. Annagh, in 1641, was held by Walter Nugent and, by 1670, was in the hands of James Nugent. There are no structures referred to on the lands. In the eighteenth century, Murrens passed through the hands of the Naper, Wadeet, Merryman, Wade, Nugent and Reilly families. In the early nineteenth century, Murrens and Annagh were held by Walter Nugent [142].

13.3.3 Meath County Development Plan 2021-27

The CDP is the statutory plan detailing the development objectives / policies of the local authority. The plan includes objectives and policies relevant to this assessment, i.e., with regard to archaeological, architectural and cultural heritage. The CDP has several policies in relation to archaeological and architectural heritage (see below).

The Council's Archaeological Heritage policies and objectives are:

HER POL 1 To protect sites, monuments, places, areas or objects of the following categories:

- Sites and monuments included in the Sites and Monuments Record as maintained by the National Monuments Service of the Department of Housing, Local Government and Heritage;
- Monuments and places included in the Record of Monuments and Places as established under the National Monuments Acts;
- Historic monuments and archaeological areas included in the Register of Historic Monuments as established under the National Monuments Acts; Meath County Development Plan 2021-2027 Chapter 8;
- National monuments subject to Preservation Orders under the National Monuments Acts and national monuments which are in the ownership or guardianship of the Minister for Housing, Local Government and Heritage, or a local authority;
- Archaeological objects within the meaning of the National Monuments Acts; and Wrecks protected under the National Monuments Acts or otherwise included in the Shipwreck Inventory maintained by the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht.

HER POL 2 To protect all sites and features of archaeological interest discovered subsequent to the publication of the Record of Monument and Places, in situ (or at a minimum preservation by record) having regard to the advice and recommendations of the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht and The

Framework and Principles for the Protection of the Archaeological Heritage (1999).

HER POL 3 To require, as part of the development management process, archaeological impact assessments, geophysical survey, test excavations or monitoring as appropriate, for development in the vicinity of monuments or in areas of archaeological potential. Where there are upstanding remains, a visual impact assessment may be required.

HER POL 4 To require, as part of the development management process, archaeological impact assessments, geophysical survey, test excavations or monitoring as appropriate, where development proposals involve ground clearance of more than half a hectare or for linear developments over one kilometer in length; or developments in proximity to areas with a density of known archaeological monuments and history of discovery as identified by a suitably qualified archaeologist.

HER POL 5 To seek guidance from the National Museum of Ireland where an unrecorded archaeological object is discovered, or the National Monuments Service in the case of an unrecorded archaeological site.

HER POL 6 To protect the Outstanding Universal Value of the UNESCO World Heritage Site of Brú na Bóinne in accordance with the relevant guidelines and national legislation, so that its integrity, authenticity and significance are not adversely affected by inappropriate development or change.

HER POL 7 To encourage the retention, conservation, and appropriate re-use of traditional buildings within the UNESCO World Heritage Site of Brú na Bóinne in preference to either their replacement, or the construction of new buildings on green field sites.

HER POL 8 To ensure that development within the UNESCO World Heritage Site of Brú na Bóinne shall be subject to the Development Assessment Criteria set out in Appendix 8 and the Development Management Guidelines in Chapter 11.

HER POL 9 To consider individual housing within the UNESCO World Heritage Site of Brú na Bóinne, as shown on Map 8.1 - UNESCO World Heritage Site - Brú na Bóinne, only for those involved locally in full time agriculture and who do not own land outside of the UNESCO World Heritage Site of Brú na Bóinne and subject to compliance with all other relevant provisions contained in this Development Plan.

HER POL 10 To ensure that residential extensions within the UNESCO World Heritage Site of Brú na Bóinne respect the scale, design and character of the original building. Meath County Development Plan 2021-2027 Chapter 8.

HER POL 11 To support the Department of Culture, Heritage and the Gaeltacht and all stakeholders in the implementation of the Brú na Bóinne Management Plan, 2017.

HER POL 12 To recognise and respect potential World Heritage Sites in Meath on the UNESCO Tentative List – Ireland.

HER POL 13 To protect and preserve in situ all surviving elements of medieval town defences

HER OBJ 1 To implement in partnership with the County Meath Heritage Forum, relevant stakeholders and the community the County Meath Heritage Plan and any revisions thereof.

HER OBJ 2 To ensure that development in the vicinity of a Recorded Monument or Zone of Archaeological Potential is sited and designed in a sensitive manner with a view to minimal detraction from the monument or its setting.

HER OBJ 3 To protect important archaeological landscapes from inappropriate development.

HER OBJ 4 To encourage the management and maintenance of the County's archaeological heritage, including historic burial grounds 2, in accordance with best conservation practice that considers the impact of climate change.

HER OBJ 5 To promote awareness of, and encourage the provision of access to, the archaeological resources of the county.

HER OBJ 6 To work in partnership with key stakeholders to promote County Meath as a centre for cultural heritage education and learning through activities such as community excavation and field/summer schools.

HER OBJ 7 To work in partnership with the community and all other relevant stakeholders to promote, understand, conserve and sustainably manage the UNESCO World Heritage Site of Brú na Bóinne.

