McTigue Quarries Ltd
Cartron Quarry, Tuam

REMEDIAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

to accompany a Planning Application for Substitute Consent for the continuation of quarrying operations and associated ancillary development and the unauthorised continued use of buildings, structure, plant and machinery

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PART I - INTRODUCTION AND PROPOSED DEVELOPMENT CONTEXT

1.0 PREAMBLE

This Remedial Environmental Impact Assessment Report (REIAR) has been prepared in accordance with the direction of An Bord Pleanála (the Board) dated the 10 July 2020 to accompany an application for Substitute Consent (SC). This direction was served by the Board via Order Number ABP-306155-19, made under s.177D of the Planning and Development Act 2000 (as amended) ('the Act'). The order confirmed that the Board was satisfied that an environmental impact assessment (EIA) and Appropriate Assessment (AA) is required in the light of the scale and nature of the quarrying and processing activities that have been carried out.

The order also confirms that exceptional circumstances exist such that the Board considers it appropriate to allow the opportunity for regularisation of the development by permitting leave to make an application for SC. A copy of the Order is provided in Appendix 1.1.

The Application being submitted to the Board for SC, is for all the winning and working of minerals, processing and associated activities which have occurred within the applicant's lands during the period between the previous grant of SC for the site in January 2015 (Ref 07.SU.0036) and present day ('the SC period').

The site is located in the Townland of Cartron some 7 kilometres to the south west of Tuam. The site is comprised of a c. 8.46ha L-shaped limestone quarry. The site is bounded to the north, east and south by agricultural fields. Immediately to the west lies another quarry, known Mortimer's Quarry. The location of the site's application area (shown in red), the Applicant's landownership (shown in blue) and the extents of the adjacent quarry, known as Mortimer's Quarry (shown in yellow) can be seen from Figure 1.1 overleaf.

Figure 1.1 Application Area, landownership and adjacent quarry

The application seeks the regularisation of buildings and structures that Galway County Council (Galway Co. Co) consider to be unauthorised. The unauthorised structures include an extension to existing garage/workshop approved under planning ref no. 06/3299; and additional workshop/ storage unit; 2 no. oil tanks; a canteen; a pumphouse; and a water tank.

The remainder of the buildings and structures situated in the north eastern part of the site (a Workshop, weighbridge and wheelwash) are authorised by a standalone planning consent granted by Galway Co. Co. in May 2007 (Ref 06/3299, held at Appendix 1.2). It is considered that the continued operation of the quarry and the

associated buildings/ structures require environmental impact assessment as a single project.

It is understood that the Board will only consider an SC application and can only grant planning permission in terms of the extant operations on site and applied for at the time of submission[1], therefore excluding future development.

1.1 Planning History

1.1.1 Overview

The quarry has an extensive planning history with quarrying commencing at the site by the McTigue family in 1954. Relevant planning history relating to the site is outlined below:

- **Planning Application Ref 06/3299-** Permission granted by Galway Co. Co. on the 21st of May 2007 for the retention of (a) garage/workshop, (b) wheelbase washing unit and c) a weighbridge subject to 3 conditions.

- **Planning Registration (PA Ref QY 71)**- The site was registered under Section 261 with 14 conditions, which are standard in nature on the 27th of April 2007.

- **Substitute Consent (An Board Pleanála Ref 07.SU.0036)**- The existing quarry was granted substitute consent subject to 6 conditions on granted 5th January 2015**.**

[1] The Board's interpretation of S/C provided by Assistant Director Philip Jones on 25 October 2012

1.1.2 Substitute Consent

As outlined above, Galway Co. Co. under the provisions of Section 261A of the Planning and Development Act 2000 (as amended) determined that development of the quarry had taken place post 1990 and would have required an EIA. The Council decided that the quarry commenced operation before 1 October 1964 and on that basis, it issued a notice under Section 261(A) (3) (a) requiring the quarry owner to apply for SC with the notice being issued on 2 August 2012.

McTigue Quarries applied for SC in May 2013 accompanied by a remedial Environmental Impact Statement (REIS) and remedial Natura Impact Statement (rNIS). This was subsequently approved by An Bord Pleanála in January 2015 under the reference number 07.SU.0036.

The Board Direction stated that with regards to the AA which was submitted as part of SC application that:

"*Having regard to the nature, scale and extent of the development for which substitute consent is sought, the remedial Natura impact statement submitted with the application, the submissions on file and the inspector's assessment, the Board completed an appropriate assessment of the impacts of the proposed development on Natura 2000 sites. The Board concluded that, on the basis of the information available, the subject development, either individually or in combination with other plans or projects, has not adversely affected and is not adversely affecting the integrity of any European site, having regard to the conservation objectives of those sites*".

In relation to the EIA for the application, the Board:

"concluded that the remedial Environmental Impact Statement submitted identified and described adequately the direct and indirect effects on the environment of the development. The Board considered that the Inspector's report was satisfactory in addressing the environmental effects of the subject development and also agreed

with its conclusions in relation to the acceptability of mitigation measures proposed and residual effects. The Board adopted the report of the Inspector and decided that the subject development would not be likely to have had/or have a significant effect on the environment".

Copies of the Inspector's report and associated Board direction and Order are provided as Appendix 1.3.

Post SC, the Applicant held the belief that extraction consent had been granted in line with the REIS proposal and continued to extract material and operate the quarry. As a result, An Taisce then served a notice under s.160 of the Planning and Development Act 2000 (as amended) that resulted in a High Court appearance.

The High Court held that the continued operation of the quarry was unauthorised development, but it refused to grant an injunction under Section 160 of the Planning and Development Act 2000 restraining its operation, instead remitting the matter for further enforcement to Galway Co. Co. An Taisce appealed the refusal to make the Section 160 order and similarly McTigue Quarries appealed the finding that the continued extraction at the quarry was unauthorised.

The case was propelled to the Supreme Court and on the 12 December 2018 the Supreme Court ruled that the appeal be allowed and that said Order of the High Court be set aside on the issue of the grant of the Order pursuant to Section 160 of the Planning and Development Act, as amended, which required McTigue Quarries Ltd to cease all unauthorised development within 6 months, including all works for the extraction of stone and gravel, the carrying out of rock and gravel processing activities, the loading of materials, and the transportation of said materials from the quarry and all related ancillary works on lands at Cartron Quarry. A copy of the Supreme Court judgement is held at Appendix 1.4. Pursuant to the Order, all mineral extraction operations at the site ceased on 11th June 2019 .

1.1.3 Leave to Apply for Substitute Consent

Following the Supreme Court Decision, in December 2019 McTigue Quarries sought the Board's approval to apply for SC under Section 177C(1) and specifically subsections 177C(2)(b) of the Act in order to regularise development that had been undertaken at the quarry since the granting of SC in January 2015.

The Board determined the application favourably on the 9th July 2020 and granted leave to submit a SC application for the site within an allocated timeframe of 6 months. An extension of time pursuant to Section 177E(4) of the Act was granted by the board on 15th December 2020 extending the final date for the making of an application for SC to 15th June 2021.

1.1.4 Enforcement

An Enforcement Notice ('EN') Ref EN09/098, dated 11th November 2009 (appended at Appendix 1.5) was served upon the Applicant by Galway Co. Co under Section 154 of the Act. The notice relates to the following development:

- Unauthorised oil storage tanks;
- Unauthorised office;
- Unauthorised extension to existing garage/workshop approved under planning ref no. 06/3299; and
- Unauthorised additional workshop/ storage unit.

The applicant sought to regularise the development listed within the EN and additional development (pumphouse, canteen, water tank and lime crushing enclosure) by including them within the project for the purposes of the remedial EIS and remedial Natura Impact Statement and within the SC application, in the form of plans and elevations. However, as a result of an administrative error at the point of submission, the structures were not referenced within the Proposal Description on the application forms or in the public notices, therefore the Board were not at liberty

to extend the consent to cover these structures, as discussed at paragraph 7.8 of the Inspectors Report.

The office and all but two of the oil storage tanks referenced in the EN have since been removed. This SC application seeks to regularise the remaining buildings and structures as referenced in the EN and the additional structures as specified above.

1.2 Legislative Context for EIA

The legislative context for the planning application accompanied by an Environmental Impact Assessment Report (EIAR) is derived from the European Communities Directive 85/337/EEC as amended by Directive 92/11/EU on the assessment of the effects of certain public and private projects on the environment.

However, the newly named, since the last substitute consent application, reporting system has developed because the European Union has adopted a new Directive (2014/52/EU) (The Directive) in relation to Environmental Impact Assessment (EIA). The Directive was published in the Official Journal of the EU on 25th April 2014 and is in force.

The Directive sets out a wide range of changes to the previous EIA Directive (2011/92/EU). The changes have been transposed into Irish law via Statutory Instrument No. 296 of 2018- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 that provides for amendments to the planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001 (as amended) (‘the Regulations’). This REIAR has been prepared in accordance with the amended Act and Regulations.

Schedule 5 Part 2 of the Regulations implements Annexes I and II of the EIA Directive into Irish law and provides the following “thresholds” in respect of the extractive industry and infrastructure projects, so that an EIA is required in respect of, or against which an EIA determination is required :

2. Extractive Industry

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

There is no specific guidance in relation to the preparation of a REIAR, however, section 177(F)(1) of the Act outlines that such a document shall contain:

(a) a statement of the significant effects, if any, on the environment, ***which have occurred*** *or* ***which are occurring*** *or* ***which can reasonably be expected to occur*** *because the development the subject of the substitute consent was carried out[2];*

(b) details of—

i. any appropriate remedial measures undertaken or proposed to be undertaken by the applicant for substitute consent to remedy any significant adverse effects on the environment;

ii. the period of time within which any proposed remedial measures shall be carried out by or on behalf of the applicant;

(c) such information as may be prescribed under section 177N.

(1A) The remedial environmental impact assessment report shall be prepared by experts with the competence to ensure its completeness and quality.

Furthermore s.177E(4)(A)(a) of the Act, relating to the Boards evaluation of REIAR, reflects the general requirement under s.171A that:

'The Board shall consider whether a remedial environmental impact assessment report submitted under this section identifies and describes adequately **the direct and indirect significant effects** on the environment of the development.' [3]

[2] Emphasis Added

[3] Emphasis Added

In the absence of any specific guidance on the production of REIAR it is considered appropriate to reference the requirements of the Act and the Regulations along with the general requirements, as far as they are applicable, of the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018 ('the Guidelines') and the Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports - August 2017 (EPA Guidelines).

In preparing this application and accompanying REIAR it is considered essential to take in to account the environmental information for the quarry that has been considered previously by the Board in the assessment of the previous SC application. This has been considered to be representative and acceptable information to provide an accurate environmental baseline for the site. Reconsideration of this period is not necessary with the environmental baseline established via the granting of SC. This is an appropriate approach to avoid unnecessary duplication of information and is recommended by regulation 222A of the Regulations.

1.3 REIAR Format and Structure

It is considered that the most appropriate method /structure, for ease of reporting and also reading, is one that provides analysis of the potential for significant environmental effects under each individual heading, as prescribed by the Regulations.

In addition to the above general basis of production of a REIAR, the Board have advised previous guidance to the author with respect to this and other substitute consent application cases, as follows:

The "matters for inclusion" in an EIAR are outlined in Section 4.2 of the Guidance and Article 5(1)(A) to (f) of the Directive, the overall structuring and scope of the Report has regard to the informational requirements of the Directives and Irish Statutory Regulations.

This REIAR is produced in the Grouped Format Structure and is compiled and presented in as transparent and as open a manner as possible. The various authors involved in its compilation have attempted to present their findings and recommendations in a clear and unambiguous fashion. The REIAR comprises two separate parts, The Non-Technical Summary and the Main Report. The Main Report is accompanied by a number of technical appendices.

Non-Technical Summary

The Main Report

Section 1 The preamble outlines the background and terms of reference for the REIAR and outlines the format and the assumptions that underpin the statement.

Section 2 Review of the reasonable alternatives considered by the applicant and the scope of the assessment with respect to the site's particular characteristics.

Section 3 describes the features of the progression of the unauthorised development from 2015- present.

Section 4 defines the planning and development context in which the planning application is assessed.

Sections 5-16 incorporates the main body of the REIAR and outlines the aspects of the environment likely to have been significantly affected by the development and the interrelationship of each discipline, as identified in the Regulations:

population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and the landscape.

As the REIAR is produced in the Grouped Format Structure, this approach can lead to certain topics, such as human health, being covered to varying degrees in most of the individual Sections, whereas other specific areas required under legislation fall almost exclusively into one Section. For those aspects of the environment likely to be significantly affected by the development, that fall neatly into one or two sections the sections within which they are covered are shown in Table 1.1.

Section	Heading	Aspects Required to be covered under the Regulations
5	Geological Assessment	Soil – Material Asset
6	Water Environment	Water
7	Air Quality & Climate	Air – Human Health
8	Noise and Vibration	Human health – Material Assets
9	Landscape	Landscape
10	Extractive Waste Management	Landscape – Material Assets
11	Ecology	Biodiversity
12	Traffic Impacts	Population – Human Health
13	Soil - Natural Resources	Soil
14	Socio-Economic Impacts	Population
15	Cultural Heritage	Cultural Heritage
16	Interactions	Inter-relationship of above factors

Table 1.1 Sections within EIAR that cover the Aspects Required to be covered under the Regulations

1.4 REIAR Baseline

The requirement for this SC application has been determined by:

a. The continuation of unauthorised quarrying operations post the previous granting of SC in January 2015; and
b. The erection of buildings and unauthorised structures in the north eastern part of the site which the Board were not at liberty to extend the previous SC to due to an administrative error at the point of submission;

and the need to regularise the same.

This need to regularise the same has been exemplified via Galway Co. Co.'s refusal to accept a recent planning application at the quarry made under section 34 of the Act. In this instance, the Applicant sought to apply for planning permission under Section 34 of the Act for the retention and continued use of structures associated with quarrying operations (Application Ref: 20/1547). The application was deemed invalid with Planning Authority confirming via a letter dated 15th December 2020, that it could not consider the application, citing Section 34(12) of the Act. A copy of the letter is appended at Appendix 1.6.

It is considered by the Applicant and as agreed by the Board, via the grant for leave to apply for SC, that they are satisfied that the erection of the structures, in combination with continued quarrying activities as a single project would have triggered a requirement for an EIA and an AA.

Quarrying operations between 1st February 1990 and 5th January 2015 did not result in any significant effects upon the environment. Similarly operations carried out between 26th February 1997 and 5th January 2015 has individually and in combination with other plans or projects not adversely affected the integrity of the European site concerned having regard to its conservation objectives. Both of the conclusions are confirmed via the Board's granting of SC in January 2015, as detailed at earlier at Section 1.1.2.

The construction and erection of the buildings and structures in the north eastern part of the site forms part of the baseline study of the site, assessed via the previous REIS. The impacts associated with the same were assessed within the previously accepted REIS and RNIS. Given that both documents included the buildings and structures within the project description, that the same were assessed as part of the overall EIA/AA projects and that the assessments were considered acceptable by the Board, it is concluded that the buildings have not resulted in any significant effects upon the environment or affected the integrity of European sites.

Given the above, it is considered reasonable to conclude that the impacts associated with the buildings/ structures that were considered acceptable in 2015, would therefore otherwise have been regularised by virtue of the previous SC for the site, save for the administrative error and their continued presence on site bringing no additional impacts.

The impacts associated with quarrying operations and the erection of the buildings/ structures are deemed to have been acceptable at the time of grant of the previous SC at the site. As such, this date forms the baseline against which the EIA reporting will be assessed.

Post January 2015 forms the period during which 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 substitute consent was carried out;

will be assessed.

Mineral extraction operations at the site ceased on 11th June 2019 in line with the Supreme Court Order dated 12 December 2018, referenced at Section 1.1.2. It is considered that the 5th January 2015 baseline up to the date upon which extraction ceased (11th June 2019) provides for the period of assessment of impacts that **have occurred**.

The period post 11th June 2019 until the present allows for the assessment of impacts **that are occurring**.

The final stage of the assessment will cover the remedial impacts that can **reasonably be expected to occur** in providing restoration and post restoration of the site.

1.5 Difficulties Encountered whilst preparing the REIAR

A small number of difficulties have been encountered in the preparation of the REAIR as outlined below:

- Limited specific guidance on production of REIAR and baselines leading to application of generic guidance and reference to legislative requirements;
- Limited timeframe in which to apply for SC meant that the collation of some data (e.g. hydrological and hydrogeological data) has been limited.

1.6 Competent Experts

The production of this REIAR has been project managed by Chris Tinsley BA (Hons), DipTP, MRTPI of Quarryplan Limited, who has a proven track record of delivering planning and environmental projects, development plan representations and planning appeals. Chris has a proven record of managing EIA development projects, project managing, producing expert environmental statements/ reports and providing supporting environmental information to accompany regular planning

applications, with specialist additional expertise in the area of minerals and renewable energy projects.

The REIAR has been reviewed by Andrew Scurfield BSc MRICS, Chartered Mineral Surveyor and Director at Quarryplan. Andrew has 30 years' experience in contributing to and Project Managing Environmental Impact Assessments to accompany Mineral Extractive Projects.

The individual sections of this REIAR and/or specialist reports, held within Appendices, have been included in their entirety or summarised by the contributor for ease of reading, however, the full reports, where applicable, are held within the Appendices.

Provided overleaf is the details of the specialist contributor to each Section of the REIAR, in the instance where a section has been prepared by a specialist contributor, the authors name, qualifications and experience is provided within the relevant section or in any appended assessment, where relevant.

Where no specialist contributor is specified or referenced within a Section, then that section has been compiled and reviewed by both Chris Tinsley and Andrew Scurfield of Quarryplan, whose combined expertise and expertise with regards to mineral extraction planning matters is referenced above.

The specialist reports include assessments of baseline conditions; past and existing impacts; the magnitude and significance of those impacts and proposed mitigation measures, where necessary. This approach is considered to be compliant with the national legislation with respect to EIA.

Section	Heading	Specialist Contributor
1	Preamble	Chris Tinsley BA (Hons), MRTPI (Senior Town Planning Consultant), Quarryplan
2	Alternative Location and Project Scoping	Chris Tinsley BA (Hons), MRTPI (Senior Town Planning Consultant), Quarryplan
3	Project Description Restoration/Landscaping Planting Proposals	Chris Tinsley BA (Hons), MRTPI (Senior Town Planning Consultant), Quarryplan Pete Mullin, Mullin Design Associates BA (Hons) CMLI
4	Planning Policy Framework	Chris Tinsley BA (Hons), MRTPI (Senior Town Planning Consultant), Quarryplan
5	Geological Setting	Chris Tinsley BA (Hons), MRTPI (Senior Town Planning Consultant), Quarryplan
6	Water Environment	Henry Lister BSc MSc – Hydrogeologist BCL Hydrogeologists Limited
7	Air Quality & Climate	Chris Tinsley BA (Hons), MRTPI (Senior Town Planning Consultant), Quarryplan
8	Noise & Vibration	Mervyn Keegan, AONA B.Sc., M.Sc.
9	Landscape	Pete Mullin, Mullin Design Associates BA (Hons) CMLI
10	Waste Management	Chris Tinsley BA (Hons), MRTPI (Senior Town Planning Consultant), Quarryplan
11	Ecology	Will Woodrow, MSc. MCIEEM, CEcol Woodrow Sustainable Solutions
12	Traffic Impacts	Chris Tinsley BA (Hons), MRTPI (Senior Town Planning Consultant), Quarryplan
13	Natural Resources (Soil Survey)	Chris Tinsley BA (Hons), MRTPI (Senior Town Planning Consultant), Quarryplan
14	Socio-Economic Impacts	Chris Tinsley BA (Hons), MRTPI (Senior Town Planning Consultant), Quarryplan
15	Cultural Heritage	Chris Tinsley BA (Hons), MRTPI (Senior Town Planning Consultant), Quarryplan
16	Interactions	Chris Tinsley BA (Hons), MRTPI (Senior Town Planning Consultant), Quarryplan

Table 1.2 Specialist Contributors to REIAR

1.7 Trans-boundary Issues

The Site is located a considerable distance from the national boundary between Northern Ireland and the Republic of Ireland, it has been concluded that there will be no areas where there is a potential for trans-boundary effects.

2.0 REASONABLE ALTERNATIVES AND PROJECT SCOPING

It is recognised within both the Act, the Guidelines and Draft Guidelines on the Information to be contained in EIAR produced by the EPA August 2017 (which reflects the requirements of the Directive) that:

*'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.'* [4]

Indeed the Guidelines recognise at paragraph 4.13 that:

"For example, some projects may be site specific so the consideration of alternative sites may not be relevant."[5]

Furthermore, s.177D and s.177E are intrinsically linked to the SC process, it arguably removes the potential for alternative site consideration as the legislation directs an applicant to, and indeed is only applicable to the site in question, rendering the alternative site element of the REIAR redundant.