HER OBJ 8 To encourage and facilitate pre-application discussions, in conjunction with the Department of Culture, Heritage and the Gaeltacht, regarding the siting and design of developments affecting the UNESCO World Heritage Site of Brú na Bóinne and the scope of any necessary impact assessments.

HER OBJ 9 To refer all planning applications within the UNESCO World Heritage Site of Brú na Bóinne to the Department of Culture, Heritage and the Gaeltacht for comment. These comments will be considered in the assessment of all such planning applications.

HER OBJ 10 To actively support and encourage the re-use of vacant and derelict dwellings within the Core and Buffer Zone of the World Heritage Site of Brú na Bóinne by providing assistance and professional advice to owners seeking to re-develop such sites.

HER OBJ 11 To protect the ridgelines which frame views within and from the UNESCO World Heritage Site of Brú na Bóinne from inappropriate or visually intrusive development.

HER OBJ 12 To prepare and implement a Business Plan for the World Heritage Site in conjunction with relevant stakeholders, subject to funding.

HER OBJ 13 To support the State in the nomination process of Tara and Kells to World Heritage status as part of an assemblage of Royal and Monastic Sites in co-operation with the relevant Local Authorities.

HER OBJ 14 To retain the surviving medieval street pattern, building lines and burgage plot widths in historic walled towns.

In relation to Architectural, Industrial and Landscape Design Heritage the Council's policies and objectives are to:

HER POL 14 To protect and conserve the architectural heritage of the County and seek to prevent the demolition or inappropriate alteration of Protected Structures.

HER POL 15 To encourage the conservation of Protected Structures, and where appropriate, the adaptive reuse of existing buildings and sites in a manner compatible with their character and significance. In certain cases, land use zoning restrictions may be relaxed in order to secure the conservation of the protected structure.

HER POL 16 To protect the setting of Protected Structures and to refuse permission for development within the curtilage or adjacent to a protected structure which would adversely impact on the character and special interest of the structure, where appropriate.

HER POL 17 To require that all planning applications relating to Protected Structures contain the appropriate accompanying documentation in accordance with the Architectural Heritage Protection Guidelines for Planning Authorities (2011) or any variation thereof to enable the proper assessment of the proposed works.

HER POL 18 To require that in the event of permission being granted for development within the curtilage of a protected structure, any works necessary for the survival of the structure and its re-use should be prioritised in the first phase of development. It is the objective of the Council:

HER POL 19 To protect the character of Architectural Conservation Areas in Meath.

HER POL 20 To require that all development proposals within or contiguous to an ACA be sympathetic to the character of the area, that the design is appropriate in terms of height, scale, plot density, layout, materials and finishes and are appropriately sited and designed with regard to the advice given in the Statements of Character for each area, where available.

HER POL 21 To encourage the retention, sympathetic maintenance and sustainable re-use of historic buildings, including vernacular dwellings or farm buildings and the retention of historic streetscape character, fabric, detail and features.

HER POL 22 Seek the retention of surviving historic plot sizes and street patterns in the villages and towns of Meath and incorporate ancient boundaries or layouts, such as burgage plots and townland boundaries, into re-developments.

HER POL 23 To actively promote the retention and restoration of thatched dwellings as a key component of the built heritage of the County.

HER POL 24 To encourage appropriate change of use and reuse of industrial heritage structures provided such a change does not seriously impact on the intrinsic character of the structure and that all works are carried out in accordance with best conservation practice, subject to compliance with normal planning criteria.

HER POL 25 To protect and enhance the built and natural heritage of the Royal Canal and Boyne Navigation and associated structures and to ensure, in as far as practically possible, that development which may impact on these structures and their setting be sensitively designed with regard to their character and setting. Development of the project will be subject to the outcome of the Appropriate Assessment process.

HER POL 26 To encourage the protection and enhancement of heritage gardens and demesne landscapes, and to support, in consultation with the owners, the provision of public access to these sites as appropriate.

HER OBJ 15 To review and update the Record of Protected Structures on an on-going basis and to make additions and deletions as appropriate.

HER OBJ 16 To identify and retain good examples of historic street furniture, e.g. cast-iron post boxes, water pumps, light fixtures and signage, as appropriate.

HER OBJ 17 To promote best conservation practice and encourage the use of appropriately qualified professional advisors, tradesmen and craftsmen, with recognised conservation expertise, for works to protected structures or historic buildings in an Architectural Conservation Area.

HER OBJ 18 To provide detailed guidance notes and continue to develop the Council's advisory/educational role with regard to heritage matters and to promote awareness, understanding and appreciation of the architectural heritage of the County.

HER OBJ 19 To commission a study over the lifetime of the Plan to assess the significance of the Mass Rocks and Holy Wells throughout County Meath.

HER OBJ 20 To identify places of special character, with a view to their designation as Architectural Conservation Areas and to modify existing ACAs, where necessary.

HER OBJ 21 To prepare and review, where necessary, detailed character statements and planning guidance for each ACA.

HER OBJ 22 To avoid the demolition of structures and the removal of features and street furniture which contribute to the character of an ACA. The Council will require that any planning application for demolition or alteration within an ACA be accompanied by a measured and photographic survey, condition report and architectural heritage assessment.