It is considered that the Board in arriving at their direction under s.177D, have determined that the project satisfies the parameters of exceptional circumstances and has determined that the extant development, is the one for which an application is to be made and therefore provides no leeway for alternative developments.

The requirements of Section 177K (1A) of the Act are however noted whereby the legislation states that the Board shall not grant substitute consent (whether subject to conditions or not) unless it is satisfied that exceptional circumstances exist that would justify the grant of such consent by the Board.

[4] Planning and Development Regulations 2001 as amended - Schedule 6 – Emphasis added.

[5] Page 27 Guidelines for Planning Authorities and AnBord Pleanala on carrying out EIA, August 2018.

The legislation at Section 177K goes on to state that when deciding whether or not to grant substitute consent, the Board shall not be bound by, take account of, or otherwise have regard to, any decision of the Board under section 177D as to the existence of exceptional circumstances in relation to an application under section 177C.

Therefore, whilst the project was considered to satisfy the parameters of exceptional circumstances, as confirmed via the grant of leave to apply, the matter must again be addressed and assessed via this SC application.

As detailed in the accompanying SC Application documentation, the project is considered to satisfy the parameters of exceptional circumstances.

The SC process (including the Leave to Apply process) is site-specific and therefore provides no leeway for alternative developments. It is considered that the information provided herein, demonstrates compliance with the requirements of the EIA Directive, regarding alternatives, as transposed into Irish Planning law.

2.1 Scope of the Environmental Impact Study

Legislation and guidelines outline that the scope of an EIAR needs to be determined by evaluating the aspects of the environment likely to be significantly affected by the development with reference to the following categories and their inter relationship.

- **Human Health**
- **Biodiversity**
- **Population**
- **Soil**
- **Water**
- **Air**
- **Climate**
- **Material Assets**

- **Cultural Heritage**
- **Landscape**

This REIAR considers the potential significant effects and consequences on the environment of the development both in the past, currently and in the future and assesses whether such effects are:

- Direct or indirect;
- short, medium or long-term;
- reversible or irreversible;
- beneficial or adverse.

Where significant adverse effects are identified a description of the measures necessary to avoid, reduce or remedy these effects is provided (mitigation measures).

To determine the environmental aspects that should be addressed within this REIAR, each of the main activities within the development were examined and potential impacts arising from those activities were identified, together with receptors of any such impacts. The main site activities, impacts and receptors are all identified within Table 2.1 below.

Extant Activity	Potential Source of Impact (alphabetical order)	Potential Receptors (Alphabetical Order)
Construction and operation of the structures in the north eastern part of the site.	Air Landscape Noise Traffic	Human Health Landscape Population
Drill and Blast Crush and Haul	Air Noise	Air Quality Ecology Human Health Landscape Water Environment
Transport to and from site	Traffic	Human health / Population
Restoration and afteruse	Land use Visual	Landscape Ecology Population Water Environment

Table 2.1. Site Activities, Impacts and Receptors

From the identification of potential impacts and receptors, a scoping matrix has been compiled which gives a clear indication of the main impacts to be assessed within this EIA. The scoping matrix is set out below in Table 2.2 and has been prepared in response to the various elements given detailed consideration in the Inspector's Reports associated with the remedial EIA undertaken by the Board in assessment of the previous SC application at the site.

Table 2.2. Scoping Matrix

Potential Source of Impact	Potential Receptor						
	Agriculture	Archaeology	Humans	Landscape	Water Environment	Ecology	Air Quality
Overburden	✓	✓	✓	✓	✓	✓	✓
Stockpiling							
Drill & Blast	✓	✓	✓	✓	✓	✓	✓
Visual			✓	✓			
Noise			✓			✓	
Dust	✓		✓	✓	✓	✓	✓
Traffic			✓				✓
After-use	✓		✓	✓	✓	✓	

The importance of keeping REIAR's as tightly focused as possible, is recognised by legislation when requiring reference to preceding EIA documentation. This objective can be further achieved by avoidance of duplication of optimised assessments and by focusing upon the "Likely and Significant" effects of a development. These elements need to be discussed in detail whereas other issues, with little or no significance, may require only a brief investigation. This will indicate that an area has been given due consideration but has been rejected from requiring a full investigation.

The environmental elements chosen for commissioning of renewed specialist reports and updating with detailed scrutiny are as follows:

Ecology (Flora and Fauna)
Landscape
Water Environment (Surface and Groundwater)
Noise and **Vibration (Blasting)**

Other areas that are considered less significant or have no potential for change since previous assessments were considered include, **Material Assets / Geology, Traffic, Cultural Heritage, Soils, and Human Beings.**

Separate reports have been prepared for each of the significant elements by specialist consultants (experts), whilst analysis of the previous assessments and the Board's commentary on the same have been undertaken by the REIAR author and presented against the relevant standards for assessment, for example, standards provided for within the Quarries and Ancillary Activities ,Guidelines for Planning Authorities - April 2004.

Each report considers the following:

- baseline study;
- identifying potential impacts past and future
- predicting and evaluating the magnitude and significance of those impacts;
- proposing mitigation measures, where necessary.

The remit of an EIAR is to consider all environmental aspects, which could experience impact from the development, from which the identification of mitigation measures can be undertaken.

The purpose of the mitigation measures is to ensure that the development could be undertaken without creating any significant or unacceptable adverse impacts on the environment or amenity of the area going forward.

2.1.1 Impacts related to risks of major accidents and disasters

The Directive requires "a description of the likely significant effects of the project on the environment resulting from, inter alia:
(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters).

Given that this report is prepared in the Group Format, where such a potential exists it will be covered in the individual report. However, Annex IV point 8 of the Directive further outlines that:

"(8) A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability to risks of major accidents and or disasters ***which are relevant***[6] *to the project concerned….Where appropriate, this description should include… details of the preparedness for and proposed response to such emergencies."*

Consideration has been given to this specified requirement under the relevant legislation and it is considered given that the project is to all intents and purposes complete and that the restoration concept for the site to be restored primarily to calcareous grassland established. It has been determined that major accidents and response plans are covered to an appropriate degree in the individual sections of this REIAR and that disasters are not relevant to this project.

[6] Emphasis added

3.0 PROJECT DESCRIPTION

This REIAR accompanies the substitute consent planning application submitted to the Board (SC) for Cartron Quarry, Co. Galway. The application covers all activities at the site between the previous grant of SC for the site in 2015 and present day, to include all operations up until June 2019.

The application and development description also includes ancillary structures and building in the north eastern part of the site. These structures were previously included within the original REIS but unfortunately were not referenced in the development description or public notices and were therefore omitted from the previous grant of permission.

As previously outlined, the site is located in the Townland of Cartron some 7 kilometres southwest of Tuam. The site is bounded to the south by Mortimer's Quarry, and to the north, east and west by agricultural fields. The precise location of the site's application area can be seen from Figure 3.1.

Figure 3.1 Substitute Consent Application Area

3.1 Previous Site Activity in the Context of a Substitute Consent Application

As outlined earlier in this REIAR the Board have granted leave to apply for SC and the baseline and format of the report has been detailed.

The Author through previous experience of such matters and discussions with the Board is aware that the general content of a REIAR must adhere to the legislative requirements as outlined in Schedule 6 of Planning and Development Regulations 2001 (as amended) and also it is appropriate to reflect the Guidelines and the EPA Guidelines as previously intimated in Section 1.2.

There is no specific guidance in relation to the preparation of a REIAR, however, Section 177(F)(1) of the Act outlines that such a document shall contain:

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 substitute consent was carried out;

a) details of—
   i. any appropriate remedial measures undertaken or proposed to be undertaken by the applicant for substitute consent to remedy any significant adverse effects on the environment;
   ii. the period of time within which any proposed remedial measures shall be carried out by or on behalf of the applicant;

Furthermore the Board's evaluation of REIAR will reflect the general requirement under s.171E that:

'The Board shall consider whether a remedial environmental impact assessment report submitted under this section identifies and describes adequately the **direct and indirect significant effects** on the environment of the development.'

In order to address the effects that have occurred since the unauthorised development in early 2015 which it is understood constitutes the updated baseline for the unauthorised structures and the appropriate baseline for the quarrying operations, it is considered appropriate to reference previously accepted environmental assessments of activities at the site and aerial photography before addressing the impacts that are occurring and might reasonably be expected to occur.

Given the relatively recent nature of the unauthorised development that triggered the requirement for this SC application, the development progression is accurately documented in the aerial imagery. The specific potential impacts of the development will be considered in the individual headings as prescribed by the Regulations, as far as is applicable and practicable. The imagery is from a range of source including Ordnance Survey Ireland, Google Earth Imagery and Site Surveys and orthophotographs arranged by the Applicant. The imagery is provided to illustrate and corroborate the timeline involved and to provide confirmation of the nature and extent of the physical changes that took place during the period from 2015 to present time, with reference to the whole Cartron Quarry site.

3.1.1 “Have occurred”

In terms of the s177(F) legislative requirements it is considered that with reference to the buildings and structures and ancillary developments in the north eastern part of the site, this baseline for the assessment of impacts that have occurred is from the date on which SC was granted for the site. Whilst excluded from the previous grant of SC due to a drafting error by the applicant’s then agent, the buildings and structures were included with the remedial EIA project and for which, the conclusions of the same were accepted by the board and SC granted. Given that the effects of the buildings and structures have been previously assessed within the previously approved REIS for the site, it is not considered necessary to re-visit the impacts over this period.

With regards to the quarrying operations aspect of the SC application, any further quarrying post the granting of SC on 5th January 2015 would have been unauthorised. Mineral extraction operations ceased on 11th June 2019.

Therefore the applicable period for the assessment of impacts that **have occurred** in relation to the buildings and structures on-site and that associated with the unauthorised quarrying operations is **16th January 2015 until 11th June 2019.**

3.1.2 "Are occurring"

Mineral extraction operations at Cartron Quarry ceased on 11th June 2019. Therefore the applicable period for the assessment of impacts that **are occurring** in relation to the use of the buildings and structures on-site and any impacts associated with the unauthorised quarrying operations is **11th June 2019 to present.**

3.1.3 "Reasonably expected to occur"

The final stage of the assessment is to consider the significant effects, or impacts, that can **reasonably be expected to occur** as a result of the development for which substitute consent is required. There are considered to be two outcomes which can be reasonably expected to occur in this respect:

The first being that the site is restored. This would comprise of the removal of all buildings, plant and machinery the utilisation of existing soil making material available on-site in the to provide suitable conditions for grassland, hedgerow and woodland planting. A restoration concept for this scenario is provided at Appendix 3.1.

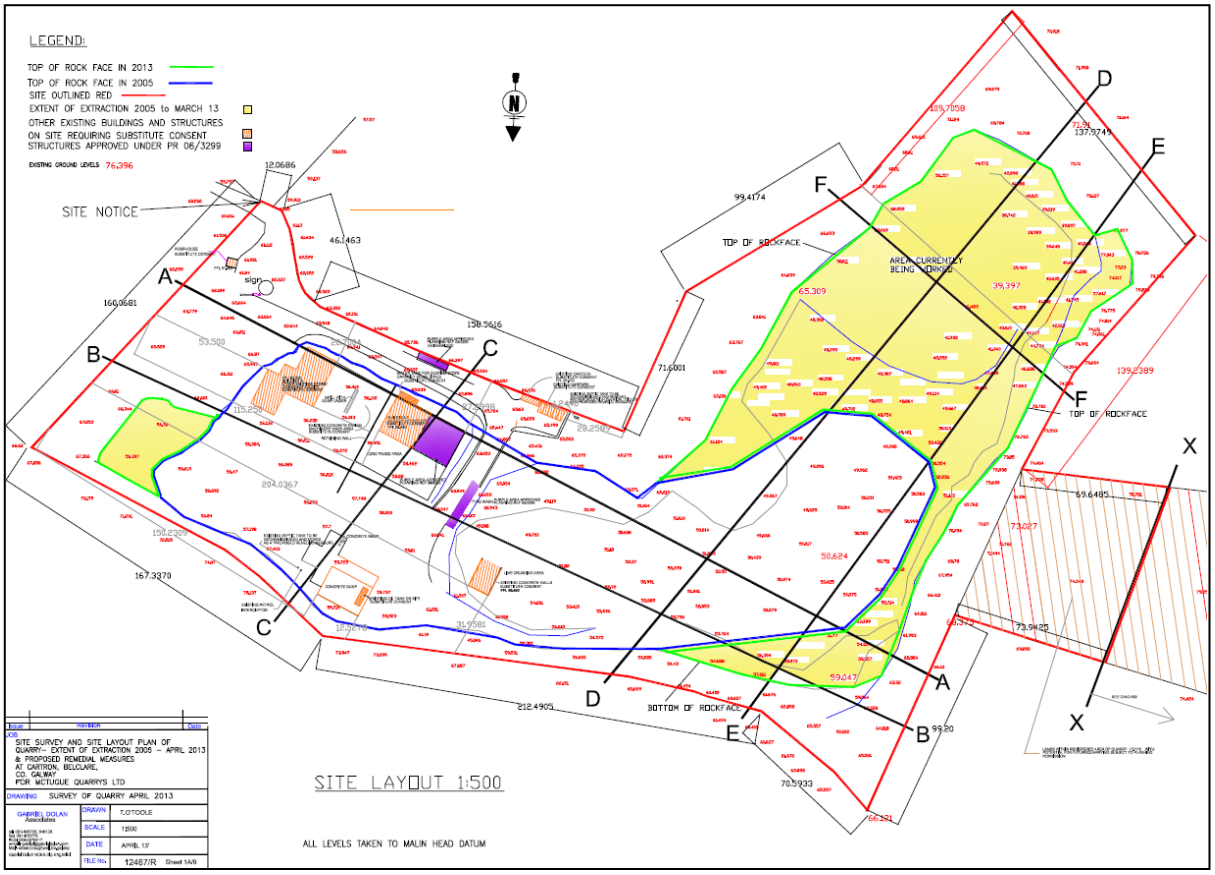
The alternative scenario which may be reasonably expected to occur is that the applicant seeks planning permission under Section 34 of the Act to make best use of the naturally occurring, finite mineral resource at the site via the continued quarrying of the same.

The quarry has been within the applicant's family ownership since the 1950's and has been the subject on continued invest over its lifetime to date. Given the conclusions of the previous SC application, it is clear that the quarry can be operated in an environmentally sustainable manner, with the most intense period in the quarry's history demonstrated not to have resulted in any significant effects upon the environment.

The specific extents of any potential future quarrying have not been defined and in any event would be subject of a separate application accompanied by its own environmental assessment and scrutiny as part of any future planning application, however, the continued working of the mineral and use of the ancillary on-site buildings and structures is considered to be a scenario which may be reasonably expected to occur at the site and therefore is considered within this REIAR.

3.1.4 Unauthorised development Chronology

Sequential historical imagery from Google Earth and other sources has been used below to illustrate the chronology of the unauthorised development at the Cartron Quarry site. The imagery illustrates the progression of the quarry faces and the winning and working of the mineral over the SC period.



January 2015- Substitute Consent Approved Plan – Drawing Ref DWG1A9

The above image is provided to illustrate 2015 baseline position which authorised activities at the site following the grant of SC on 5th January 2015. The plan shows the location of the buildings and structures in the north eastern part of the site with quarrying operations shown in the southern part of the site.

July 2016

The above aerial image produced by local business ‘flybyphotos’ shows the extent of quarrying operations in July 2016. The image shows how quarrying operations have progressed generally in a southern direction from that approved via the SC.

2017

The aerial image from 2017, obtained from Ordnance Survey Ireland shows the extent of quarrying operations in 2017 (exact month unavailable). The image shows how quarrying operations have generally continued in the southern part of the quarry. Face progression is also evident in the north eastern part of the site, to the east of the structures/ buildings.

June 2018

The Google Earth imagery from June 2018 shows the extent of operations in 2018. The images shows that quarrying operations have been generally focussed in the south eastern part of the quarry with mineral extraction focussed along the eastern boundary of the quarry.

March 2019

Google Earth imagery from March 2019 shows the extents of quarrying operations in March 2019, c. 3 months prior to the cessation of mineral extraction. The image shows that quarrying has been concentrating primarily in the southern part of the quarry void, with an additional sinking of the quarry floor evident in the south eastern part of the void.

February 2021

The final image reflects the georeferenced Orthophotography, collected as part of the UAV Topographic Face Update Survey of the site undertaken by Quarryplan in February 2021. This accurately records the physical extent of the mothballed quarry operations. The image reflects the extent of quarrying operations to date at the site and the continued use of the buildings and structures in the north eastern part of the quarry site. Further detail on the present extent of workings are shown in the accompanying Topographical Survey and Cross-Section drawings which accompany the SC application.

Areas of Face Progression/ Quarrying Operations Summary

For ease of reference, the main areas of face progression/ quarrying operations as displayed via the preceding chronology are shown hatched in magenta in the above image. The image demonstrates that operations have been focussed in 3 main areas of the quarry: the southern boundary; the central part of the site in the quarry floor; and the north eastern face.

3.2 The location and extent of the Site

The overall SC application site extends to some 8.46ha and is located within the Townland of Cartron, near Tuam, Co. Galway. The application boundary, for reasons previously outlined, incorporates the totality of the Applicant's operations.

The previous REIS for the site describes how Cartron Quarry has been a feature within the landscape since 1954 when quarrying operations were begun at the site. Activity has been carried out at the quarry on a small scale continual basis between 1954 and 1999, when more intensive mechanical extraction of mineral began to take place. The SC for the site granted in January 2015 granted consent for operations which had taken place at the quarry since 1990.

The general approach to operations has not varied substantially since the granting of SC and the unauthorised activities post 15th January 2015 have been confined to the disturbed extent of the quarry.

The remainder of this section will summarise the continued activities and intervening period post the granting of SC in January 2015. As outlined in Section 2 above it is recognised that the REIAR must reflect the requirements of Schedule 6 of the Regulations and detailed studies of the individual areas, where relevant, are provided in sections 4 to 15 of this report and are not unnecessarily repeated in the sections covered below.

3.2.1 Drilling, Blasting and Rock Breaking

As per the previous SC, the process adopted to produce blast rock for the purposes of processing has been via the utilisation of a fully mobile air drill rig, with drilling being undertaken on average two days every month. The impacts of this drill rig and mitigation measures adopted during the use of the same are outlined in the Air Quality and Noise and Vibration Sections, 7 and 8 respectively.

There have been approximately 40 blasts at the quarry post the 5th January 2015. The requirement for blasting has been determined by aggregate sales, with one blast occurring on average every 2 months. This involved the controlled filling of the drilled holes with explosive material and the inclusion of detonators and charges. The holes were then detonated in a tight time sequence to ensure that the potential impact was limited to the equivalent nature of one component hole of the blast. Drilling took place for 2-3 days prior to each blast.

Following each blast, rock breaking has been carried out using a hydraulic breaker unit mounted on to a tracked excavator for approximately 1.5 days following each blast in order to eliminate oversized boulders.

The measured impacts for the unauthorised blasts are considered in detail in Section 8.

3.2.2 Processing of Material

The processing of material within the site continued to be undertaken within the quarry void at the active face. Processing of material was predominantly undertaken during the period which mineral extraction was ongoing, with very limit processing in order to remove remaining blasted rock undertaken following the cessation of mineral extraction in June 2019. A mobile impact crusher and screen deck were used which were tracked back to the face following each blast. Screened output has been stockpiled on the quarry floor. On occasion, secondary crushing and screening may have been carried out in order to produce chips and specified aggregates. This was undertaken in the quarry floor using a mobile cone crusher and screen deck. Secondary crushing was undertaken when demand dictated.

The crushing and screening units utilised at the site are fully mobile and are able to operate on any standard bench removing the requirement for the blast rock to be hauled. Modern mobile primary track crushing and screening units are fitted with dust suppression units and enclosures of all potential emission points.

The benefits of mobile plant are numerous, with an obvious reduction in internal haulage from blast pile, in addition to the potential emission points with respect to dust and noise being adjacent to a working face and for the completed development at levels significantly below the level of the surrounding lands, which affords significant natural attenuation.

3.2.3 Vehicle Movements

The primary method of transportation of aggregates off-site over the SC period has been via eight-wheel rigid lorries, each with a capacity of 20 tonnes. Although an articulated lorry and smaller vehicles were used on occasion, eight-wheel rigid HGV's have been the made mode of distribution.

The site has extracted on average 100,000 tonnes per annum over the SC period. Based on a 20-tonne payload and 275 working days per annum, this equates to an average of 19 two way trips per day.

3.2.4 Hours of Operation

The quarry operated within the hours of 07.00 to 18.00 Monday to Friday and from 08.00-13.00 on Saturdays. The quarry did not operate on Sundays or Bank Holidays.

3.2.5 Quarry Employment

The quarry directly employed 12 employees, to include truck drivers, machine operators, loader and crusher operators and office staff. The majority of the extraction jobs have been lost at this time.

3.2.6 Discharge and Fuel Storage

No off-site discharge of waters is required at the quarry with rainfall naturally percolating into the quarry floor.

Fuel for the on-site machinery is stored in a bunded tank in the north eastern part of the site. Vehicles are fuelled from the fully bunded and enclosed double skin tank within the north eastern part of the quarry adjacent to the workshop area. Fuel is transported to plant and machinery at the working face via a double skinned bowser which is filled within the bunded area surrounding the tank in the north eastern part of the site. No fuel is stored within the quarry floor and operatives have been trained in best practice for refuelling of machinery and also in emergency procedures.

3.2.7 Buildings and Structures

Ancillary buildings and structures within the quarry site are comprised of:

- Garage/ Workshop (Building A)- used for the servicing of quarry vehicles and machinery;
- Store/ Workshop (Building B)- for storage and servicing of quarry vehicles, plant and machinery);
- Canteen;
- Pumphouse;
- Oil tanks;
- Water tank, weighbridge and wheelwash.

The Garage/ Workshop/ store buildings are used to house and maintain the plant and machinery used on-site. Planning permission was granted by Galway Co Co in May 2007 (Ref 06/3299) for a garage/ workshop; a wheel was unit and weighbridge unit. These aspects of the development benefit from planning permission and therefore are excluded from this SC application. The remaining unauthorised

buildings/ structures are included within the SC application. Detailed drawings of the same are enclosed within the application package.

3.3 Decommissioning – Remediation - Restoration – Potential Continuation of Operations

As outlined above the final stage of the development cycle is to be considered and to provide assessment of the significant effects / impacts that can **reasonably be expected to occur** as a result of the development which is the subject of this SC application.

Given that there is no scope within the SC process for the granting of any future development, this presents a challenge in so far as the site must be restored in a satisfactory fashion but without amounting to works which would require development consent. The restoration scheme approved under the previous SC showed the site being restored primarily to calcareous grassland. The drawing shows that all buildings, structures, plant and machinery removed from the site and bunds reshaped, lowered and planted up with a mix of woodland and grassland species. The plan shows Native Hedgerow mix added along all boundary edges.

As detailed in the restoration scheme prepared by MDA, the restoration proposals accord with the previously approved restoration concept for the site, with the site proposed to be restored to calcareous grassland with woodland and hedgerow planting and a waterbody. Existing soils will be spread across the quarry floor with material regraded and planted. Details are shown in restoration concept for the site appended at Appendix 3.1.

As outlined at Section 3.1.3, an alternative option may be to seek planning permission under Section 34 of the Planning and Development Act 2000, as amended, to make best use of the naturally occurring, finite mineral resource at the site via the continued quarrying of the same.

The specific extents of any potential future quarrying have not been defined and in any event would be subject to its own environmental assessment and scrutiny as part of any future planning application, however, any continued working of the mineral and use of the ancillary on-site buildings and structures on-site would be in a similar fashion to that previously experienced at the site.

3.4 Alternatives Considered

As outlined above the remedial nature of this REIAR and the parameters of the SC process removes the potential to consider either design or locational alternatives. The site is considered appropriate for its uses for the quarrying by virtue of:

- The extent and nature of quarrying at the site and at the adjacent quarry to date;
- The availability of limestone mineral resource for aggregate production;
- Accessibility and nearby links to national road network;
- Proximity to local construction markets in Tuam, Galway and the western region;
- The volume of mineral, which is available above the water table, therefore removing any requirement for de-watering or discharging off-site;
- The lack of sensitive receptors within close proximity to the quarrying operations;
- The absence of any statutory designations at or surrounding the quarry; and
- The absence of any direct connectivity between the site and European sites.

Given that minerals can only be worked where they are found, the site is considered a suitable location for minerals development.

4.0 PLANNING POLICY FRAMEWORK

4.1 Introduction

This section considers the development in the context of the following contemporary planning policy sources:

- Galway County Development Plan (2015-2021);
- The National Spatial Strategy (2002-2020);
- Sustainable Development- A Strategy for Ireland (1997);
- National Planning Framework (2018); and
- Regional Planning Guidelines for the West 2010-2022 (2010).

Galway County Council commenced the preparation of the 2022-2028 County Development Plan on the 18th June 2020. The plan is still at the very early stages of preparation and therefore is not considered any further at this stage.

The level of compliance with the policies and objectives outlined in these documents indicates the suitability of the development from a planning and sustainable development perspective.

4.2 Galway County Development Plan (2015-2021)

The subject site is within the County Galway Administrative Area. The Galway County Development Plan (GCDP) was adopted in 2015 and sets out an overall strategy for the proper planning and sustainable development of the functional area of Galway County. Section 6.21 of the GCDP relates to mineral extraction.

4.2.1 Extractive Industry Policies

Policy EQ1 relates to environmental management practice. The aim of the policy is to ensure that mineral developments have regard to best environmental practice and

to undertaking activities in accordance with Natura 2000 requirements. As described in Section 11 of this REIAR and in the accompanying remedial Appropriate Assessment Screening Report (RAASR), the development has not either individually or in combination with other plans or projects, adversely affect the integrity of any European site. The proposed development is therefore considered to accord with Policy EQ1.

Policy EQ2 relates to a steady supply of aggregate resource. The aim of the policy is to ensure adequate supplies of aggregate resources to meet future growth needs within County Galway without adversely affecting the environment or adjoining existing land uses.

The development between 2015 and 2019 has seen the quarrying of some c. 100,000 tonnes of mineral per annum. This has directly contributed to the local supply of aggregate but has also sustained local economic activity within the area. As demonstrated at Section 5 of this statement, the working of the mineral is not considered to have resulted in any significant effects upon the limestone resource as a whole. As demonstrated throughout this REIAR, the working of the mineral and the operations at the site are not considered to have resulted in any unacceptable impacts upon the environment and as such, the development is considered to have been in accordance with Policy EQ2.

Objective EQ1 relates to the protection of natural assets. The aim of this policy is to safeguard protected areas from inappropriate development. The application site is not located within or adjacent to any designated areas. Given that development has occurred within the despoiled lands within the quarry void and that this REIAR has demonstrated that the development has not given rise to any significant effects upon the environment or affected the integrity of European sites, it is considered that the development has not resulted in any adverse impacts upon natural assets. As such, the development is considered to have been in accordance with Objective EQ1.

Objective EQ2 relates to management of aggregate extraction. The aim of the policy is to ensure that quarry developments accord with up to date guidance, include

appropriate mitigation and ensure quarry development has a minimal impact upon the landscape, highways and amenity. As demonstrated throughout this statement, the quarrying operations across the SC period has been undertaken in accordance with relevant guidance, with the development demonstrated not to have resulted in any significant effects upon the environment. As such, the development is considered to have been in accordance with Objective EQ2.

Objective EQ3 relates to sustainable reuse of quarries. The aim of the policy is to encourage the use of quarries and pits for the sustainable management of post recovery stage construction and demolition waste. It is proposed that the site be restored to calcareous grassland in order to assimilate with the previously approved restoration scheme for Cartron Quarry. As such, the development is considered to accord with Objective EQ3.

Objective EQ4 relates to compliance with the EU habitats Directive. As detailed at Section 11 of this statement and in the accompanying RAASR, the development has been demonstrated not to have affected the integrity of European sites, either individually or in combination with other projects. As such, the development is considered to accord with Objective EQ4.

4.2.2 Economic Development Policies

Policies EDT1-10 of the GCDP relate to economic development and tourism. The aim of the policies is to promote economic development without resulting in any unacceptable impacts on the environment and resist any development which would adversely impact tourism.

The development over the course of the SC period has sustained employment within the Applicant's business. The operations at the quarry have generated local economic activity through a range of local spending on the likes of transport, fuel, wages, purchases and business rates. Given the location of the site and its position adjacent to Mortimer's Quarry and as detailed at Section 9 of this REIAR, the development would have been seen in conjunction with the same and therefore

would not have resulted in any significant effects upon tourist assets. As detailed at Section 9 the unauthorised development has not resulted in any significant effect in terms of views from Knockmaa Hill, with operations during the SC period taking place within the previously assessed quarry void. The aggregate resultant from the development has assisted in local construction projects and highways projects which in turn have benefitted tourism. As such, the development is considered to be in accordance with the relevant economic and tourism policies contained within the GCDP.

4.2.3 Other relevant policies of the GCDP

Policies TI1-11 relate to transport and infrastructure. The development has resulted in highways movements of c. 19 two-way trips per day. As detailed at Section 12, this is significantly less than those previously considered acceptable on the local highways network by virtue of the previous granting of SC for the site. As such, the development is considered to be in accordance with the transportation and infrastructure policies of the GCDP, where applicable.

Policies WS1-6 relate to water. As detailed further in Section 6, the development is not considered to have posed an unacceptable impact upon ground or surface water. As such, the development is considered to accord with the water policies of the GCDP, where applicable.

Policies WM1 and 2 relate to waste management. As detailed at Section 10, the development has not resulted in the generation of any waste with the quarrying operations taking place within previously despoiled lands with soils and overburden at the site proposed to be utilised in the restoration of the site. The development is considered to be in accordance with the waste management policies of the GCDP, where applicable.

Polices CC1-8 and FL1-5 relate to climate change and flood risk. As discussed at Section 6, the development is not considered to have been particularly susceptible to climate change, nor would it have resulted in increased flood risk either at the site, in

the vicinity, or further downstream. The development type is not one which is vulnerable to flood risk. As such, the development is considered to be in accordance with the climate change and flood risk policies of the GCDP, where applicable.

Policies GH1-4 and **AH1 and 2** relate to heritage. As discussed in Section 15, the development is not anticipated to result in any unacceptable impacts upon heritage assets. As such, the proposed development is considered to accord with the heritage policies of the GCDP, where applicable.

Policies ARC1-6 relate to archaeology. The subject development has taken place within previously despoiled lands and as such, no potential for archaeological impacts could have been experienced with all top and sub soils previously removed from the areas of working. As such, the development is considered to be in accordance with the archaeology policies of the GCDP, where applicable.

Policies NHB1-8 relate to natural heritage. As detailed in Section 11, the development is not considered to have resulted in any unacceptable impacts upon protected sites. The application site is considered to be of low ecological potential given its use as an operational hard rock quarry. As such, the development is considered to be in accordance with the natural heritage policies of the GCDP, where applicable.

Policy LCM1 relates to landscape character. As detailed at Section 9, the application site is located in an area where the landscape value is rated as ‘low’. The development has resulted in only a modest landscape impact given that workings have been limited to within the quarry void. Restoration details are provided which would see the site restored to calcareous grassland. As such, the development is considered to be in accordance with the landscape policies of the GCDP, where applicable.

Policies RA1-5 relate to amenity. As detailed in sections 7, 8 and 9, given the separation distance between the site and the nearest sensitive receptors, the development is not anticipated to have resulted in any unacceptable impacts upon

amenity by virtue of noise, dust or visual impact. As such, the development is considered to accord with the amenity policies of the GCDP, where applicable.

Given the above, the proposed development is considered to accord with the provisions of the GCDP.

4.3 The National Spatial Strategy, 2002-2020

The National Spatial Strategy (NSS) 2002-2020 sets out the long-term planning and development framework context for the future growth and development of the state up until the year 2020. Among its key aims is to

"achieve a better balance of social, economic, physical development and population growth between regions".

The site is located within the West Region. Section 4.8 of the NSS states that:

"Building on the dynamic role of Galway as a gateway and expanding its influence in promoting economic activity will be at the heart of extending balanced regional development to the West region (Counties Galway, Mayo and Roscommon). The support of the additional potential of Castlebar and Ballina in County Mayo and Tuam in County Galway as hubs will also be crucial".

In terms of Galway City, the NSS identifies how

"Galway, with its population catchment, quality of life attractions, transport connections and capacity to innovate with the support of its third level institutions, will continue to play the critical role which has been essential in activating the potential of the region. The challenge now is to sustain and broaden this role to strengthen other areas".

With regards to County Towns and towns with a population over 5,000, the NSS states:

"Castlebar, Ballina and Tuam, as hubs, will perform important roles within the national structure at the regional and county level. Critical factors will include improvements in regional accessibility through advanced communications infrastructure, by road and public transport and through the regional airport at Knock".

The application site is located c. 7km from Tuam and c.23km from Galway City. Significant economic importance is placed upon each of the settlements with Map 10 of the NSS identifying Tuam as a Hub and Galway City as a Gateway (see Figure 4.1 overleaf).

The application site benefits from excellent access to the regional and national road network. Given the site's geographic location and the resource quality and availability, the site can be viewed as having had a significant regional influence by providing the necessary raw materials required in terms of sustaining the roles of Tuam and Galway as important economic centres, as envisaged via the NSS.

The development at the site has been complementary to the designations at Tuam and Galway through its role as an important generator of affordable and sustainable building materials. The development has sustained employment in the local area, with knock-on impacts in terms of local expenditure in the settlements.

The NSS recommends that planning policies should be proactive in catering for future needs including the advance provision of relevant services and infrastructure. Over the course of the SC period, the development at Cartron Quarry has assisted in sustaining the roles of the identified settlements as envisaged by the NSS, thus allowing for sustainable patterns of growth and development patterns within the region.

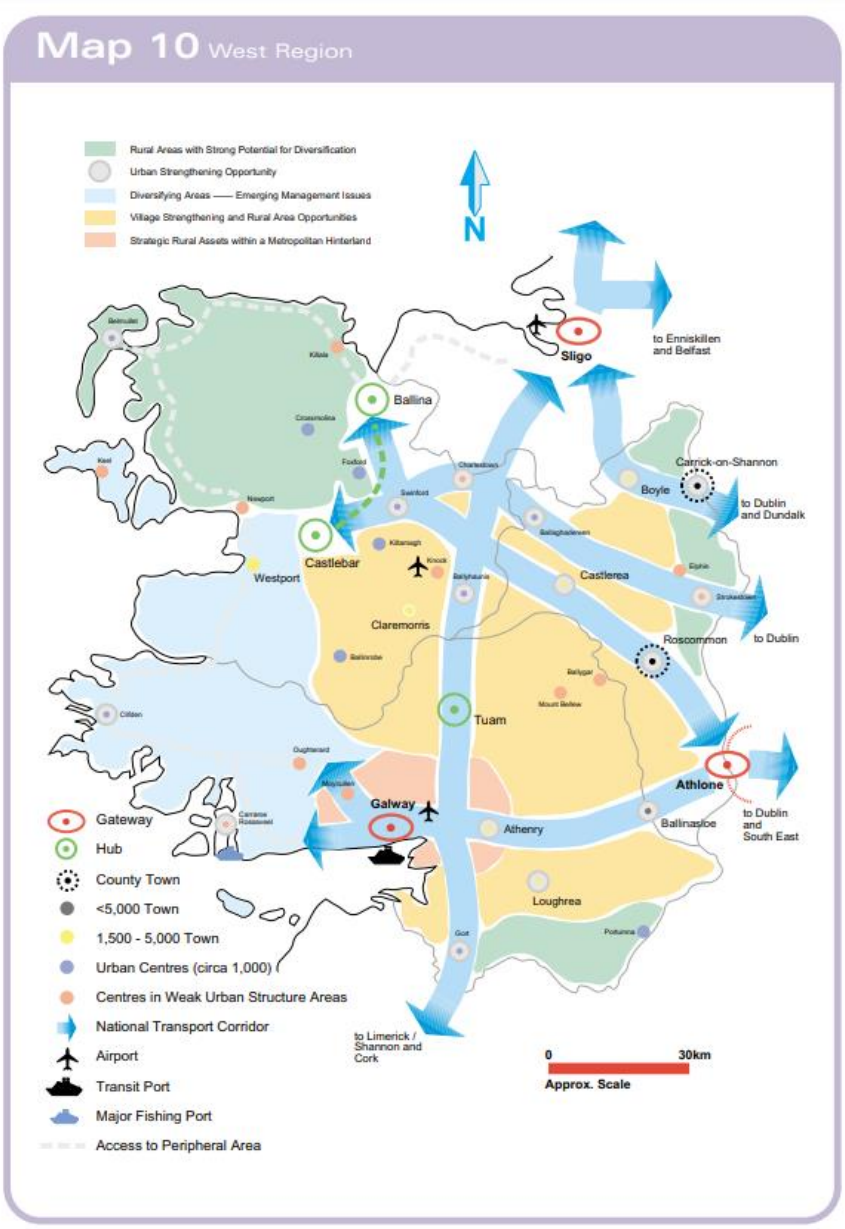


Figure 4.1 NSS Map 10 Extract

4.4 Sustainable Development- A Strategy for Ireland (1997)

The principle of sustainable development is now a fundamental tenet of land use planning policy in Ireland. The document 'Sustainable Development – A Strategy for Ireland', published by the Department of the Environment in 1997 contains a framework for applying the principles of sustainable development to different sectors of the economy.

The general principle of sustainable development has also been enshrined in the Planning and Development Act 2000 (as amended) and in County Development Plans, including the GCDP.

In this context, the development has been influenced by these policies and seeks to provide an appropriate methodology to maximise the exploitation of local resources.

There are several sections and policy recommendations outlined in the Sustainable Development Plan which are reviewed in the context of the proposal, as set out below.

The 'Strategic Framework' section outlined in the plan attempts to put in context perceived incongruities whereby on the one hand, there is a fundamental requirement to meet the present day needs in a sustainable way while on the other hand equally ensuring equity in access to, and use of resources, as well as equitable opportunities to participate in decision-making processes all with an overriding goal to achieve economic and social progress.

Within the *priorities for action* identified within the Strategic Framework are:

- a balance between the conservation and utilisation of resources;
- concrete action on the basis of practical programmes and clear targets and;
- an ability to measure and monitor sustainable development performance.

Accordingly, the Government's priorities within the framework of the Strategy are to:

- undertake a high level of environmental protection so that renewable resources are conserved and not depleted beyond their renewable rates;
- ensure that non-renewable resources are used prudently and efficiently with a strong emphasis on the use of substitute resources, where practicable
- and the concentration of critical natural capital on the needs of the future;

The Environment and Economic Development Chapter of the strategy quotes:

"Ireland should replace the traditional adversarial approach that presents industrial development and environmental protection as opposites. The new approach should simultaneously maintain high environmental quality and promote a competitive enterprise sector" - Forfas, Shaping our Future.

The Extractive Industries section accepts that quarrying for stone, gravel, sand, crushed rock, etc is based on an ultimately finite resource, stating that products are used mainly in the construction industry, both as crushed rock and for the production of cement. The strategy also notes that ground limestone is also used in agriculture.

The strategy goes on to state that whist in principle raw materials for the quarrying industry are not in short supply, the environmental impacts, require greater consideration. In certain cases, demand for aggregates for use by the construction industry could be met in some degree by recycling and reuse of construction/demolition waste.

It should be noted that due to irregular supply patterns and inconsistencies in material quality, recycled aggregate materials are often not suitable for a range of uses. Given the properties of the limestone mineral resource, replacing the mineral with recycled aggregate has not been considered as an appropriate option in suiting the needs of the business's customers.

Given the above, the development is considered to accord with the provisions of the Sustainable Development Strategy for Ireland.

4.5 National Planning Framework, 2018

The National Planning Framework (NPF) is the Government's high-level strategic plan for shaping the future growth and development of the country to the year 2040.

The NPF describes how 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.

The NPF goes on to state that 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.

National Policy Objective 23 seeks 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 terms of rural development, the NPF describes how the spatial, social and economic disparities between rural areas are a reflection of the fact that stronger rural areas tend to be located in a geographically advantageous place, and also have the human and social capital to address their needs and respond effectively to emerging opportunities and strategies.

The application site is considered to be strategically well placed, serving markets in Counties Galway and Mayo over the course of the SC period.

National Policy Objective 15 is to:

"Support the sustainable development of rural areas by encouraging growth and arresting decline in areas that have experienced low population growth or decline in recent decades and by managing the growth of areas that are under strong urban influence to avoid over-development, while sustaining vibrant rural communities".