HER OBJ 23 To ensure that conversions or extensions of traditional buildings or the provision of new adjoining buildings, are sensitively designed and do not detract from the character of the historic building.

HER OBJ 24 To update the survey of surviving thatched structures in the County and to promote available grant schemes to assist owners with their retention and repair.

HER OBJ 25 To carry out a survey of Land Commission dwellings over the life of the Development Plan, to acknowledge their contribution to the building stock of the County, as appropriate.

HER OBJ 26 To require an architectural / archaeological assessment, as appropriate, which references the Meath Industrial Heritage Survey and other relevant sources, for all proposed developments on industrial heritage structures or sites.

HER OBJ 27 To carry out Phase 2 of the Industrial Heritage Survey which will comprise a field survey and assessment of surviving structures and sites and consider (if appropriate) proposing them for addition to the Record of Protected Structures

HER OBJ 28 To discourage development that would adversely affect the character, the principal components of, or the setting of historic parks, gardens and demesnes of heritage significance.

HER OBJ 29 To require that proposals for development in designated landscapes and demesnes include an appraisal of the landscape, designed views and vistas, including a tree survey, where relevant, in order to inform site appropriate design proposals.

13.3.4 Buildings

13.3.4.1 Designated structures

The Record of Protected Structures in the CDP was reviewed as part of the baseline study for this rEIAR chapter. The review established that there are no structures within the Site or the study area listed in the Record of Protected Structures.

13.3.4.2 National Inventory of Architectural Heritage

The 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 rEIAR on the 14th January 2025 [143]. The review established that there are no structures within the Site or the study area listed in the NIAH.

13.3.4.3 Field inspection

On the 6th of February 2025 fieldwork was carried out to identify any additional non-designated structures in the vicinity of the Site. This involved assessing all upstanding structures that are marked on the 1910 edition of the six-inch Ordnance Survey mapping within 100m of the Site (see Fig. 13-1). There are three structures indicated in this area, of which two are upstanding. These structures are not of special architectural significance interest (see Table 13-1).

Table 13-2: Structures in the vicinity of the Site.

No.	**1**
Structure type	House
Townland	Murrens
Designation	None
Data source	1910 six-inch Ordnance Survey map
Perceived Significance:	None
Quality of effect:	None
Significance of effect	None
Description	Three-bay two=storey house with hipped slate roof, single central chimney stack and porch-covered entrance. This structure has no special architectural significance.
Image	Figure 13-2
No.	**2**
Structure type	Demolished
Townland	Murrens
Designation	None
Data source	1910 six-inch Ordnance Survey map
Perceived Significance:	None
Quality of effect:	None
Significance of effect	None
Description	The structures in this location has been demolished.
Image	-
No.	**3**
Structure type	House
Townland	Murrens
Designation	None
Data source	1910 six-inch Ordnance Survey map
Perceived Significance	None
Quality of effect	None
Significance of effect	None
Description	Three-bay two-storey house with hipped slate roof, two central chimney stacks and porch-covered entrance. This structure has no special architectural significance.
Image	Figure 3-3

Figure 13-2: Structure 1 looking north

Figure 13-3: Structure 3 looking north

13.3.5 Archaeological Assessment

13.3.5.1 Recorded Monuments

Examination of the Record of Monuments and Places indicates that there are no Recorded Monuments in the Site (see Fig. 13-1). The closest Recorded Monument to the Site externally is ME014-019---- a Ringfort – rath in Moylagh townland (see Fig. 13-4). This is described in the RMP as:

ME014-019---- Moylagh Ringfort – rath

> *Situated on a local rise in an undulating landscape. This is a raised and circular grass-covered area (diam. 34m WNW-ESE; 31m NNE-SSW) defined by a scarp (at SW: Wth 3m; H 1.5m; at NE: Wth 7.5m; H 3.1m) that is incorporated into a road boundary E-SE. There is no visible fosse or entrance. It was damaged in road-widening in 1979 when much of the E half was removed.*

There is an apparent north-south aligned collapsed souterrain in the interior of the monument. The monument is situated ca.158m north of the Site and is too far distant to be directly or indirectly affected by the development. The views from the monument to the Site are partly screened by a hedgerow with mature trees but some views of the Site remain (see Figure 13-5). The effects on the setting of the monument will be mitigated by the construction of a landscaped screening bund on the northern side of the Site facing the monument.

Figure 13-4: Drone view of ME014-019---- looking northwest

Figure 13-5: View from the southern bank of the ringfort ME014-019---- looking northeast to the Site.

The remaining Recorded Monuments in the study area are situated further from the Site and are considered too far distant to be directly or indirectly affected by the development (see Appendix 13-1 for recorded monuments in the study area).

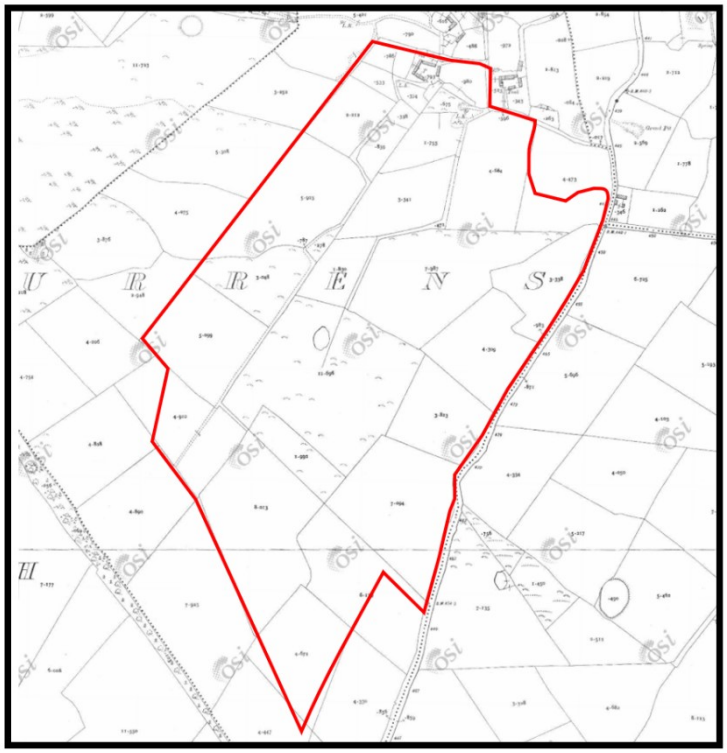
13.3.5.2 Sites and Monuments Record

Examination of the Sites and Monuments Record ('SMR') which is maintained by the Dept. of Housing, Local Government and Heritage on the 14th of January 2025 [143] indicated that there are no SMRs in the Site. There is one SMR in the study area (see Appendix 13.2). This is a Ringfort – rath (SMR ME014-033----) in Moylagh townland which is situated ca. 0.7km to the northeast. This is considered to be too far distant to be directly or indirectly affected by the development.

13.3.5.3 Cartographic Sources

Ordnance Survey 1st and 3rd edition six-inch maps and the first edition 25-inch maps of the area were examined. On the first edition 25-inch there are two lime kilns indicated in the northern part of the Site and structure No. 2 that have all been removed (See Figure 13-6).

Figure 13-6: First edition 25-inch with the Site indicated with the red line



13.3.5.4 Place name evidence

The place names were extracted from the cartography in order to facilitate the search for structures and monuments and small finds, to help identify any unrecorded monuments or structures, to search for any published papers and documents related to the study area and to assist in the study of the historical development of the area. The place names were looked up in the Placenames Database of Ireland at Logainm.ie [142] (see Table 13-2). The placenames refer primarily to topographical features and proprietors' names.

Table 13-2: Townland names in the study area

Townland name	Translation
Annagh	A marsh or morass
Baltrasna	Cross town
Ballany	Town of the marsh
Glenaward	Glen of the bard
Greenan	A sunny hill
Moylagh	A flat hill
Murrens	Beautiful hills. Thomasbridstown in 1619
Springhall	Originally Baile an tobair, town of the well

The placenames do not indicate any additional heritage sites within the study area.

13.3.6 Aerial Photography

Examination of the Ordnance Survey 1995, 1996-2000, 2001-2005, 2006-12. 2011-13 and 2013-18 aerial imagery as well as Google earth imagery from 2009, 2014, 2016, 2017, 2020, 2021, 2022 and 2024 and Bing imagery from 2016 did not indicate any additional cultural heritage sites in the Site.

13.3.7 Other Sources

Examination of archaeological corpus works on prehistoric artefacts ([144], [145], [146], [147]), and pottery ([148]) and Iron Age material ([149]) did not reveal any additional material in the study area**.**

13.3.8 Archaeological investigations

Examination of the Excavations Bulletin at Excavations.ie [150] [151] indicated that there have been no licensed excavations carried out on the Site or the study area.

13.3.9 Field Inspection

A Field inspection was carried out on the 6th of February 2025. This involved an inspection of all the lands in the Site (see Figure 13-1 and Figure 13-5). The Site is indicated on Figs. 13-1 and 13-7. The Site is the existing area of extraction which has been completely soil-stripped (see Fig. 13-8). There was no visible indication of any archaeological, architectural or cultural heritage material.

Figure 13-7: Google earth Aerial photo taken in 2024 showing fieldwork areas numbered.

Figure 13-8: Panoramic view of the Area 1, looking southwest.

13.4 Characteristics and Impacts of the Development

13.4.1 Construction and Operational Stage

13.4.1.1 Direct Effects

There is a negative, moderate and long term effect on the setting of a ringfort ME14-019---located in a field to the north of the Site. There will be no direct effects on any other known items of archaeology, buildings of special architectural heritage interest, or cultural heritage in the Site or the vicinity during the construction and operational phase of the development.

13.4.1.2 Indirect Effects

There will be no indirect effects on any known items of archaeology, buildings of special architectural heritage interest, or cultural heritage in the Site or the vicinity during the construction and operational phase of the proposal.

13.4.1.3 Interaction with other Effects

No interaction with other Effects has been identified.

13.4.1.4 Do Nothing Effect

The do-nothing impact does not arise.

13.4.1.5 Worst-case Effect

No worst-case scenario has been identified.

13.4.1.6 Cumulative Effect

No screened projects in the vicinity of the Site which may lead to cumulative effects have been identified and no cumulative effects arise.