The development has contributed towards achieving sustainable growth in a rural location and sustaining vibrant local communities within County Galway via the economic stimulus provided by local employment and expenditure on the likes of transportation, purchases, wages and business rates. Given the above, the development is considered to accord with the provisions of the Sustainable Development Strategy for Ireland.

4.6 Regional Planning Guidelines for the West 2010-2022 (2010)

The aim of the Guidelines is to provide a framework for long term strategic development of the West Region for the period 2010–2022 which is consistent with the National Spatial Strategy (NSS) 2002–2020 and which ensures the successful implementation of the NSS at regional, county and local level.

A key aspect of the West Regional Authority's Regional Planning Guidelines is integrating sustainable economic development with the protection and enhancement of the environment.

The Guidelines state that:

"Extractive industry represents a valuable resource in the provision of raw material for the construction industry and is also an important source of employment. The products provide building materials for the provision of housing and infrastructure. The industry can however have significant impacts on the landscape, habitats and rural amenity, the road network and has the potential for water pollution or intrusion of groundwater supplies. Local production of aggregate which is suitable for local use can lessen the impact on road infrastructure".

Policy EP51 states:

"Support the sustainable development of the extractive industry in the West Region as a rural enterprise. Developments of this nature must follow EIA and Habitats Directive Assessment procedures, minimise all environmental impacts and be rehabilitated to an appropriate land use which ensures positive impacts for biodiversity. Developments shall be assessed and/or carried out in accordance with relevant national legislation and DoEHLG, NPWS and EPA Guidelines".

As demonstrated throughout this document, the development has generated a number of economic benefits in the local area and on a wider county level. The development has sustained rural employment and generated a number of economic benefits via local expenditure. The development is not considered to have resulted in any significant effects upon the environment and as such, is considered to be in accordance with Policy EP51.

Given the above, the development is considered to be in accordance with the provisions of the Regional Planning Guidelines for the West.

4.7 Summary and Conclusions

The subject site is within the Galway County administrative area. The Galway County Development Plan (2015-2021) is the current statutory Development Plan for the area. As demonstrated at Section 4.2, the development is considered to accord with the policies of the County Development Plan.

The development has allowed for the significant economic and social benefits generated by the site in terms of employment, investment and prosperity to be sustained without posing a significant effect upon the environment, as detailed within this report. The development has complemented the roles of Tuam and Galway City as a Hub and Gateway, respectively.

The aggregates produced at the quarry have supported economic growth across the West Region.

The development has been demonstrated to accord with the relevant local and national planning policy provisions. The development has maximised the potential of the finite natural resource found at the site without posing any significant effects upon the environment and as such, the development is considered to accord with the three dimensions of sustainable development and therefore is in accordance with the proper planning and sustainable development of the area.

PART II – REMEDIAL ENVIRONMENTAL IMPACT ASSESSMENT

5.0 GEOLOGICAL ASSESSMENT

5.1 Introduction

Quarrying, by definition, requires the excavation and removal of the mineral deposit, thereby producing a permanent impact on the local bedrock environment within the footprint of the quarry. The geological impacts of the development over the SC period are considered below.

5.2 Receiving Environment

The mineral is identified on Geological Survey Ireland (GSI) 1-100,000 mapping as thick and medium thick bedded pure limestone, comprising of the Knockmaa and Coranellistrum Limestone formations respectively. The extents of the formation, as mapped by GSI, in relation to the application boundary is reproduced at Figure 5.1 below.

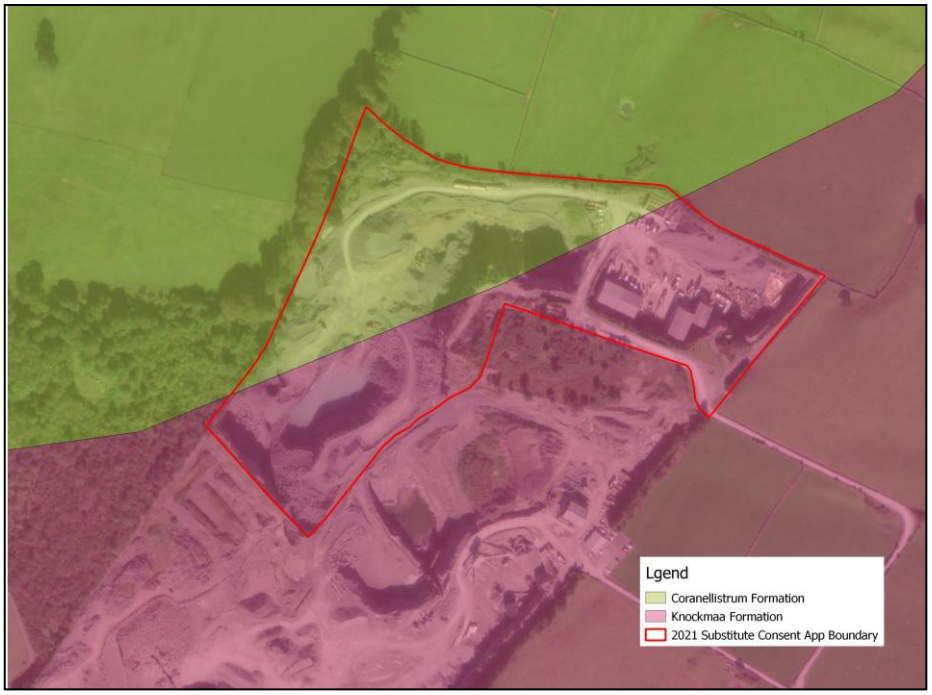


Figure 5.1 Knockmaa and Coranellistrum Limestone formations

As demonstrated via Figure 5.2 below, GSI mapping shows that both limestone formations are significant in their lateral extents, with each formation covering areas in excess of 50 square kilometres. By contrast, the SC application area covers just 8.46ha, within mineral extraction areas contained to localised areas as detailed at Section 3.

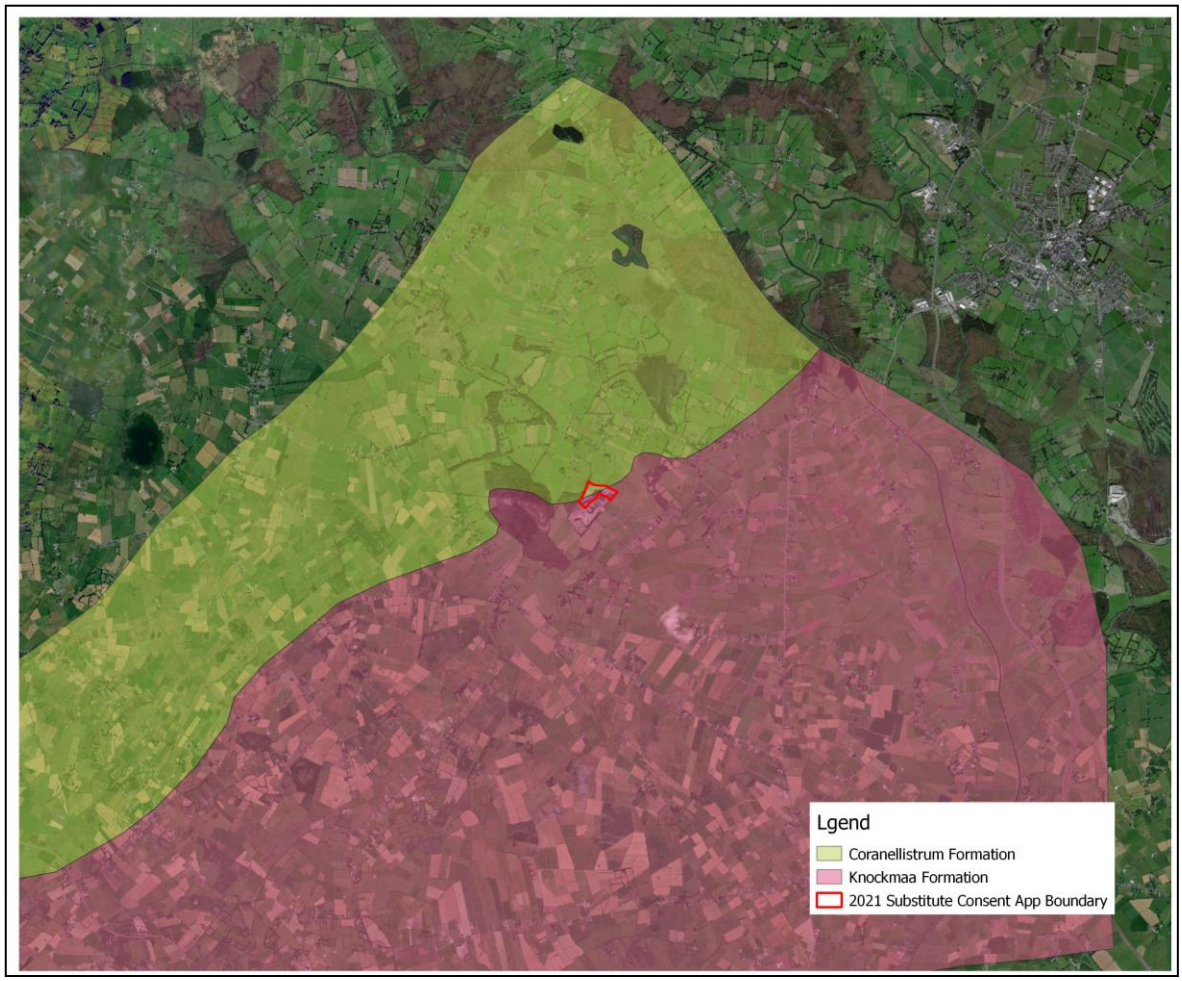


Figure 5.2 Extents of Limestone Formations

5.3 Geological Impacts

5.3.1 Impacts that have occurred

The impact of quarrying operations at the site upon the geological environment has been assessed as part of the REIS for the previous SC Application. Given that the application area for this SC application corresponds with that previously assessed and approved, and that geological impacts do not alter in the intervening timeframe post the previous approval of those documents, it is considered unnecessary to revisit the previously accepted conclusions.

The SC area covers an area of some 8.46ha, with the primary areas of working comprising only a fraction of this area, as detailed in Section 3. The applicant has confirmed via sales records that output at the site has been c.100,000 tonnes per annum. Given the scale of operations which have taken place at the quarry over the SC period in comparison to the large extents of the two limestone formations which form the economic mineral at the site, the removal of the mineral is not considered to have resulted in a significant effect upon either formation, as a whole.

5.3.2 Impacts that are occurring

Mineral extraction operations ceased at the site in 2019 and therefore no impacts upon the geology are experienced at the site.

5.3.3 Impacts that can be reasonably expected to occur

With the implementation of the restoration scheme for the site there will be no further removal of soils or limestone resource.

There is no scope in the SC process to allow for future working and as such, no impacts upon the geology at the site are anticipated. In the event that the alternative scenario is adopted and planning permission is sought under section 34 of the Act

for future working, given the scale of the quarry in comparison to the significant lateral extents two limestone formations which have been worked at the site, the removal of the mineral is not considered to result in any significant effect upon the formations as a whole. In any event, this would be the subject of a separate environmental assessment in the future.

5.4 Conclusions

Quarrying, by definition, requires the excavation and removal of the mineral deposit, thereby producing a permanent impact on the local bedrock environment within the footprint of the quarry. The limestone formations found at the site extend over significant areas (over 50sq km each). Given the limited extent of the workings within the SC period, the impacts upon the geological environment whilst permanent, are not considered to have resulted in a significant effect on the Limestone deposit as a whole.

Given that mineral extraction operations have ceased, no impacts upon the formation are currently being experienced nor are they likely to occur in the future with the SC process unable to grant permission for future development. Any proposals for the future working of the mineral would be subject to its own planning application and environmental assessment.

6.0 WATER ENVIRONMENT

6.1 Introduction

An assessment was undertaken to establish the potential impacts upon the water environment, both hydrogeological and hydrological, of the development, with a baseline start date of post January 2015.

In completing this report, it is considered essential to take into account the environmental information that (i) has been considered previously by the Planning Authority and the Board and (ii) has been considered to be representative and acceptable information to provide an accurate environmental baseline for the site.

This is an appropriate approach to avoid unnecessary duplication of information and is recommended by regulation 222A of the Planning and Development Regulations 2001 (as amended).

Reference is made to previous hydrological and hydrogeological work completed by O' Callaghan, Moran & Associates Environmental Consultants (OCM) – specifically Chapter 11 (“Water”) presented in the remedial Environmental Impact Statement in May 2013.

6.2 Competent Expert

The assessment was undertaken by BCL Hydrogeologists Limited and managed by Henry Lister, who holds a Batchelor of Science Honours Degree [Geology] conferred by Plymouth University, 1992; and a Master of Science Degree [Groundwater Engineering] conferred by the University of Newcastle upon Tyne, 1994.

BCL has provided specialist services and advice to the extractive industry since 2000. BCL's work has included:

- Water environment impact assessments: typically to examine lowering of groundwater levels, potential impact upon surface water features, risk of derogation of water supplies & water quality;
- Data collation and interpretation (meteorological, geological, hydrological and hydrogeological);
- Conceptualisation of hydrogeological systems;
- Impact prediction and modelling;
- Formulation of mitigation measures (appropriate, practical and cost-effective);
- Management and undertaking of operational impact monitoring and impact assessment;
- Review and auditing of contingency mitigation schemes;
- Liaison with project team, planning authorities, regulatory agencies and general public;
- Design of Water Management Schemes: Rainfall runoff and storm event calculations; Sizing of settlement lagoons and storm attenuation ponds;
- Applications for Abstraction Licences and Discharge Consents;
- Prognosis, design, installation and test pumping of abstraction boreholes;
- Involvement with research project, completed in association with Capita Symonds, on behalf of the Minerals Industry Research Organisation and Environment Agency: Optimising the Use of Artificial Recharge Features to Mitigate the Impacts of Quarry Dewatering; Including a programme of dewatering & pump tests to trial various configurations of recharge trench, soakaway and compensation pond; and
- Reporting in connection with proposed developments within varying hydrogeological terrains at over 250-no. quarries throughout Ireland and the UK.

6.3 Baseline Setting

The impact of previous development at the quarry upon the water environment was assessed in the previous SC application for the Site. Paragraph 7.5.3 of the Inspector's Report states that:

"Given that the site is essentially a dry working site this reduces potential risks other than recharge of contaminated water back into the groundwater. In relation to water impacts having reviewed the information I consider that the measures in place and proposed address potential impacts to water and that no significant impacts have arisen and are likely to arise from the operation of the quarry on the subject site.

The rEIS concluded that the quarry would not have significant impacts on water and I would concur with this conclusion".

6.3.1 Buildings and Structures

Ancillary buildings and structures within the quarry site are comprised of:

- Garage/ Workshop (Building A) - used for the servicing of quarry vehicles and machinery;
- Store/ Workshop (Building B) - for storage and servicing of quarry vehicles, plant and machinery;
- Canteen;
- Pumphouse;
- Oil tank;
- Water tank, weighbridge and wheelwash.

The Garage / Workshop / store buildings are used to house and maintain the plant and machinery used on-site. Planning permission was granted by Galway Co. Co. in May 2007 (Ref 06/3299) for a garage / workshop; a wheel wash unit and weighbridge unit. These aspects of the development benefit from planning permission and therefore are excluded from this SC application. The remaining unauthorised buildings / structures are included within the SC application. Detailed drawings of the same are enclosed within the application package.

6.3.2 Topography

The Site straddles a ridge that extends down from the summit of Knockmaa Hill (proposed Natural Heritage Area, where the main features of interest relate to woodland and areas of limestone pavement, which support distinct flora species). The summit attains an elevation of 167 metres above Ordnance Datum (maOD) and it is approximately 550 m to the west of the Site. Following the ridgeline, ground level at the western limit of the Site equates to 93 maOD, dropping to 84 maOD at northeast boundary of the yard area.

Given the topography of the ridgeline:

- The northern and western boundaries of the Site overlook agricultural land that generally slopes away to the north (EPA River Sub-Basin Boadaun_010 leading to Black-Shrule_010). Ground level at the northwest corner of the Site is at 70 maOD.
- Immediately to the south and east of the quarry complex (including Mortimer's Quarry), the land falls in a southerly direction, veering to the southwest (EPA River Sub-Basin Ballinduff Stream_010). At the southern corner of Mortimer's land, ground level is at 50 maOD.

Some 200 m to the east of the Site:

- The main ridge starts to climb towards a smaller un-named hill (hereafter "Carrowntemple Hill"), which attains a summit elevation of circa 110 maOD. The summit is 630 m east of the Site.
- There is a less prominent topographic divide that extends southwards, forming a watershed between lands to the west (EPA River Sub-Basin Ballinduff Stream_010) and lands to the east (EPA River Sub-Basin Clare-Galway_050).

The topographic setting of the quarry is illustrated upon Figure 6.1. This includes river sub-basin catchment boundaries.

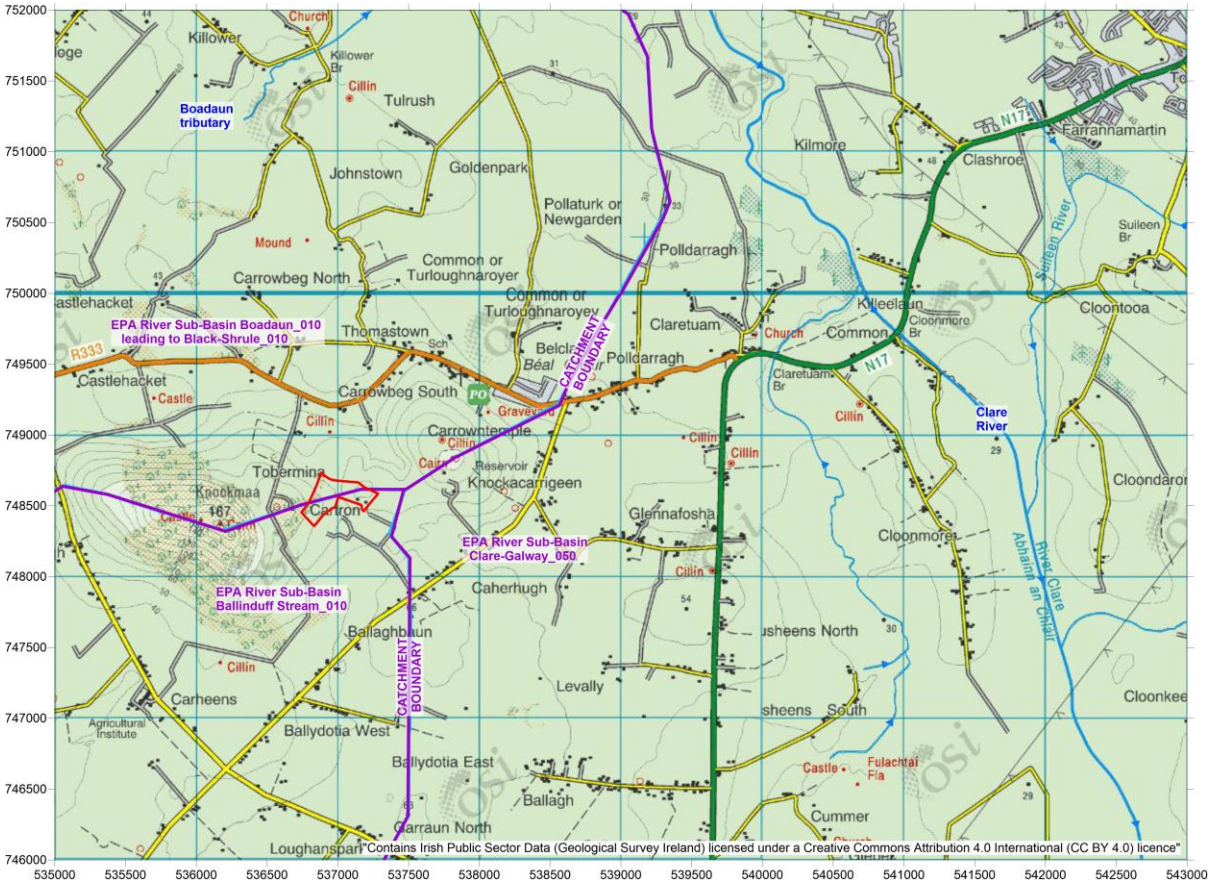


Figure 6.1: Topographic Setting with River Sub-Basin Catchment Boundaries

6.3.3 Hydrology

There are no surface watercourses in the immediate vicinity of the Site, which demonstrates that incident rainfall is readily lost to groundwater rather than taking an overland (surface water) flow path.