13.4.1.7 Major Accidents

No effects on any known items of archaeology, buildings of special architectural heritage interest, or cultural heritage in the Site or the vicinity arising from unplanned events associated with the proposal have been identified by the assessment.

13.4.2 Closure Stage

13.4.2.1 Direct Effects

There will be no direct effects on any known items of archaeology, buildings of special architectural heritage interest, or cultural heritage in the Site or the vicinity during the closure phase of the proposal.

13.4.2.2 Indirect Effects

There will be no indirect effects on any known items of archaeology, buildings of special architectural heritage interest, or cultural heritage in the Site or the vicinity during the closure phase of the proposal.

13.4.2.3 Interaction with other Effects

No interaction with other effects has been identified.

13.4.2.4 Do Nothing Effect

The do-nothing effect does not arise.

13.4.2.5 Worst Case Effect

No worst-case scenario has been identified at the closure stage.

13.4.2.6 Residual Effects

After the proposed mitigation measures have been implemented there will be no residual effects on cultural heritage present within the application area or the vicinity.

13.5 Proposed Mitigation Measures / Factors

There is a negative, moderate and long-term effect on the setting of a ringfort ME14-019--- located in a field to the north of the Site. The effects on the setting of the ringfort ME014-019--- will be mitigated by the construction of a landscaped screening bund on the northern side of the Site facing the monument. No other effects on archaeological, architectural of cultural heritage have been identified and no mitigation is required.

13.6 Interaction with other Environmental Attributes

No interaction with other environmental attributes has been identified.

13.7 Monitoring

No additional monitoring will be required.

13.8 Reinstatement

See closure above.

13.9 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 Murrens Quarry within the Site and the overall Quarry Site 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 Site.

14.2 Assessment Methodology

This chapter describes the assessment methodology to assess the impact the quarrying / extraction activities at Murrens Quarry has on the surrounding road network. The assessment describes the existing situation at the Site in terms of access while also describing the existing situation and the existing situation on the external road network. The methodology adopted for this assessment is summarised as follows:

- 12-hour traffic counts were undertaken by IDASO on the 14th of January 2025. Count information was obtained from the existing R195 / L68185 priority junction, which provides access to the existing Site; and,
- Existing Traffic Assessment - A spreadsheet model was created which contains the base year do-nothing traffic count data described above. The traffic count data was used to develop a PICADY model of the existing R195 / L68185 priority junction.

14.2.1 Relevant Guidelines, Policy and Legislation

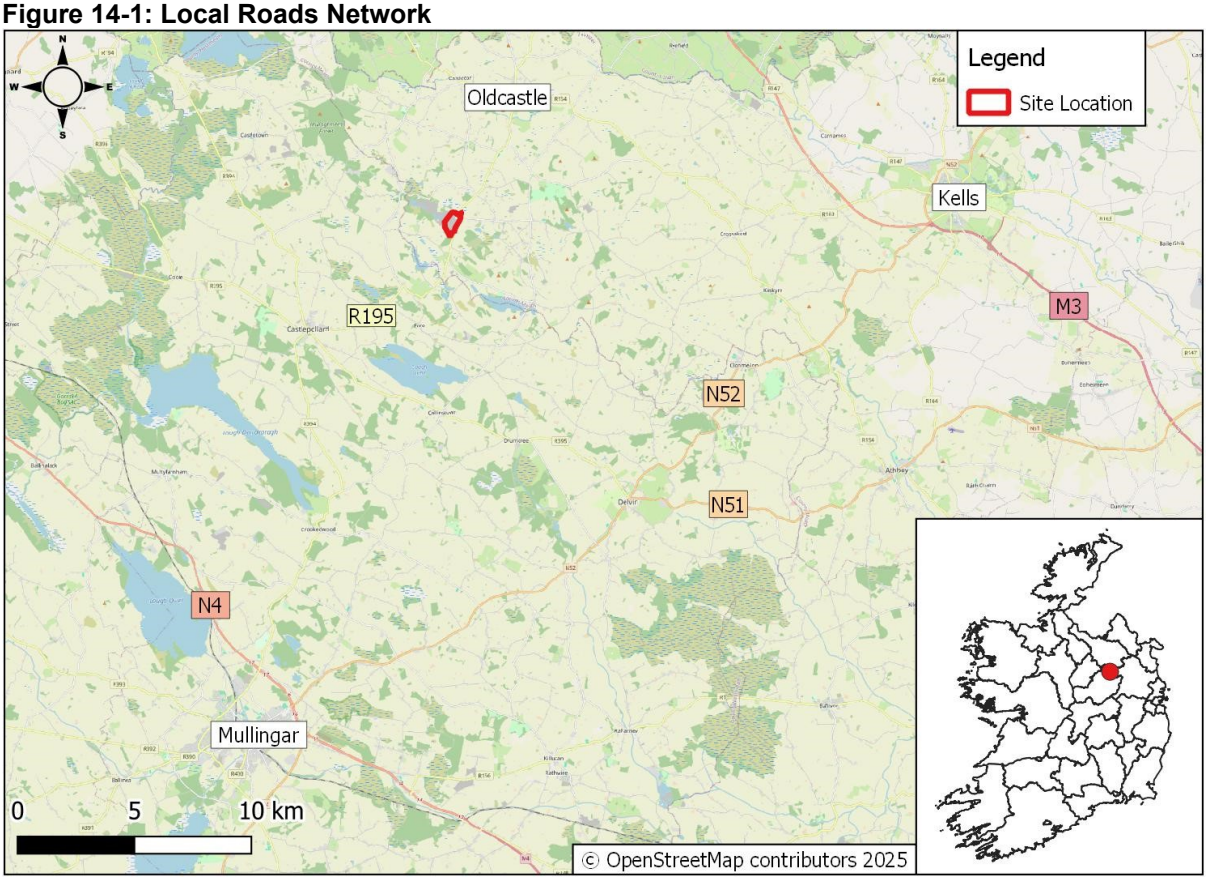
In undertaking this assessment, Roadplan Consulting has made reference to:

- The Meath County Development Plan 2021 – 2027 [20];
- The Institute of Highways and Transportation Guidelines on the Preparation of Traffic Impact Assessments [152];
- The Transport Infrastructure Ireland ('TII') Transport Assessment Guidelines [153] ; and,
- The TII National Traffic Model [154].

14.3 Receiving Environment

The existing road network within the vicinity of the Site is illustrated in Figure 14-1 below and is described further below.

Figure 14-1: Local Roads Network



14.3.1 Existing Road Network

Access to the existing Site is via the existing L68185 local road. The existing L68185 is a cul-de-sac that is approximately 200m in length and provides access to the existing quarry, a farmyard and a number of residential dwellings. The L68185 provides access to the R195 regional road.

The R195 regional road carries local traffic between Oldcastle and Castlepollard. A speed limit of 80km/h applies along the existing R195 regional road while no speed limit signs are provided along the L68185.

14.3.2 Existing Traffic Volumes

Traffic flows for the existing R195 / L68185 priority junction are provided in Appendix 14-1.

Table 14-1: R195 / L68185 Priority Junction – AM Peak

From / To	R195 (south)	L68185	R195 (north)	Totals
R195 (south)	0	1	54	**55**
L68185	1	0	4	**5**
R195 (north)	68	6	0	**74**
Totals	**69**	**7**	**58**	**134**

Table 14-2: R195 / L68185 Priority Junction – PM Peak

From / To	R195 (north)	L68185	R195 (south)	Totals
R195 (north)	0	4	59	**63**
L68185	5	0	0	**5**
R195 (south)	87	1	0	**88**
Totals	**92**	**5**	**59**	**156**

From the traffic counts, it is noted that the traffic flows along the existing R195 are low during the AM and PM peak hours.

During the 12-hour traffic count, it was noted that there were 16 HGVs entering the L68185 and 15 HGVs exiting the L68185, which provides access to the Site.

14.3.2.1 Staff Volumes

At present, the quarry currently employs ca. 9 full-time staff.

14.3.2.2 Working Hours

The existing quarry currently operates from 07:00 to 19:00 Monday to Friday and from 07:00 to 14:00 on Saturdays. No work is conducted on Sundays or Bank Holidays.

14.4 Remedial Impact Assessment

14.4.1 Operational Phase

A capacity assessment using the computer programme PICADY for the existing R195 / L68185 priority junction, which provides access to the development, has been carried out.

Full details and results of capacity assessments are contained in Appendix 14-2 – PICADY Results. The parameters shown in the tables are defined as follows:

- **Ratio of Flow to Capacity ('RFC')** is a factor indicating the flow on a junction arm relative to its capacity. An RFC of 1.0 means the junction has reached its ultimate capacity, and an RFC of 0.85 means that the junction has reached its reserve capacity;
- **Avg. Queue** is the average number of vehicles queued over the time period on the junction approach;
- **Queue delay** is the average number of seconds delay to each vehicle in the time period; and,
- **Total Delay** is the total number of vehicle hours of delay to all vehicles at the junction over the time period.

14.4.2 Existing R195 / L68185 Priority Junction

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the existing R195 / L68185 priority junction.

Table 14-3: R195 / L68185 Priority Junction - Peak Capacity Results

Year	Period	Approach	Predicted RFC value	Avg Queue (vehicles)	Queue delay (secs./veh.)
2025	AM Peak	R195 (south)	-	-	-

Year	Period	Approach	Predicted RFC value	Avg Queue (vehicles)	Queue delay (secs./veh.)
Base Flows		L68185	0.01	0	7
		R195 (north)	0.01	0	6
	PM Peak	R195 (north)	-	-	-
		L68185	0.01	0	9
		R195 (south)	0	0	6

The summary predictions shown in the table above indicate that the existing R195 / L68185 priority junction is operating within capacity with no queues and minimal delays during the AM and PM peak periods.

14.4.3 Cumulative and Indirect Impacts

Cumulative impacts associated with the Site were also assessed.

As the development is currently operational, there will be no increase in journeys during the Operational Phase of the Site. Therefore, there will be no change in cumulative traffic demand from the Site.

Indirect impacts relate to the transport of materials to and from the Site and are addressed throughout this chapter.