As dictated by the topographic setting, the Site straddles the watershed between two EPA Sub-Basin Areas:

- The land to the north of the Site, which drains to a tributary (Boadaun) of the Togher River before joining the Black River. The Boadaun arises some 2.6 km to the north of the Site, where ground level is around 25-30 maOD. In the Water Framework Directive (WFD), the status of the Boadaun is “unassigned” and it is “not at risk”. The Black River has “good” status (Q4-5) and is “not at risk”.
- The land to the south of the Site, which drains to the Ballinduff Stream (the closest reach of stream being over 6 km to the southwest of the Site). The stream arises at an elevation of 20 maOD. The status of the Ballinduff Stream is “unassigned” and it is “not at risk”. The latest Q value is 4.

The Site does not overlap with the sub-basin area of the Clare River; its catchment area is approximately 200 m to the east of the Site, at closest approach. An un-named tributary of the river passes 2.8 km to the east of the quarry complex, where ground level is close to 30 maOD; and the Clare River itself is some 3.7 km to the east of the Site. The Clare River has “good” status (Q3-4) and is “not at risk”.

6.3.4 Karst Features

The closest turlough is an un-named feature close to Carrowbeg, about 0.75 km north of the Site boundary. The turlough is encircled by the 30-maOD contour line.

The second closest turlough (Common or Turloughnaroyey) is 1.5 km to the northeast of the Site, again at the roughly the same elevation.

There are numerous “enclosed depressions” dotted across the ridge and northern-eastern slopes of Carrowntemple Hill. The closest is a circular feature (15 m diameter) found at 73-74 maOD; it is 55 m from the northern boundary. The second closest is visible on aerial photos and is of similar dimensions; it is some 150 m from the eastern corner of the Site, where ground elevation equates to 73 maOD.

The karst features are illustrated upon Figure 6.2.

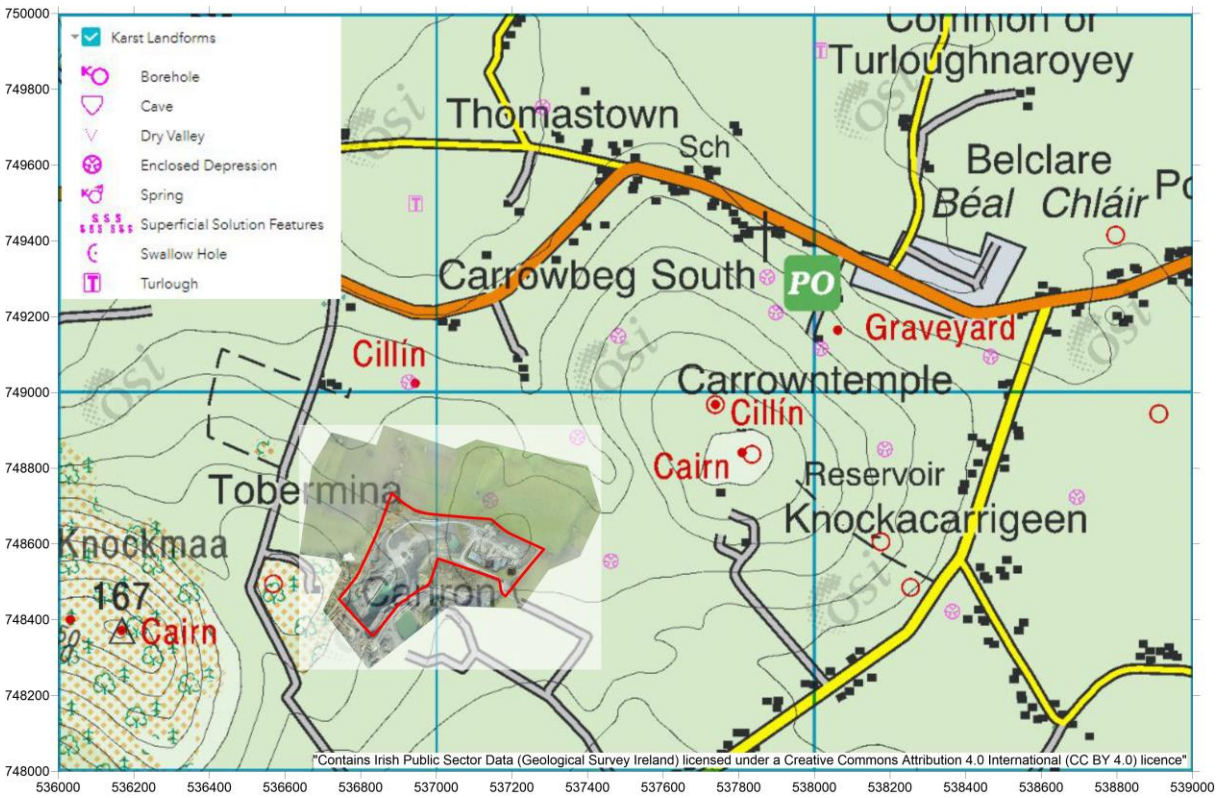


Figure 6.2: Karst Features

6.3.5 Geology

Outside the quarry, the slopes of the ridge are typically covered by Quaternary Sediments: Till derived from limestones, which thins out and is absent from the higher ground, particularly Knockmaa Hill.

The northwest half of the Site extracts from the Coranellistrum Formation, which is described by GSI as comprising “Medium to thick-bedded pure limestone (100-200m thick): Grey bioclastic calcarenites with chert in the basal part, but also containing thin layers of chert nodules and dolomitic beds higher up. Macrofauna is mainly braciopods and corals”.

The south and east areas of the quarry are working the Knockmaa Formation, which is described by GSI as a “thick-bedded, pale grey, pure limestone, similar to that in the Corrallenistrum Formation”. Thickness is not specified.

Both bedrock formations (Figure 6.3) are of Dinantian (Carboniferous) age.

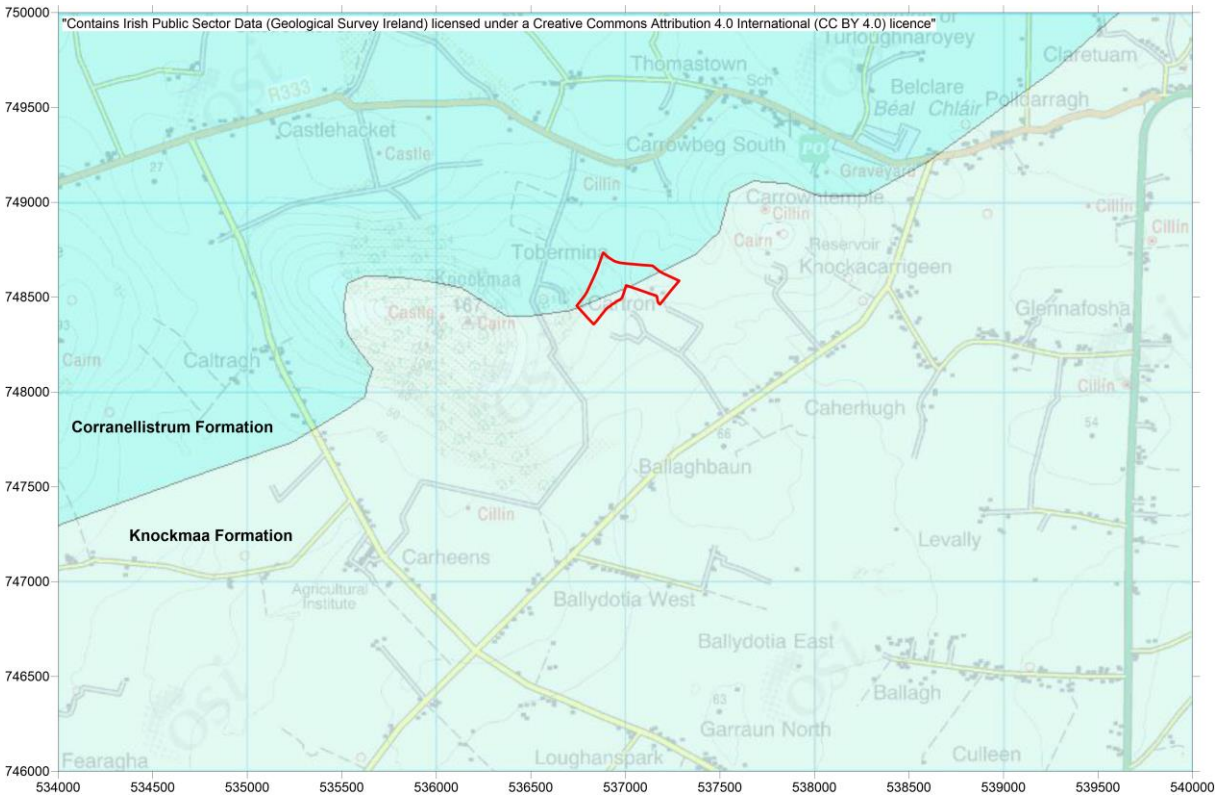


Figure 6.3: Extract from GSI Mapping: Bedrock Geology

6.3.6 Regional Hydrogeology

The Groundwater Data Viewer (Geological Survey Ireland Spatial Resources) shows that the Coranellistrum Formation and Knockmaa Formation, taken together, are treated as a single aquifer unit. The unit is classed as a Regionally Important Aquifer - Karstified (conduit) or Rkc, covering 7,063 km^2.

The GSI map (Figure 6.4) includes the locations of Group Scheme Abstraction Points, together with their associated Preliminary Source Protection Areas:

- There are 2 boreholes serving the Belclare Group Water Scheme, which are 1.5 km and 1.85 km to the northeast of the Application Area, with a combined yield of approximately 153m^3/day (OCM). At its closest approach, the source protection area extends to the summit of Carrowntemple Hill. The summit is 630 m east of the Site.
- There is an abstraction borehole in the Ballagh area (3 km southeast of the Site), with source protection area extending to within 1.4 km of the Site.
- A larger source protection area is shown to the southwest of Carheens (1.8 km to the southwest of the Site); the associated abstraction point is 5.6 km from the Site boundary.

“Groundwater Wells and Springs” are marked on the same map. The closest is at Ballaghbaun, more than 0.9 km to the south of the quarry. The depth and status of the well are not recorded.

There are no Public Supply Source Protection Areas within 5 km radius of the Site.

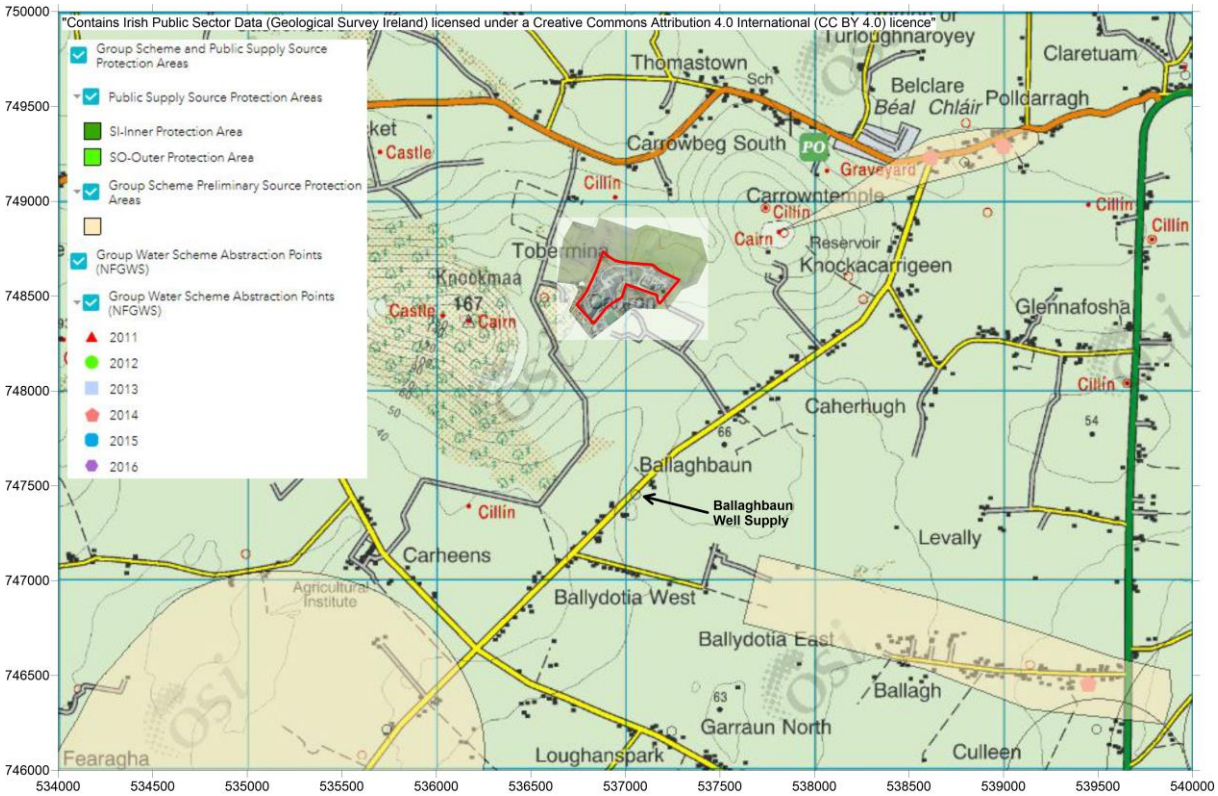


Figure 6.4: Extract from GSI Mapping: Water Supplies

The GSI assigned aquifer vulnerability rating for the Site, which indicates the potential susceptibility to contamination from pollution sources at the ground surface, is Extreme. The vulnerability rating is based on the nature and depth of the subsoils, which in this case are non-existent.

6.3.7 Site Hydrogeology

The Applicant has a supply borehole that was drilled in 2001 to a depth of approximately 170 m below ground level (mbGL). It is understood that the pump was replaced in 2007 and was set at approximately 90 mbGL. The well is located at the southern boundary of the yard, where ground level is *circa* 75 maOD. The well is not accessible to establish groundwater level using a dip meter, but it is understood from the quarry owner that the water level was at some 50 mbGL (c.25 maOD) when the new pump was installed in 2007.

Mortimer's Quarry has a domestic well, which was installed for use at a neighbouring dwelling house. The well is installed at the eastern boundary of Mortimer's Quarry. It is understood that the well was drilled to approximately 140 mbGL and that the pump was installed at approximately 80 mbGL. The owner has provided groundwater level measurements taken at this well between September 2009 and June 2019, generally collected on a monthly basis, as required by conditions attached to the planning permission for the Site. The local datum (100 m) has been converted to Ordnance Datum (65 maOD at best estimate). This has informed calculation of groundwater levels as follows: minimum 25.7 maOD; average 37.6 maOD; and maximum 45.7 maOD. The hydrograph is presented below:

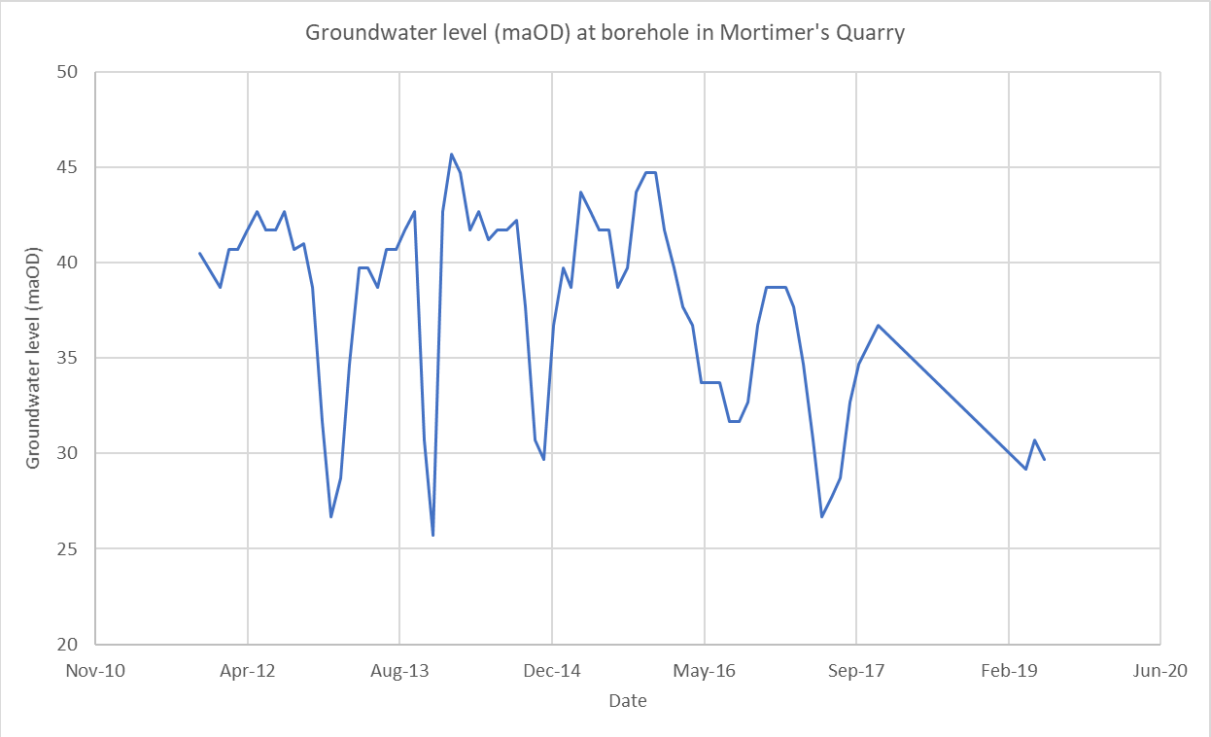


Figure 6.5 Groundwater Hydrograph

Further understanding of groundwater levels is based upon seasonal ponding in the lowest sinkings of the quarry complex (including Mortimer's Quarry). The topographic survey completed on 18th February 2021 includes the following data:

- Water level at 45.053 maOD in Mortimer's sump.

- Water level at 43.151 maOD in the lowest sinking at the southwest section of the Applicant's quarry.
- Water level at 40.452 maOD in the lowest sinking at the northeast corner of the Applicant's quarry.

Triangulating between these data points, it is evident that the interpolated groundwater flow direction is towards the north (with a hydraulic gradient of 0.02). As outlined earlier, the land to the north of the Site drains to a tributary (Boadaun) of the Togher River before joining the Black River. The Boadaun arises some 2.6 km to the north of the Site, suggesting that the groundwater comes to surface at around 25-30 maOD, indicating that the regional hydraulic gradient is gentler (0.005 to 0.007) than at the quarry (0.02).

It should be noted that the ponding on the quarry floor is a seasonal/ephemeral occurrence following periods of prolonged rainfall, typically in late winter to early spring. Site experience proves that the quarry is dry for a significant proportion of the year, as detailed in Section 3.1.4 (sequential historical imagery from Google Earth and other sources), which includes aerial images showing dry workings in 2016, 2017, 2018 and 2019. The only image showing standing water on the quarry floor within the Application Area is that dated February 2021.

Three piezometers have now been installed at the Site to allow future monitoring of groundwater levels. The 1st round of readings was collected on 24th April 2021, showing that groundwater level beneath the quarry footprint was at *circa* 20 maOD on that date. This is about 5 m lower than the minimum groundwater level recorded at Mortimer's Well. It is consistent with the level difference and flow direction as interpolated across the quarry sumps in February 2021, where Mortimer's sump was at 45 maOD and the Applicant's northeast sump was at 40 maOD *i.e.* 5 m difference across the quarry complex in wet weather conditions.

Thus, it is evident that groundwater level has dropped by over 20 m between February and April 2021. It demonstrates how markedly and rapidly groundwater

level will decline with the onset of spring. It is anticipated that groundwater level will not show significant increase until effective rainfall reaches its peak next winter.

The aquifer beneath the Site is part of the Clare-Corrib Water Body (1,422 km^2). Under the Water Framework Directive (2013-2018), its quantitative and chemical status are listed as “Good”; but it is “At Risk” of failing to meet its WFD objectives by 2027, mainly related to concerns regarding Ammonia, Nitrates and ortho-Phosphate (typically derived from agricultural sources).

Historic water quality data, relating to samples taken from the quarry sump and supply borehole, are presented in the REIS (Chapter 11: Tables 11.1 and 11.2 respectively). Where available, the author of Chapter 11 of the REIS (OCM) compared the sample data with the Environmental Quality Standards (EQS) specified for 'Good Status' in the Environmental Objectives (Surface Water) Regulations 2009 (S.I. No. 272 of 2009); and with the Threshold Values (TV) for groundwater quality, introduced by the European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010).

OCM reported that the results were indicative of uncontaminated groundwater for the parameters tested; and there was no visual or olfactory evidence of contamination in the groundwater in April 2013.

6.3.8 Flood Risk

Flood and Drainage Maps are published at https://www.floodinfo.ie/map:

- River Flood Extents and Past Flood Events: There is no record of any flooding either within the Site boundary, or on the lands immediately adjoining the Site.
- Arterial Drainage Schemes (ADS), Drainage Districts (DD) and Land Commission (LC): The mapping shows that the Site is not in an area designated as benefiting lands *i.e.* lands that are subject to either flooding or poor drainage, which would benefit from drainage works. The closest ADS is

for the drainage network SG43/1, which flows northwards from Turloughnaroyey (1.5 km to the northeast of the Site). There are no DD and LC features in the vicinity of the Site.

6.4 Impact upon the Water Environment – Buildings and Structures

The construction and erection of the buildings and structures in the north eastern part of the landholding forms part of the baseline study of the Site, assessed via the previous REIS. The impacts associated with the same were assessed within the previously-accepted REIS and RNIS. Given that both documents included the buildings and structures within the project description, that the same were assessed as part of the overall EIA / AA projects and that the assessments were considered acceptable by the Board, it is concluded that the buildings have not resulted in any significant effects upon the environment or affected the integrity of European sites.

Given the above, it is considered reasonable to conclude that the impacts associated with the buildings / structures that were considered acceptable in 2015, would therefore otherwise have been regularised by virtue of the previous SC for the Site, save for the administrative error and their continued presence on Site bringing no additional impacts.

6.5 Impact upon the Water Environment – Discharge & Fuel Storage

No off-site discharge of waters is required at the quarry, with rainfall naturally percolating into the quarry floor.

Fuel for the on-site machinery is stored in a bunded tank in the north eastern part of the Site. Vehicles are fuelled from the fully bunded and enclosed double-skin tank within the north eastern part of the Site, adjacent to the workshop area. Fuel is transported to plant and machinery at the working face via a double-skinned bowser, which is filled within the bunded area surrounding the tank in the north eastern part

of the Site. No fuel is stored within the quarry floor and operatives have been trained in best practice for refuelling of machinery and also in emergency procedures.

6.6 Impact upon the Water Environment – Extraction Operations

6.6.1 Impacts that "Have occurred"

The applicable period for the assessment of impacts that **have occurred** in relation to the unauthorised quarrying operations is **16th January 2015 until 11th June 2019.** The Google Earth imagery (section 3.1.4) shows the extent of operations during this period. The images show that quarrying operations were generally focussed upon the southern part of the void, together with minor extraction along the eastern boundary of the Site and some working within the central section of the quarry floor.

As explained in section 6.3.7, an understanding of groundwater level at the Site has been derived from various sources, including: Mortimer's Well; 3 new piezometers on Site; topographic survey of seasonal ponding in the deepest sections of the quarry complex; ground elevation at the closest approach of local watercourses; and sequential historical imagery from Google Earth and other aerial photographic sources.

This shows that the quarry has been dry for a significant proportion of each year but there can be shallow ponding on the quarry floor *i.e.* a seasonal/ephemeral occurrence following periods of prolonged rainfall, typically in late winter to early spring. The piezometer data demonstrates how markedly and rapidly groundwater level would have declined with the onset of dry weather, dropping by up to 20 m. It is considered that groundwater level would not have shown significant increase until the following winter (when effective rainfall would have reached its peak).

The quarry operations during the period 16th January 2015 until 11th June 2019 did not involve sub-watertable working or dewatering. Therefore, there would have been no lowering of the watertable as a result of the quarrying activities; and no

drawdown-related impact upon groundwater levels / flow. Thus, there would be no secondary impact upon the flow regime at local watercourses or water supplies.

The operation of mobile and fixed plant would have presented a risk that pollutants would have had potential to enter groundwater as a result of hydrocarbon spillage or leakage on Site. Such sources would have included fuel, lubricating and hydraulic oils. Experience has demonstrated that the risk of such a pollution incident would have been minimised by compliance with the following measures:

- Fuel for the on-site machinery was stored in a bunded tank in the north eastern part of the Site. Vehicles were fuelled from the fully bunded and enclosed double-skin tank within the north eastern part of the quarry adjacent to the workshop area. Fuel was transported to plant and machinery at the working face via a double-skinned bowser, which was filled within the bunded area surrounding the tank in the north eastern part of the Site. No fuel was stored within the quarry floor and operatives were trained in best practice for refuelling of machinery and also in emergency procedures.
- Operators would have checked their vehicles on a daily basis before starting work to confirm that leakages were not present. Operators would have reported any defect to ensure that repairs were undertaken to that vehicle before it entered the working area.
- Sufficient oil sorbant material (*3M Oil-Sorb* or similar) would have been available on Site to cope with a loss equal to the total fluid content of the largest item of plant.
- Following the use of such oil sorbant material, any contaminated materials would have been disposed from Site in accordance with prevailing tipping legislation.
- Adequate containment would have been provided for all oils stored on the Site, equipped with bunds complying with the relevant regulatory standards.

The risk of quarry-related impact upon water quality at local abstractions has been assessed for the period 16th January 2015 to 11th June 2019. The inferred

groundwater flow direction is from south to north. The land to the north of the Site drains to the Boadaun tributary, which arises some 2.6 km to the north of the Site. There are no mapped water supplies between the quarry and the Boadaun. Outwith the quarry complex, the closest supplies are at Ballaghbaun (0.9 km to the south of the quarry); 2 boreholes serving the Belclare Group Water Scheme (1.5 km and 1.85 km to the northeast); the Ballagh supply (3 km southeast of the Site); and the Carheens borehole (5.6 km to the southwest of the Site). The Site boundary does not overlap with the Preliminary Source Protection Areas associated with these water supplies. Furthermore, it is considered that the measures advanced to protect groundwater and surface water quality would have served to prevent the derogation of water supplies.

There is no record of any flooding either within the Site boundary, or on the lands immediately adjoining the Site. Any rainfall runoff occurring during storm events between 16th January 2015 to 11th June 2019 would have posed no risk to 3rd party land. Site experience shows that the floor of the workings would have been free-draining, sufficient to cope with rainfall ingress (except during prolonged periods of rainfall in late winter / early spring, when there would have been temporary shallow ponding before percolating into the floor of the quarry).

6.6.2 Impacts that "Are Occurring"

Quarrying operations at Cartron Quarry ceased on 11th June 2019. Therefore the applicable period for the assessment of impacts that **are occurring** is **11th June 2019 to present.**

There has been no sub-watertable working or dewatering during this period. Therefore, there has been no lowering of the watertable as a result of the quarrying activities; and no drawdown-related impact upon water resources (groundwater, watercourses or water supplies).

No off-site discharge of waters has been required at the quarry, with shallow, temporary/seasonal ponding of rainfall in the deepest sections of the quarry, thereafter, naturally percolating into the quarry floor.

Fuel has been stored in a bunded tank in the north eastern part of the Site. Vehicles have been fuelled from the fully bunded and enclosed double-skin tank within the north eastern part of the Site adjacent to the workshop area. Operatives have been trained in best practice for refuelling of machinery and also in emergency procedures. No fuel has been stored within the quarry floor. The treatment systems, engineering measures and fluids handling protocol advanced via the previously approved SC application to protect groundwater quality will have served to safeguard the surface water environment and water supplies.

6.6.3 Impacts that can be "Reasonably Expected to Occur"

There are considered to be two outcomes which can be reasonably expected to occur:

The first scenario is that the Site is restored. This would comprise of the removal of all buildings, plant and machinery; and the utilisation of existing soil-making material available on-site to provide suitable conditions for grassland, hedgerow and woodland planting.

The quarry would be dry for a significant proportion of the year but there would be shallow ponding on the quarry floor *i.e.* a seasonal/ephemeral occurrence following periods of prolonged rainfall, typically in late winter to early spring. There would be no lowering of the watertable as a result of the quarrying activities and no drawdown-related impact upon water resources (groundwater, watercourses or water supplies).

The alternative scenario, which may be reasonably expected to occur, is that the Applicant seeks planning permission under Section 34 of the Act to make best use of the naturally occurring, finite mineral resource at the Site via the continued quarrying of the same.

Given the conclusions presented in sections 6.6.1 and 6.6.2, it is clear that the quarry can be operated without any significant effects upon the water environment.

The specific extents of any potential future quarrying would be subject of a separate application, accompanied by its own environmental assessment and scrutiny as part of any future planning application.

In terms of protecting the water environment, this would be underpinned by a comprehensive programme of hydrometric monitoring, including measurement of groundwater levels on a monthly basis at the Site piezometers; and sampling of water quality at the quarry sump and the Applicant's borehole (pH, conductivity, suspended solids, hydrocarbons, major nutrients and faecal coliforms).

6.7 Conclusion

The impact of previous development at the quarry upon the water environment was assessed in the previous SC application for the Site. Paragraph 7.5.3 of the Inspector's Report states that:

"In relation to water impacts having reviewed the information I consider that the measures in place and proposed address potential impacts to water and that no significant impacts have arisen and are likely to arise from the operation of the quarry on the subject site. The rEIS concluded that the quarry would not have significant impacts on water and I would concur with this conclusion".

Having assessed the impacts that have occurred in relation to the unauthorised quarrying operations from 16th January 2015 until 11th June 2019, it is evident that the quarry continued working without any significant impact upon the water environment. With regards to impacts that are occurring and are reasonably likely to occur, it is clear that the quarry can be operated without any significant effects upon the water environment.

It is therefore concluded that operations during the SC period at the Cartron Quarry site, have not resulted, are not resulting or unlikely to result in any a significant effect upon the water environment.

7.0 AIR QUALITY & CLIMATE

7.1 Introduction

The following section considers the air quality and climate change impacts associated with the unauthorised works at the site over the SC period.

7.2 Relevant Guidelines & Standards

The Quarries and Ancillary Activities, Guidelines for Planning Authorities (DOEHLG, 2004) states that following with regard to the control of dust;

"There are currently no Irish statutory standards or EPA guidelines relating specifically to dust deposition thresholds for inert mineral/aggregate dust. (See, however, the Air Quality Standards Regulations 2002 for measurement standards). There are a number of methods to measure dust deposition (such as the Frisbee method) but only the German TA Luft Air Quality Standard relates a specific method (i.e. Bergerhoff) of measuring dust deposition with dust nuisance. On this basis it is recommended that the following TA Luft dust deposition limit value be adopted at site boundaries near quarry developments:

Total dust deposition (soluble and insoluble): 350 milligram per square metre per day (when averaged over a 30-day period).

Best practice dust control measures should be proposed by the applicant".

On the basis of the above, the following limits are considered applicable to the operation of the quarry over the SC period;

Total dust deposition (soluble and insoluble): 350 mg/m^2/day (when averaged over a 30-day period).

7.3 Dust Deposition

In quarries, dust typically becomes airborne due to the action of wind on material stockpiles and other dusty surfaces, or when thrown up by mechanical action, for example the movement of tyres on a dusty road or activities such as blasting, drilling, screening, etc. There are many types of particulate matter (PM) that are included in the definition of dust, including variations in terms of size and chemical composition.

A basic classification of particles may be made into those that are easily deposited and those that remain suspended in the air for long periods. This division is useful as deposited dust is usually the coarse fraction of particulates that causes dust annoyance, whereas suspended particulate matter is implicated more in exposure impacts.

Airborne particles have a large range of diameters, from nano-particles and ultrafine particles (diameters less than 0.1µm) to the very large particles with diameters up towards 100µm. There is no clear dividing line between the sizes of suspended particulates and deposited particulates, although particles with diameters >50 µm tend to be deposited quickly and particles of diameter <10 µm have an extremely low deposition rate in comparison. Therefore, the size of suspended and deposited dust particles affects their distribution and as such requires two very different approaches to sampling these fractions.

Large particles (100µm diameter) are likely to settle within 5-10m of their source under a typical mean wind speed of 4-5 m/s, and particles between 30-100 µm diameter are likely to settle within 100m of the source. Smaller particles, particularly those <10 µm in diameter, have a greater potential to have their settling rate impeded by atmospheric turbulence and to be transported further from their source. Dust emissions are exacerbated by dry weather and high wind speeds. Therefore, the dust deposition impact depends on the wind direction and the relative location of the dust source and receptor.

PM_{10} is the fraction of airborne (suspended) PM which contains particles of diameter less than 10µm. PM_{10} includes all particles, of different sizes and types, which are relevant for potential health effects. PM_{10} can penetrate deep into the respiratory system increasing the risk of respiratory and cardiovascular disorders.

Dust emissions can arise as a result of operational activities, and /or wind erosion of exposed surfaces. The amount of dust that is raised is highly dependent upon a number of interrelated factors, which include:

- The nature of the material;
- The prevailing meteorological conditions;
- The activities being undertaken;
- The influence of any on site mitigation measures.

The prevailing meteorological conditions are the most significant issue which will affect the rate of dust deposition outside of the boundary of a quarry and its associated activities. Therefore, it can be assumed that during the drier months of the year, there is the potential for dust deposition rates to be higher than the annual average dust deposition rate.

7.4 Baseline Impacts

The Board's assessment of matters pertaining to air quality/ dust impacts for Substitute Consent Ref 07.SU.0036 are set out in the Inspector's Report which states:

"The REIS indicates that dust is not currently a significant issue and monitoring confirms no elevated levels of dust deposition at site boundaries and reduction of levels have occurred over the years arising from these measures. On the basis of the information submitted I consider that impacts relating to air emissions and quality have been assessed and there is nothing to suggest that significant adverse impacts have arisen as a result of the operations on the subject site. I would conclude that

the overall impacts on air quality would be acceptable having regard to mitigation measures in place".

The previous REIS chapter describes how dust deposition has been undertaken at the site with measurements carried out using the standard Bergerhoff method. The results of the monitoring as detailed in the REIS Chapter are presented in **Table 7.1** below, which includes for comparative purposes the 350 mg/m^2/day limit. The REIS Chapter states that the exact positioning of the monitoring locations was not known, however they were understood to be along the site boundary.

Monitoring Period	**DM1**	**DM 2**	**DDML 3**
February 2008	22.6	5.86	5.01
Limit Value	**350 mg/m^2/day**		

Table 7.1: Dust Deposition monitoring survey results (Feb 2008)

The application site has not been the subject of any dust deposition monitoring over the course of the SC period. Dust deposition monitoring has been undertaken annually at the adjacent Mortimer's Quarry in compliance with conditions attached to planning permission for mineral extraction at the site. This data is presented in annual environmental monitoring reports which are available via the Galway Co. Co. online planning system.

The monitoring reports submitted to Galway Co. Co. for the adjacent quarry details how deposition monitoring is undertaken at 4 locations along at the site boundaries of Mortimer's Quarry. Three of the locations (D1, D2 and D4) are located along or within close proximity to the shared boundary with the application site as shown at Figure 7.1 below.

Figure 7.1 Dust Monitoring locations proximate to shared Boundary

Available deposition data collected at the monitoring locations along the shared boundary between 2015 and 2019 is presented at Table 7.2 below.

Monitoring Period	**D1**	**D2**	**D4**
April 2015	231	205	40
Sept/ Oct 2017	122	203	182
2018 *maximum deposition encountered over x 4 quarterly monitoring periods.	338*	268*	231*
April 2019	No Result	302	73
May 2019	140	211	141
June 2019	329	No Result	240
Limit Value	**350 mg/m^2/day**		

Table 7.2: Dust Deposition monitoring survey results along shared boundary (2015-2019)

The available dust deposition data from locations within close proximity of the shared boundary between the application site and the adjacent quarry demonstrates that there have been no exceedances in the industry standard 350 mg/m^2/day limit value.

7.5 Impact Assessment

7.5.1 Impacts that have occurred

Wind speed and direction have the greatest potential to impact on dust deposition in proximity to the site. The previous REIS describes how the prevailing wind direction is from the south-west. The properties to the north-east of the site, i.e. downwind of the prevailing wind direction, are in excess of 1km away from the site's northern boundary. The nearest property to the north is c. 500m away.

Previous dust monitoring at the site has shown very low levels of dust deposition at the site's boundary. Data from dust deposition monitoring locations within close proximity to the shared boundary between the application site and the adjacent quarry demonstrates that there have been no recorded exceedances of the accepted industry standard of 350 mg/m^2/day limit value during the course of the SC period.

There is no evidence to suggest any exceedance in dust deposition limit values at the site's boundary over the course of the SC period. The quarry has been operated in accordance with the mitigation measures listed at Section 7.6 below. Given the same and the significant separation distances between the application site and the nearest properties, it is considered highly unlikely for the nearest residential receptors to have experienced dust nuisance impact at such distances. As such no significant impact is anticipated to have been experienced as a result of operations during the SC period.

7.5.2 Impacts that are occurring

No mineral extraction within the application area has taken place since June 2019. Activity at the site during this period has been limited to ancillary activities, generating very limited vehicle movements and movement of material experienced. As such, the potential for dust generation is considered to have been limited in the period following the cessation of mineral extraction. Given the same, the potential for properties to be impacted by fugitive dust emissions is considered to be negligible.

7.5.3 Impacts that can be reasonably expected to occur

There is no scope in the SC process to allow for future working and as such, the scope for dust generating activities is limited. The site will be restored in accordance with the submitted restoration scheme. The movement of restoration materials and has the potential to result in potential dust impacts. Given the separation distance between the quarry and the nearest residential receptors it is considered that the scope for significant dust effects to be experienced at the properties is severely limited.

All potential dust impacts from the Cartron Quarry site are considered to be reversible i.e. the risk of impact will cease on completion of quarrying and restoration of the site. Any effects associated with decommission/ restoration would be short lived with the restoration works carried out over a limited timeframe with the benefits of the same considered to significantly outweigh any low potential for amenity impacts by virtue of dust emissions. Where applicable the mitigation measures utilised at site will be adhered to during the restoration of the site.

In the event that the alternative scenario is adopted and planning permission is sought under 34 of the Act for future quarrying, given that no exceedance in the recognised limit value for dust deposition has been experienced at the site's shared boundary, it is considered unlikely that the nearest properties, located over 500m away from the site would experience any adverse impacts by virtue of dust

emissions arising from the site, particularly if mitigation measures such as those outlined below continued to be utilised. In any event, this would be the subject of a separate environmental assessment in the future.

7.6 Dust Mitigation Measures

The following dust mitigation measures were employed at the Cartron Quarry site to minimise operational impacts. The aim of these mitigation measures was to minimise the release of dust to the environment.

7.6.1 Operating and Dust Mitigation Measures:

The site manager has overall responsibility for ensuring that operations within the quarry site comply with the requirements of any planning authorisation. The site has at its disposal a suitable water bowser and associated water supply to allow for dampening down of the site when windblown dust from its surface arises. This was used in periods of dry weather.

7.6.2 Access Roads, Site Roads and Vehicles Loading Activities & Movements:

The objective of these procedures is to minimise the creation and release of dust generated by transportation activities carried out during both access to and movements within the site. This includes minimising dust from transport vehicles entering and leaving the facility.

- Regular attention is paid to cleaning dust material from all roadways, hard surfaced areas and working areas of the facility. Dust from cleanup is re-incorporated into the stockpile. This is done during every lull in operations and at the end of each working period.
- Roadways and other areas where vehicles are regularly moving are kept clean, by sweeping or by wetting;
- When loading vehicles, the following procedures are adhered to:

  - No overloading of vehicles or containers resulting in either peaks of cargo or overspill onto the working areas or roadways.
  - Keep fall heights of the material into the transport vehicles to a minimum.
- Strictly applied, suitable on-site speed limits are set, displayed and observed for the movement of all vehicles (10 km/h).

7.6.3 Stockpiling Operations

The aims of these procedures are to ensure that materials are stockpiled only within the designated processing/working areas and any release of dust to atmosphere is minimised.

- Stockpiling and offloading operations to the processing plant and equipment is co-ordinated in such a way as to minimise the potential for double handling of material.
- Unloading of materials within the facility is carefully planned to ensure minimum exposure to winds, thereby reducing dust emission to air.
- The aims of the stockpiling procedure is to ensure that management of the stockpile is conducted in such a way that releases of dust to atmosphere are minimised.
- Stockpile areas are clearly and physically delineated to deter vehicles from running over mineral extract at the stock edge.
- Stockpiles are managed to ensure that the profile of material will minimise wind whipping.
- During any stockpiling, stockpiles are profiled and compacted by flattening out peaks and ridges and when partially worked, are re-contoured to prevent ridges or overhanging falls.
- Whenever possible, settled stockpiles are not be broken into when the wind is likely to lift newly exposed dry dust. When this is unavoidable, effective dust control methods are implemented.
- Prior to carrying out any stock handling operations, the dust suppression equipment is checked to ensure that it is working properly.