14.5 Mitigation and Monitoring Measures

HGV traffic can be of particular concern to both local residents and highway users, and the mitigation measures outlined below are designed to alleviate any adverse impacts:

- The Applicant will adhere to a routing policy to ensure all movements are made via the strategic road network to avoid HGVs passing through residential areas as far as is practical; and,
- The Applicant would employ a policy of safety and environmental awareness for all HGV drivers accessing the Site.

The Applicant will continuously monitor the routing policy to ensure all movements are made via the strategic road network to ensure that delays and impacts at key junctions are minimised.

14.6 Residual Impacts

The flow to capacity – RFC ratios of the junction, which provides access to the quarry, is significantly below its ultimate capacity. The local roads infrastructure has the capacity to cater for the past and current traffic loads, and therefore, the existing Site does not have a significant impact on the local road network infrastructure

14.7 Difficulties Encountered

No difficulties were encountered.

15 INTERACTIONS OF THE FOREGOING

The major interactions between the environmental impact topics are assessed within the above Chapters of this rEIAR. 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 rEIAR

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		X	✓	✓	✓	✓	✓	✓	X	✓
Biodiversity	X		X	✓	✓	✓	✓	✓	X	X
Land, Soils & Geology	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	X	✓
Acoustics (Noise & Vibration)	✓	✓	X	X	X	X		X	X	✓
Landscape & Visual	✓	✓	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	No Interaction
✓	Interaction

16 SCHEDULE OF COMMITMENTS

Table 16-1 outlines the environmental commitments which will be undertaken as part of the development.

Table 16-1: Schedule of Commitments

Commitment
General
The Site will comply with all relevant legislation and best practice to reduce any potential environmental impacts. HGVs leaving the Site will exit via the wheel wash and weighbridge. The Applicant will ensure that all personnel working on-site are trained and aware of the mitigation measures detailed within the rEIAR. Typical operational hours associated with the Site are: • Monday to Friday 07:00 – 19:00; • Saturday 07:00 – 14:00; and, • Sunday & Public Holidays Closed.
Biodiversity
General Measures The following mitigation measures were adhered to during the Substitute Consent application period and will continue to be adhered to throughout the Operational and Remedial phase of the Development to ensure compliance with wildlife legislation and to mitigate potential environmental impacts: • All activities to comply with relevant legislation and best practices to minimize potential environmental impacts. The mitigation measures outlined in this rEIAR and AA will remain fully adhered to; • The Site manager will ensure that all personnel working onsite are trained and informed of the mitigation measures outlined in this rEIAR and AA; • An ECoW will remain appointed for the remedial works and will be available should protected or notable species be encountered during operations at the Site; • Prior to works, all Site personnel will receive a toolbox talk regarding the mitigation measures outlined in the rEIAR, and AA. Everyone working on remedial elements of the must understand the role and authority of the ECoW; and, • The ECoW will inspect the Site before remedial works commence and will conduct inspections as required during the works to ensure compliance with the rEIAR and AA and all relevant wildlife legislation.
Protection Measures for Sand Martin Given the presence of suitable habitat for nesting sand martins, the following mitigation measures will be implemented:

Commitment
• All personnel operating onsite will be made aware of the presence (including the location) of sand martin nests onsite and the legal protection afforded to this species; • Annual monitoring for breeding sand martin by an experienced ornithologist will be undertaken. The resultant annual report will be submitted to the Planning Authority on an annual basis; • Areas where nesting activity is noted will be clearly marked to ensure disturbance is avoided and routinely monitored, making changes to these marked areas as necessary; • All exposed faces designated for excavation during the breeding season (1*st* March to 31*st* August) will be assessed for their potential to provide breeding sites by February each year under the advice of the ECoW. These areas can then be managed or worked in such a way as to make them unattractive to sand martin so that extraction can continue without interruption. These management procedures include reprofiling the quarry face to less than 45° or utilising netting to cover nest holes outside the breeding season. This will prevent sand martin from nesting / burrowing within the active areas onsite; • Old disused / inactive nests will be removed outside of the nesting season under the supervision of the ECoW, to ensure that no birds are utilising the nests, and the nests are fully removed; • Regular checks of the Site for evidence of sand martin nesting will be undertaken between March and April, particularly after quarry closures such as Easter; • Before the commencement of the nesting season, a suitable aggregate face for sand martins will be set aside. As the phased removal of the earth banks within the Site progresses, a sand martin embankment will be created to ensure active nesting habitat is retained as restoration progresses through the quarry, refer to Section 6.3.1 for further details. The sand martin embankment will be sited away from main activities; and, • Should sand martin be observed nesting within the works area, then the ECoW will be consulted for advice.
<u>Protection Measures for Peregrine Falcon</u> To ensure that peregrine falcon that may use the Site will be protected from the Development, the following measures will be implemented: • Regular checks of the Site for evidence of sand martin nesting will be undertaken between March and April, particularly after quarry closures such as Easter; • All personnel operating on-site will be made aware of the legal protection afforded to peregrine falcons and biodiversity signage will be erected throughout the quarry; • Should a peregrine falcon nest be identified on-site, all personnel operating on the Site will be made aware of the presence and location of the nest. Access will be restricted below cliffs which are actively being utilised by peregrine falcons. This will be done using fencing and / or other appropriate barriers; • Infrastructure will not be installed, nor any material stockpiled, within 25-50m of rock faces supporting peregrine falcon; • A buffer of 25-50m will be implemented from any identified peregrine falcon nests on-site. If stockpile removal works are required during the breeding season (1st March to 31st August), the ECoW will need to be consulted. This distance may be increased if this buffer is deemed insufficient and peregrine falcon becomes disturbed due to works on-site; • As part of the restoration plan for the Site, the quarry ledges will be left in place and unplanted. This will provide suitable breeding habitat for peregrine falcon; and,