7.6.4 Monitoring & Reporting

- A high standard of housekeeping is maintained on site.
- Any complaints received from neighbouring properties are logged and appropriate actions taken to reduce the potential for further complaint.

7.7 Conclusion

The potential for any dust arising from the Cartron Quarry site has been assessed and it is considered that the potential for nuisance impact has been and is limited to the immediate vicinity of the activities, even without dust suppression/ mitigation measures in operation, because of the quarried materials predominantly coarse nature. The potential for nuisance dust impacts is considered to be negligible at the nearest sensitive receptors and dust deposition monitoring results from within the quarry and along the shared boundary with the neighbouring quarry suggests that no exceedance in the DOEHLG 2004 recommended levels is likely to have been experienced.

The impacts that have occurred, are occurring and can reasonably expected to occur have been assessed and are not considered to give rise to any significant environmental effect, given the separation distance between the quarry and the nearest properties and that monitoring has confirmed operations consistently have cumulatively operated below the guideline figure provided for in the DOEHLG 2004 recommended levels.

Any residual dust deposition impacts resulting from the future de-commissioning and restoration of the quarry will be short lived and all potential dust impacts from the Cartron Quarry site are considered to be reversible i.e. the risk of impact will cease on completion of quarrying and restoration of the site.

8.0 NOISE AND VIBRATION

This Noise Impact Assessment report has been prepared by Mervyn Keegan. Mervyn Keegan is a Director of the environmental consultancy, AONA Environmental Consulting Ltd. Mervyn Keegan's areas of professional expertise are in Noise Control & Acoustics and Air Quality & Odour consultancy, including impact assessment and mitigation design. Mervyn Keegan has over 22 years of environmental consultancy experience. Mervyn is a full member of the Institute of Acoustics, with a Bachelor of Science Degree (Applied Sciences), a Master of Science Degree (Environmental Science) and a Diploma in Acoustics in Noise Control.

AONA Environmental Consulting Ltd. is an independent consultancy specialising in Environmental Impact Assessment and Licensing. Mervyn Keegan has prepared in excess of ten Noise & Vibration and Air Quality & Climate impact assessments per annum for quarry developments in the Republic of Ireland, Northern Ireland and the UK in the last 15 years and is an expert in the awareness and understanding of the relevant legislation and guidance that pertains to best practise in such assessments. Mervyn Keegan has appeared as an Expert Witness at oral hearings, public inquiries and legal hearings. Mervyn Keegan has produced Noise, Air Quality & Odour Impact Assessment reports to assess the impacts of a range of development types including roads, residential developments, industrial developments, quarries and mines and wind energy developments, among others.

8.1 Introduction

This remedial Noise & Vibration Impact Assessment has been prepared to accompany an application for Substitute Consent (the Application) at Cartron Quarry, Belclare, Tuam Co. Galway and forms part of the Remedial Environmental Impact Assessment Report.

The Noise & Vibration Impact Assessment has considered all the winning and working of minerals, processing and associated activities which have occurred within the applicant's lands during the relevant period between the previous grant of SC for the site in January 2015 (Ref 07.SU.0036) and the date at which extraction ceased (June 2019); impacts which are occurring (June 2019 – present); and impacts which may be reasonably likely to occur in the future. The Noise & Vibration Impact Assessment has also considered the regularisation of buildings and structures that Galway County Council consider to be unauthorised. The unauthorised structures include an extension to existing garage/workshop approved under planning ref no. 06/3299; an additional workshop/ storage unit; a canteen; a pumphouse; a lime crushing enclosure; and a water tank.

The site is located in the Townland of Cartron some 7 kilometres southwest of Tuam. The site is bounded to the south by Mortimer's Quarry, and to the north, east and west by agricultural fields. The precise location of the site's application area can be seen from Figure 3.1.

8.2 Methodology

8.2.1 Relevant Guidelines & Standards

The noise and vibration impact assessment has been undertaken with regard to the following established standards and guidelines to determine the impact of the existing Cartron Quarry site activities on the surrounding noise environment and assess for the potential for noise disturbance at existing noise sensitive receivers in the locality:

- Quarries and Ancillary Activities, Guidelines for Planning Authorities, April 2004, Department of the Environment, Heritage and Local Government. (DoEHLG Guidance)
- Environmental Management Guidelines Environmental Management in the Extractive Industry (Non-Scheduled Minerals), Environmental Protection Agency (2006)

The Quarries and Ancillary Activities, Guidelines for Planning Authorities states that following with regard to the control of noise and blasting;

'Control of noise: Noise-sensitive uses in the vicinity of a quarry, such as dwellings, schools, hospitals, places of worship or areas of high amenity, require that the amount of noise be minimised. The sensitivity to noise is usually greater at night-time (20.00 to 08.00) than during the day, by about 10 dB(A). Many quarries are situated in areas of low background noise and it is appropriate to consider this when setting noise limits. In general, it can be expected that complaints will result where the noise from quarrying and associated activities are between 5 to 10 dB above the background noise levels. In areas of higher background noise levels, the EPA recommends that ideally, if the total noise level from all sources is taken into account, the noise level at sensitive locations should not exceed a L_{Aeq} (1 hour) of 55 dB(A) by daytime and a L_{Aeq} (15 minutes) of 45 dB(A) by night-time. Audible tonal or impulsive components in noise emissions (e.g. the reversing siren on a lorry, required for safety reasons) can be particularly intrusive, and such components should be minimised at any noise-sensitive location.

It may be necessary to raise the noise limits to allow temporary but exceptionally noisy phases in the extraction process, or for short-term construction activity which cannot meet the limits set for routine operations, e.g. the construction of baffle mounds, which bring long-term environmental benefits.

The developer may be required to carry out noise surveys to measure noise levels at the site boundary near sensitive locations, as agreed in advance with the planning authority. Surveys should be carried out in accordance with the EPA's "Environmental Noise Survey – Guidance Document" (2003). Noise monitoring should be carried out on a quarterly basis (or as otherwise agreed), and commenced prior to the commencement of development. The results should be reported to the planning authority within 3 weeks (or as agreed). 95% of all noise measured shall comply with the specified limit values. No individual noise measurement should exceed the limit values by more than 2 dB(A).

Control of blasting: Nearby residents (e.g. within 500 meters) need to be given advance notice when blasting operations are due to take place, which should only be carried out between 09.00 and 18.00 hours, Monday to Friday (except in emergencies or for health and safety reasons beyond the control of the developer). Similarly, such residents should be given the "all clear" signal by means of sirens or other agreed measures when blasting has been completed.

The EPA recommends that to avoid any risk of damage to properties in the vicinity of a quarry, the vibration levels from blasting should not exceed a peak particle velocity of 12 millimeters per second as measured at a receiving location when blasting occurs at a frequency of once per week or less. In the rare event of more frequent blasting, the peak particle velocity should not exceed 8 millimeters per second. The nature of the underlying rock can influence the way blast vibrations are transmitted through the ground to locations outside the site, so it is important that such information (including predicted vibration levels in adjacent noise-sensitive receptors) be submitted with the planning application where relevant.

Blast noise is characterised by containing a large proportion of its energy within a frequency that is below the normal hearing range and is therefore termed "air overpressure." The EPA recommends that blasting should not give rise to air overpressure values at the nearest occupied dwelling in excess of 125 dB(Lin)$_{max.\ peak}$ with a 95% confidence limit.

The developer should carry out blast monitoring (groundborne vibration and air overpressure) for each blast. The monitoring locations should be as agreed within the planning authority and shall be established prior to the commencement of blasting. The results should be reported to the planning authority on a regular agreed basis. Groundborne vibration levels measured at the nearest occupied dwelling should not exceed the specified limit values. 95% of all air overpressure levels measured at the nearest occupied dwelling shall conform to the specified limit value.

No individual air overpressure value should exceed the limit value by more than 5 dB(Lin)'.

As outlined in the Environmental Management Guidelines Environmental Management in the Extractive Industry (Non-Scheduled Minerals), Environmental Protection Agency (2006), the Environmental Protection Agency (EPA) has produced a Guidance Note for Noise in Relation to Scheduled Activities (EPA, 1996). It deals in general terms with the approach to be taken in the measurement and control of noise, and provides advice in relation to the setting of noise Emission Limit Values (ELV) and compliance monitoring. In relation to quarry developments and ancillary activities, it is recommended that noise from the activities on site shall not exceed the following noise ELVs at the nearest noise-sensitive receptor:

- Daytime: 08:00–20:00 h $L_{Aeq\ (1\ h)}$ = 55 dB(A)
- Night-time: 20:00–08:00 h $L_{Aeq\ (1\ h)}$ = 45 dB(A)

Note:

- 95% of all noise levels shall comply with the specified limit value(s). No noise level shall exceed the limit value by more than 2 dB(A).
- On-site activities should be permitted during night-time hours where they comply with the noise ELVs (e.g. heating up of asphalt plants, loading of materials).
- Where existing background noise levels are very low, lower noise ELVs may be appropriate.
- Audible tones or impulsive noise should be avoided at night.
- It is also appropriate to permit higher noise ELVs for short-term temporary activities such as construction of screening bunds, etc., where these activities will result in a considerable environmental benefit.
- In relation to blasting activities within quarry development, it is recommended that the following vibration and air overpressure ELVs are adopted and

applied at the nearest vibration and air overpressure sensitive location (e.g. a residential property):

Ground-borne vibration: Peak particle velocity = 12 mm/s, measured in any of the three mutually orthogonal directions at the receiving location (for vibration with a frequency of less than 40 Hz)
Air overpressure: 125 dB (linear maximum peak value), with a 95% confidence limit.

- Normal hours of blasting should be defined (e.g. 09:00–18:00 h Monday to Friday), and provision should be included to permit blasting outside these hours for emergency or safety reasons beyond the control of the quarry operator.
- It is recommended that quarry operators provide advance notification of blasting to nearby residents through use of written notes, signage at site entrance, telephone, or warning sirens (or a combination of these methods).

On the basis of the above, the following noise limits are suggested as appropriate for the operation of the quarry and associated activities post January 2015;

***The equivalent sound levels attributable to all on-site operations associated with the development shall not exceed 55 dB(A) L_{eq} over a continuous one hour period between 0700 hours and 1900 hours on Monday to Friday inclusive, and 0700 hours and 1400 hours on Saturday, when measured at any noise sensitive receptor. Sound levels shall not exceed 45 dB(A) at any other time*.**

8.2.2 CadnaA Noise Prediction Modelling Methodology

A CadnaA noise prediction model has been prepared to predict and assess a worst-case noise level that could have occurred due to the specific operation of Cartron Quarry, Co. Galway. This noise model is based on the recent scale of site operations and associated plant and equipment and lorry movements to and from

the site. Thus, the noise prediction model provides an appropriate level of confidence when assessing specific historical noise impacts from the Cartron Quarry site.

CadnaA has been developed to allow detailed noise predictions to be undertaken in accordance with:

- ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2 General methods of calculation.
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise

The CadnaA noise prediction model allows for noise from all sources entered into the model to be undertaken simultaneously. The noise model can take topographical effects, ground absorption, screening effects, reflections and focusing effects, among others, into consideration. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. The model calculates the propagation of the sound from each noise source and produces a noise level contour map and graphics in proximity to a facility with colour coded noise level contours. Model parameters, sources, and settings have been incorporated into the model as detailed in Table 8.1.

Parameter	**Source**	**Details**
Horizontal distances – Quarry and surrounding area	Quarryplan	Digital 3d Models in AutoCAD format.
Quarry Dimensions	Quarryplan	Digital 3d Models in AutoCAD format.
Receiver Locations	AONA Environmental	In outdoor amenity areas adjacent to nearest residential properties @ 1.5m height.

Plant types, location & Sound Power Level	Quarryplan / site operator.	Source noise measurements were undertaken in close proximity to plant and equipment and within buildings on site. This allowed for an accurate Sound Power Level L_w to be assigned to active plant.
Ground Absorbtion	AONA Environmental	A Ground Absorbtion Rate G = 0.5 has been used in the model, which is appropriate for the surrounding land type.

Table 8.1: Modelling Parameters, Sources and Assumptions

AONA Environmental has previously undertaken source specific noise level readings in close proximity to the main noise sources that operate on quarry sites. This allows for the generation of accurate sound power levels for all main existing noise sources on the site. For the purposes of noise impact assessment, the Sound Power level (L_W) was determined by measuring the Sound Pressure Level (L_P) at a specific distance from the noise source and assuming a Directivity Index (Q) of 2, i.e. hemispherical propagation, using the following equation;

$$L_W = L_p + |10 \cdot \log\left(\frac{Q}{4\pi \cdot r^2}\right)|$$

AONA Environmental has been advised of the specific noise sources that operated during the SC Period on the Carton Quarry site. Therefore, an accurate noise prediction model has been prepared based on accurate source sound level data.

The type of plant that has been used at the Cartron Quarry site includes the following (not all of which was in use concurrently or continuously) ;

- Drilling Rig – approximately 40 blasts took place at the quarry post the 5th January 2015, Drilling took place for 2-3 days prior to each blast .
- Primary Crusher – Kleeman mobile tracked unit
- Primary screen deck - primary screening undertaken in tandem with crushing – Finlay equipment.

- Secondary crusher – cone crushing carried out, occasionally as required.
- Secondary deck screen – secondary screening is carried out in tandem with secondary crushing, occasionally as required.
- Tertiary crusher - tertiary crusher used occasionally as required.
- Tertiary screen deck - tertiary screening is carried out in tandem with tertiary crushing, occasionally as required.
- Tracked excavators – two midsize Hitachi excavators. One of which is used to continually feed the primary, secondary or tertiary crushing and screening. Other used for overburden clearance, haul road construction, etc.
- Front end loaders - two midsize Volvo L180 front end loaders. One operates near the primary screen output stockpiles to load trucks. The second operates near the secondary screen output stockpiles to load trucks.
- Truck movements off site – the average number of truck movements off site was up to 19 movements per day. Truck loading and export was between 0800 – 1800 Monday to Friday.
- Other noise sources – personnel vehicle movements and workshop noise sources.
- Operating Hours – 0700 – 1800 Monday to Friday and 0800 – 1300 Saturday. No operation on Sunday.

The following noise sensitive receiver locations have been included in the CadnaA noise prediction model.

Description	Address (near)	ITM Coordinates	
NSR 1	R333, Killower ED, Tuam, Galway	536736	749248
NSR 2	R333, Killower ED, Tuam, Galway	536978	749210
NSR 3	R333, Killower ED, Tuam Galway	537013	749206
NSR 4	Belclare, Claretuam ED, Tuam, Galway.	537181	749113
NSR 5	Claretuam ED, Tuam, Galway	537861	748187
NSR 6	Claretuam ED, Tuam, Galway	537495	747929
NSR 7	Killower ED, Tuam, Galway.	537467	747911

Table 8.2: Noise sensitive receiver locations included in the noise prediction model.

Figure 8.1: Noise Monitoring Locations (NML 1 & 2), Vibration Monitoring Location (VML) and Noise Sensitive Receiver (NSR 1- 7) locations included in the noise prediction model.

8.3 Noise Impacts that have occurred

8.3.1 Noise Monitoring

AONA Environmental has undertaken baseline noise monitoring in proximity to the nearest noise sensitive properties to the Cartron Quarry site on Thursday 22nd April 2021. The noise monitoring survey was conducted in accordance with *ISO 1996-2, 2017 Acoustics – Description, Measurement and Assessment of Environmental Noise.*

The Cartron Quarry site was not in operation during the survey. The adjacent Mortimers Quarry site was noted to be operational. A Norsonic Nor 140 sound level meter was used during the survey, which was calibrated before and after the noise survey period. The weather conditions during the noise survey were noted to be dry, warm and with a light south-easterly breeze.

The baseline noise monitoring locations are outlined in Table 8.3 and the recorded noise levels have been compared to that measured in 2013, as reported in the previous substitute consent application and REIS, grant in 2015.

Description	Location	ITM Coordinates	
NML 1	Approx. 80m north of farmyard to the north of the quarry to represent properties located to the north of the quarry	536679	749173
NML 2	Approx. 75m north-west of properties located along the local road to the east of the quarry site.	537432	747991

Table 8.3: Baseline noise monitoring locations on 22nd April 2021.

Location	Date	Time	$L_{Aeq, 60min}$	$L_{A10, 60min}$	$L_{A90, 60min}$	Notes
NML 1	19/04/2013	08.57 – 09.57	43	45	32	Cartron Quarry not audible. Agricultural sources dominant
		09.57 – 10.57	52	46	31	
	22/04/2021	10.44 – 11.44	46.2	47.1	34.5	Cartron Quarry not audible. Agricultural sources dominant. Agricultural activity in surrounding fields.
NML 2	19/04/2013	11.14 – 12.14	45	47	40	Cartron Quarry not audible. Mortimers Quarry audible. Passing traffic on local road
		12.14 – 13.14	44	48	33	
		13.14 – 14.14	48.4	50.1	35.1	
	22/04/2021	12.02 – 13.02	45.2	47.1	36.8	Cartron Quarry not audible. Mortimers Quarry operation faintly audible. Passing traffic on local road and occasional lorry movements. Agricultural activity in surrounding fields.

Table 8.4: Noise monitoring survey results at NML 1 and NML 2 on 22nd April 2021 compared to 19th April 2013.

The noise monitoring data presented in Table 8.4 indicates that there is relatively little difference in the noise climate since the assessment work undertaken in 2013. Cartron Quarry was not in operation and therefore, not audible during the noise surveys undertaken on 22nd April 2021. Mortimers Quarry was in operation and occasionally was faintly audible during the noise surveys undertaken on 22nd April 2021. Previous relevant noise surveys and their findings are summarised in Table 8.5 overleaf.

Based on the noise survey data outlined in Tables 8.4 and 8.5, it can be deduced that the quarry noise at the nearest residential properties was significantly below the 55 dB(A) noise limit that applies to the Cartron Quarry & Mortimer's Quarry.

Therefore, the specific quarry noise levels did not exceed the absolute limit that is applied to all extractive sites taken from the Guidelines Quarries and Ancillary Works, which states that *"site noise shall not exceed 55dB(A) $L_{Aeq,T}$ during 08:00hrs – 18:00 hrs Monday to Saturday and 45 dB(A) $L_{Aeq,T}$ at any other time when measured at any noise sensitive premises in the locality".*

Year	Source	Summary of findings
2006	EIS submitted on behalf of Frank Mortimer Ltd. Noise survey undertaken by Biospheric Engineering	Survey undertaken in January 2006 with both McTigue's Quarry & Mortimer's Quarry in operation. Measured L_{A90} levels in the area of 39 – 47 dB L_{A90} suggest minimal quarry noise impact.
2007	Noise survey undertaken by Environmental Efficiency Ltd. on behalf of McTigues Quarries Ltd.	Survey undertaken in June 2007 in order to assess compliance with Condition 2 of Quarry Reg. QY71 with both Cartron Quarry & Mortimer's Quarry in operation. Measured L_{A90} levels in the area of 39 – 47 dB L_{A90} suggest minimal quarry noise impact. Noise level of 66 dB L_{Aeq} at mon. loc. was attributed mainly to passing trucks on local road. A background noise level of 30 dB L_{A90} was assessed to be more representative of the onsite emissions arising from both quarries.
2011	Annual Env. Noise Survey on behalf of Frank Mortimer Ltd. Survey undertaken by Biospheric Engineering	Survey undertaken in October 2011. Report noted that crushing noise from Mortimer's Quarry was just audible at nearest property to the east of the site. A background noise level of 38 - 47 dB L_{A90} was assessed to be more representative of the onsite emissions arising from Mortimer's Quarry. Cartron Quarry was not referenced.
2014	Annual Env. Noise Survey on behalf of Frank Mortimer Ltd. Survey undertaken by TMS Environment	Survey undertaken in June 2014. A background noise level of 36 - 41 dB L_{A90} was assessed to be representative of the onsite emissions arising from Mortimer's Quarry at 4 monitoring locations in the area. Cartron Quarry was not referenced
2017	Annual Env. Noise Survey on behalf of Frank Mortimer Ltd. Survey undertaken by RPS	Survey undertaken in October 2017. Report noted that main noise source was from traffic on local road at nearest property to the east of the site. A background noise level of 32 dB L_{A90} was reported to be more representative of the onsite emissions arising from Mortimer's Quarry. Cartron Quarry was not referenced.

Table 8.5: Summary of previous relevant noise monitoring survey in proximity to Cartron Quarry.