Commitment

- An annual peregrine falcon monitoring programme will be established during the remedial phases of the Development to establish the potential effects, if any, of the Development on peregrine falcon. The findings of the monitoring will be submitted to Meath County Council, the National Biodiversity Records Centre and NPWS.

The mitigation measures that will be implemented on-site will ensure that the Development does not result in undue disturbances to peregrine falcons.

Protection Measures for Amphibians

In order to ensure that the works do not have adverse effects on amphibians, the following remediation / mitigation measures will be implemented:

- Amphibian surveys will be completed as per standard best practice for each of the water bodies in the Site;
- No works or alternates to the existing waterbodies will take place until amphibians have been confirmed as being absent;
- Vegetation clearance and ground stripping adjacent to the ponds will be supervised by the ECoW to ensure no adverse effects occur to any amphibians in the area;
- Should potential impacts to waterbodies confirmed as supporting amphibians be required, the NPWS will be consulted with regards to the requirement for a derogation licence
- Should amphibians be encountered on Site during the works, the 'ECoW' will be consulted for advice; and,
- Two new ponds will be constructed to compensate for the ponds removed as part of historical quarrying activities at the Site. In addition, hibernacula and habitat piles will be installed in the landscaped area around the two new ponds to support any potential amphibians in the area.

Land, Soils and Geology

The Applicant has indicated that mitigation measures completed at the Site were generally in accordance with the EPA (2006) Environmental Management Guidelines: Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [66], whereby;

- All plant and HGVs used were refuelled onsite, on a concrete plinth which flows into and adjacent 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 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 (interceptors located onsite) and removed from the Site for disposal or recycling.

As part of this application for substitute consent, the following mitigation measures should be implemented in relation to geology and soils:

- All plant and HGVs used will be refuelled at the Site 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;

Commitment
• Fuel (diesel) will be stored in a double-skinned tank in the Site in accordance with existing procedures; • Spill kits will be 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 Site for disposal or recycling.
Water
The Applicant has indicated that mitigation measures completed at the Site were generally in accordance with the EPA (2006) Environmental Management Guidelines: Environmental Management in the Extractive Industry (Non-Scheduled Minerals) [72], whereby; • All plant and HGVs used were refuelled onsite, on a concrete plinth which flows into 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 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 an underground waste oil interceptor and removed from the site for disposal or recycling. As part of this application for substitute consent, 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 be 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.
Air Quality
The following mitigation that were followed during Site Operation of the Development are: • The operation of a dust suppression system; • The operation of an overhead sprinkler system, located adjacent to the weighbridge to suppress dust arising via from traffic damping loads entering/leaving the Site;

Commitment
• Dry material stockpiles are avoided where possible and stored in sheds; and, • Recording any environmental incidents onsite relevant to dust emissions.
Climate
Given the relatively small activity, due to its nature, size, location and intensity of operations, mitigation measures were not considered to be required.
Noise and Vibration
Historic Noise Mitigation Measures 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 equipment/vehicles were throttled down or switched off when not in use; • Drop heights of material were minimised; • Where possible, plant and machinery was enclosed or cladded; and, • Internal routes were routed to minimise noise emissions from vehicles onsite. **Operational Phase – Noise** Plant operating hours will be from 07:00 to 19:00, Monday to Friday and 07:00 to 14:00 Saturdays. No activities will take place on Sundays or Public Holidays. 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; • Vehicle speeds will be kept below 15km/hr within the Site; • All plant equipment/vehicles are throttled down or switched off when not in use; and, • Internal routes are reduced in gradients and routed to minimise noise emissions from vehicles onsite.
Landscape & Visual
No mitigation measures are proposed in relation to the remedial Landscape and Visual Impact Assessment.
Cultural Heritage

Commitment
There is a negative, moderate and long-term effect on the setting of a ringfort ME14-019--- located in a field to the north of the Site. The effects on the setting of the ringfort ME014-019---- will be mitigated by the construction of a landscaped screening bund on the northern side of the Site facing the monument. No other effects on archaeological, architectural of cultural heritage have been identified, and no mitigation is required.
Material Assets – Traffic & Transport
HGV traffic can be of particular concern to both local residents and highway users, and the mitigation measures outlined below are designed to alleviate any adverse impacts: • The Applicant will adhere to a routing policy to ensure all movements are made via the strategic road network to avoid HGVs passing through residential areas as far as is practical; • The Applicant would employ a policy of safety and environmental awareness for all HGV drivers accessing the Site; and, • The Applicant will continuously monitor the routing policy to ensure all movements are made via the strategic road network to ensure that delays and impact at key junctions are minimised.

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