8.3.2 Quarrying Noise Impacts that have occurred

The results of the noise prediction model to address all the winning and working of minerals, processing and associated activities which have occurred within the applicant's lands during the period between the previous grant of SC for the site in January 2015 (Ref 07.SU.0036) and present day are presented in Table 8.6. The sound power level (L_W) of the noise sources included in this noise prediction model are as follows:

Point Sources:

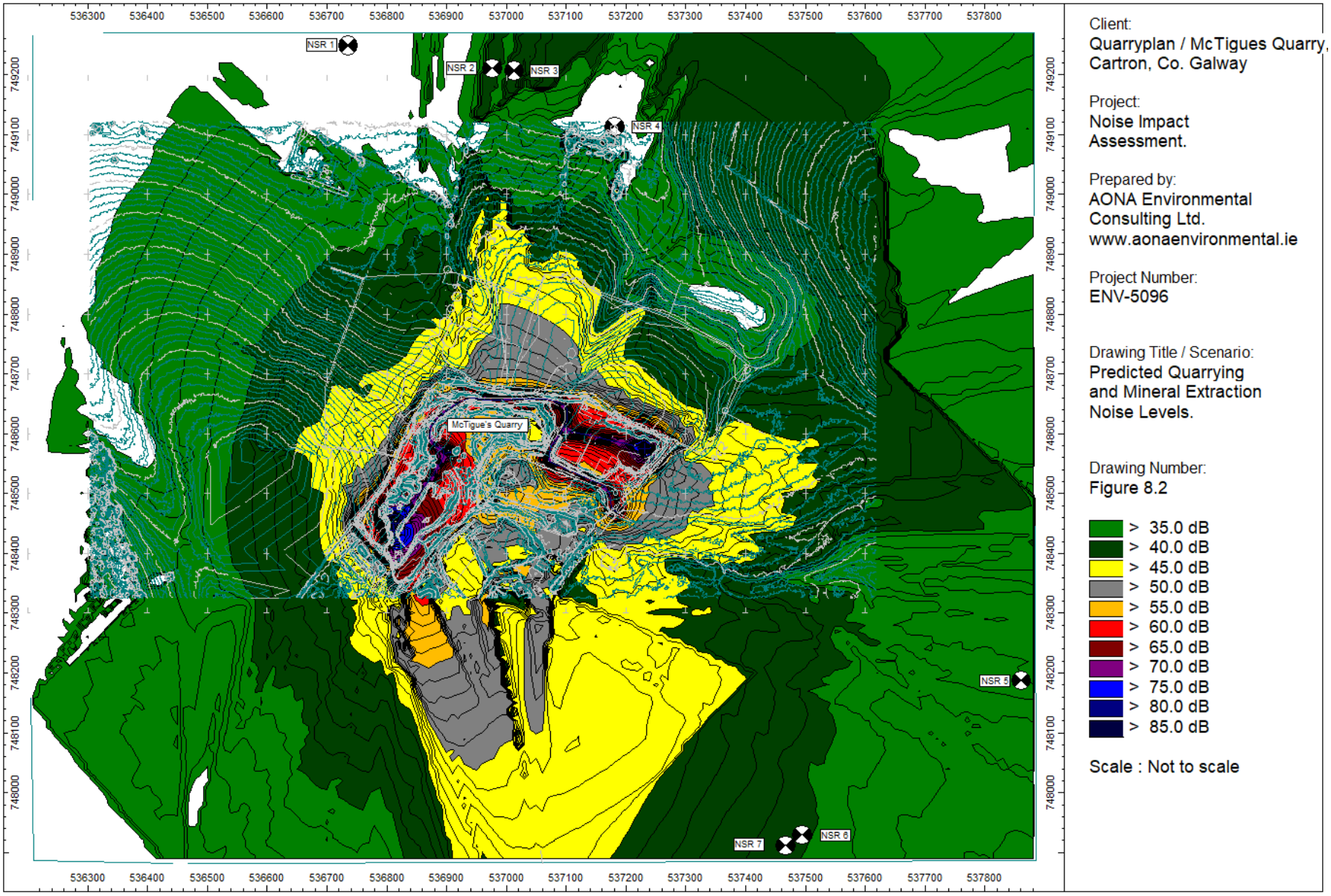
Name	L_W dB(A)	Notes
Crushing & Screening Plant at working quarry faces	120.0	Assumed to be operational 100% of time
Excavator at working quarry faces	112.0	Assumed to be operational 100% of time
Drill Rig	115.0	Operational for just 15 days per annum

Moving Line Sources:

Name	L_W dB(A)		Moving Pt. Src		Notes
	Type	Value	Number per hour	Speed (km/h)	
Front Loaders	PWL-Pt	105	30.0	10.0	Assumed to be operational 100% of time
Haul Truck Movements	PWL-Pt	105	6.0	10.0	

Name	**Predicted Worst-case Noise Level**	**Receiver Height (m)**	**Coordinates**	
			X (m)	**Y (m)**
NSR 1	32.8	1.50	536736.00	749248.00
NSR 2	40.4	1.50	536978.00	749210.00
NSR 3	42	1.50	537013.00	749206.00
NSR 4	30.2	1.50	537181.00	749113.00
NSR 5	39	1.50	537861.00	748187.00
NSR 6	40.2	1.50	537495.00	747929.00
NSR 7	40.4	1.50	537467.00	747911.00
Limit	**55 dB(A)**			

Table 8.6: Predicted worst-case noise levels from the mineral extraction operations which have occurred within the applicant's lands during the period between the previous grant of SC for the site in January 2015 (Ref 07.SU.0036) and present day (See Figure 8.2).


536300 536400 536500 536600 536700 536800 536900 537000 537100 537200 537300 537400 537500 537600 537700 537800
749200 749100 749000 748900 748800 748700 748600 748500 748400 748300 748200 748100 748000
NSR 1
NSR 2
NSR 3
NSR 4
NSR 5
NSR 6
NSR 7
McTigue's Quarry
Client:
Quarryplan / McTigues Quarry, Cartron, Co. Galway
Project:
Noise Impact Assessment.
Prepared by:
AONA Environmental Consulting Ltd.
www.aonaenvironmental.ie
Project Number:
ENV-5096
Drawing Title / Scenario:
Predicted Quarrying and Mineral Extraction Noise Levels.
Drawing Number:
Figure 8.2
> 35.0 dB
> 40.0 dB
> 45.0 dB
> 50.0 dB
> 55.0 dB
> 60.0 dB
> 65.0 dB
> 70.0 dB
> 75.0 dB
> 80.0 dB
> 85.0 dB
Scale : Not to scale

The highest predicted daytime noise level of 42 dB(A) at NSR 3 indicates that the quarrying noise sources did not have a significant noise impact at properties in proximity to the Cartron Quarry site relative to the quarry noise limits during daytime.

In relation to the regularisation of buildings and structures that Galway County Council consider to be unauthorised, including an extension to existing garage/workshop; an additional workshop/ storage unit; a canteen; a pumphouse; and a water tank, these sources can be taken to be insignificant in comparison to the mineral extraction and transport sources outlined above. Noise levels from the enclosed workshops will have been insignificant and contained.

8.3.3 Cumulative Noise Impacts that have occurred

The cumulative noise impacts that have occurred from the operations of Cartron Quarry and Mortimer's Quarry have been outlined above in the results of the noise monitoring undertaken in recent years as presented in Table 8.5. These noise levels outline the cumulative noise levels due to the two quarry sites. The measured daytime noise levels indicate that the cumulative noise from quarrying in the area of the site has not had a significant noise impact at properties to the north and east of the Cartron Quarry site relative to the quarry noise limits during daytime.

8.3.4 Noise & Vibration Impacts that have occurred from Drilling & Blasting

The drill rig operations and blasting to allow for the quarrying process, took place infrequently with blasting occurring once every 2 months and drill rig operations took place for approximately 2-3 days in advance of each blast.

Blasting of the rock results in an instantaneous noise impact. However, this is a very short – term noise impact and results in an instantaneous increase in

noise levels during daytime hours with immediate reversion back to preceding noise levels. A typical sound level from blasting, measured at 15 m from the source is 94 dB(A) (Hoover 1996). Table 8.7 outlines the predicted noise levels in the vicinity of an active blasting site. The accepted reduction in noise levels with distance from a blast is based on the assumption that the sound level drop off rate equates to 6 dB per doubling of distance. Blasting parameters including PPV and Air Overpressure have been set by the EPA for all quarrying proposed operations in Ireland.

Distance to receiver (m)	Sound Level At Receiver Location dB(A)
15	~ 94
30	~ 88
60	~ 82
120	~ 76
240	~ 70
480	~ 64
960	~ 58

Table 8.7: Estimated Blasting Noise in the vicinity of the quarry.

As indicated in Table 8.7, sensitive receivers within approximately 500m of the blasting site could be exposed to instantaneous noise levels of approximately 65 dB(A). However, these blasts result in very short – term instantaneous noise impact at all residential receivers in the vicinity of the quarry and do not constitute a significant noise impact.

Vibration monitoring was undertaken during blasting events in the adjoining Mortimer's Quarry. It is reasonable to assume that vibration impacts from blasting in the Mortimer's Quarry will be similar in terms of impact at the nearest sensitive residential locations as from the adjacent Cartron Quarry site. Vibration monitoring has been undertaken at the nearest residential property (c. 580m to the south of the Cartron Quarry southern boundary) during blasting events in the adjoining Mortimer's Quarry since 2011 (See

location in Figure 8.1- VML1). Vibration monitoring has been undertaken by Irish Industrial Explosives.

Year	Date	PPV mm/s Horizontal	PPV mm/s Transverse	PPV mm/s Vertical	Air Over-pressure dB Lin
2011	21/5/11	1.3	0.7	1.2	123
	13/8/11	1.2	0.8	1.5	124
	22/10/11	0.12	0.06	0.06	122
2012	03/08/12	1.2	0.95	0.65	117.5
	12/10/12	1.27	1.46	0.00	123.5
2013	15/03/13	1.71	2.09	1.02	122
2016	21/03/16	2.5	1.5	4.8	121
	05/05/16	1.39	0.95	0.88	125
	12/05/16	0.95	1.27	0.69	131
	19/05/16	2.47	1.46	1.39	125.9
	14/07/16	0.8	1.1	1.9	126
	30/08/16	1.3	1.3	2.2	122
	23/09/16	1.2	1.1	0.8	122
	27/10/16	1.9	2.28	0.76	119.7
	24/11/16	1.58	1.07	1.2	128.7
2017	20/01/17	1.33	2.03	0.89	115.7
	21/02/17	0.8	0.7	0.8	128
	28/04/17	1	0.6	0.5	118

Table 8.8: Vibration monitoring survey results at the nearest residential property to the east during blasting events in the adjoining Mortimer's Quarry since 2011. Note: Data from 2016 onwards is within the substitute consent period (highlighted in red).

It is considered that the levels of vibration experienced at the receptor properties, at a distance in excess of 500m, are not significant in environmental terms. Accordingly it is considered reasonable to assume that the levels were within acceptable parameters and it is considered that any potential vibration impact in relation to blasting was negligible.

The DoEHLG Guidance provides a limit for ground-borne vibration: Peak particle velocity = 12 mm/s, measured in any of the three mutually orthogonal directions at the receiving location (for vibration with a frequency of less than 40 Hz). The DoEHLG Guidance provides a limit for Air overpressure: 125 dB (linear maximum peak value), with a 95% confidence limit. These limits will not have been exceeded by drilling and blasting practices and therefore no significant impact will have occurred as a result of blasting.

8.4 Impacts that are occurring

No mineral extraction within the application area has taken place since June 2019. Activity at the site during this period has been limited to ancillary activities, generating very limited vehicle movements and/or movement of material. As such, the potential for noise generation is considered to have been limited in the period following the cessation of mineral extraction. Given the same, the potential for properties to be impacted by noise emissions is considered to be negligible.

The noise monitoring survey results from April 2021 (Table 8.4) shows levels of 34.5 and 36.8 dB $L_{A90,60min}$ at the nearest receptors. The Noise Survey showed noise sources to be comprised of passing traffic on local road, occasional lorry movements and agricultural activity in surrounding fields. Therefore no significant effects are being encountered at the nearest properties.

8.5 Impacts that are reasonably likely to occur

There is no scope in the SC process to allow for future working and as such, the scope for noise generating activities is limited. The site will be restored in accordance with the submitted restoration scheme. Activities associated with restoration works has the potential to result in potential noise impacts. Should quarrying and associated operations cease on the site, noise levels from de-commissioning of the structures on the quarry site and / or the regrading of

the benches in the extraction area and subsequent infill with groundwater will be short-term noise impacts. Such activities will be subject to a higher noise limit of 70 dB(A) as distinct from normal site operations. Such activities may include overburden removal, bund de-construction, restoration works, de-commissioning of plant and equipment, etc. Typically, such works will be carried out during an 8 week window per annum.

In the event that the alternative scenario is adopted and planning permission is sought under 34 of the Act for future quarrying, given that the noise modelling has predicted that operations at Cartron Quarry have individually and cumulatively operated below the guideline figure provided for in the DOEHLG recommended noise levels, no significant effect is predicted as a result of future working at the quarry. In any event, this would be the subject of a separate environmental assessment in the future.

8.6 Conclusions

The noise monitoring surveys that have been undertaken in proximity to the Cartron Quarry site typically report that the ‘Quarry noise was faintly audible’ or ‘Quarry noise was not audible’. The periodic noise monitoring surveys that have been undertaken in proximity to the Cartron Quarry site indicate that the cumulative noise from the operation of the two adjacent quarries is not having a significant noise impact at the nearest residential properties. Therefore, it is concluded that operations during the SC period at the Cartron Quarry site, have not resulted, are not resulting or unlikely to result in any a significant noise impact at the nearest residential properties. The addition of the unauthorised structures has not noticeably altered the resultant noise levels at the surrounding noise monitoring locations and the predicted specific noise levels due to the operation of the Cartron Quarry site indicate that the operations have not had a significant noise impact at the nearest residential properties.

The impacts that have occurred do not give rise to any significant environmental impact, and operations consistently have cumulatively operated below the guideline figure provided for in the DOEHLG recommended noise levels.

With reference to the vibration target levels as provided for in the DoEHLG Guidance, the site has operated in full compliance.

9.0 LANDSCAPE

This section of the REIAR is comprised of a Remedial Landscape and Visual Impact Assessment (RLVIA) which has been prepared by Mullin Design Associates, Chartered Landscape Architects.

The assessment address landscape and visual impacts that have potentially occurred at Cartron Quarry, Belclare, Tuam, Co. Galway between January 2015 and June 2019 when quarrying operations ceased and impacts that are occurring from June 2019 to present and impacts which are reasonably likely to occur in the future.

This report specifically assesses the quarried area within the boundary limits of Cartron quarry, however, it inevitably evaluates and references the adjoining Mortimer quarry as both are indistinguishable in the landscape. The adjoining operation is owned by Mortimer Quarries which is unrelated to the applicant's operation. Within this section the Cartron Quarry development is referred to as 'the quarry' while the adjacent quarry is always referred to as 'Mortimer Quarry'.

The figures and tables referenced throughout this section constitute an important element of the assessment and as such are held at Appendices 9.1 and 9.2 respectively, separate to the section to allow for ease of access to the reader, that the text and the visual analysis can be viewed side by side.

9.1 Author of the Report

This study has been drafted and overseen by Pete Mullin, BA (Hons) CMLI, MILI, Member of the Irish and UK Landscape Institutes principal of Mullin Design Associates. Pete Mullin has studied, practiced and taught Landscape Architecture for over 31 years, is a Chartered Landscape Architect and former Policy Consultant.

To date he has been involved with preparation of several hundred Landscape and Visual Impact Assessments, for a wide variety of Annex 1 and Annex 2 projects. He has been an expert witness at numerous public inquiries and oral hearings.

9.2 Background and setting

The subject site is located at Grid Reference OS. M 37231 48469, approx. 7 km Southwest of Tuam, Co Galway. It is c1km south of the R333 and 2.5km west of the N17 located within the catchment system of the River Clare (Figure 9.0).

The site is comprised of a c. 8.46ha L-shaped limestone quarry, bound to the north, east and south by agricultural fields. It is within the Northeast Galway (Tuam environs) No.5 Landscape Character Area (LCA). The key characteristics of this LCA are as follows:

- The landscape is flat, fertile pastoral land bound with field hedgerows.
- There is little or no coniferous forestry or deciduous woodland.
- There are no areas of particular scenic value

Details of this character area are discussed further in Section 9.3.6.

The context of the site is predominately rural / agricultural in character, with a number of small scale commercial woodlands, interspersed with individual dwellings and farmsteads.

Topographically the assessment area is considered a rolling lowland landscape with the site located at approximately 60m AOD.

Existing landuse types within a 5km catchment of the site include:

Residential	With the exception of residential clusters and townlands there are no named villages or towns within 5km (Tuam 7km); remaining residential properties include detached dwellings & farmsteads.
Transport	N17, R333, Local Roads, Lanes and Access tracks
Commercial	Telecom masts, Power Lines,
Culture/Tourism	Churches, Graveyards, Castle, Cairns

Within the study area the report identifies key locations (visual receptors) that may receive potential landscape and visual impact from the development and which represent the worst case scenario views of the site; these are identified as:

- Individual Residential Properties; Commercial Properties; Public Buildings
- Roads, Tourist Routes and Viewpoints
- Junctions and Crossroads
- Sites of Cultural/Historic/Visitor significance

This study has been structured and laid out in the following subsections:

- **Method of Assessment** – explanation of how the assessment has been undertaken, with reference to methodology, terminology, assessment criteria, and planning policy.
- **Landscape and Visual Context** – baseline description, classification and evaluation of the existing landscape character containing the application site and an assessment of visual amenity, with identification of visual receptors.
- **Project Description**– description of the development.
- **Impacts** – an outline of landscape and visual impacts which:-
    a. Have occurred (January 2015 to June 2019);

b. Are occurring (June 2019 to Present)
c. May potentially occur (Going forward)

- **Summary and Conclusions** – summary of assessment results.

9.2.1 Method of Assessment & Guidelines

The assessment of the landscape and visual impacts for this development are based on the most up to date guidelines provided by The Landscape Institute and Institute of Environmental Management & Assessment in the 'Guidelines for Landscape and Visual Impact Assessment', (3rd Edition) 2013, and The Countryside Agency and Scottish Natural Heritage – Landscape Character Assessment Guidance for England and Scotland 2002 have been used as important reference documents.

As recommended within the Guidelines for Landscape and Visual Impact Assessment, (3rd Edition) 2013 the landscape and visual assessment incorporates both desk and field studies and has been compiled and interpreted by an experience landscape professional.

Reference has been made to County Galway Landscape Character Assessment within the County Galway Development Plan which provide a baseline landscape description.

9.2.2 Assessment Criteria

The aim of the landscape and visual impact assessment is to identify, evaluate key effects arising from the unauthorised aspects of the development. The assessment combines **sensitivity** with predicted **magnitude of change** to establish the **significance of residual landscape & visual effects.** These are based on pre-defined criteria as set out in Tables 9.1 – 9.5 held at Appendix 9.2.

9.2.3 Methodology

This Landscape & Visual Assessment was undertaken in the following stages:

● Desk Study (Stage 1)	1	Analysis of Baseline data, Map/Plans
	2	Consultation of Policy Documentation
	3	Zone of Visual Influence (Theoretical)
	4	Identification of Potential Visual Receptors
● Field Study	5	Confirmation of Visual Receptors
	6	Photo Survey from Visual Receptors
	7	Zone of Visual Influence (Actual/Field)
	8	Confirmation of Landscape Character
	9	Establish Landscape Sensitivity
● Desk Study (Stage2)	10	Analysis of Field Survey data
	11	Viewpoint Analysis
	12	Consider Mitigation & Restoration
● Desk Study (Stage3)	13	Report Preparation

9.3 Assessment of Baseline Conditions

This section establishes the landscape and visual context (or baseline) of the subject development. Typically for a proposed development this process involves consideration of the existing 'pre-development' condition of the receiving environment. However for a substitute consent scenario, the baseline will be a date which predates the introduction of any unauthorised development.

In relation to unauthorised development s177(F) of the Act requires consideration of impacts which **have occurred**; **impacts which are occurring**; and **impacts reasonably expected to occur**.

9.3.1 'Impacts which have Occurred'

In relation to establishing a baseline for 'impacts which have occurred', firstly it is important to emphasise that the majority of development currently visible at this site was authorised under substitute consent reference 07.SU.0036, which authorised operations up to January 2015 .

The baseline focus of this study considers potential landscape and visual effects which have occurred as a result of additional unauthorised extractive operations between January 2015 and June 2019 combined with a number of unauthorised built structures including:

- Extension to existing garage/workshop approved under planning ref no. 06/3299;
- additional workshop/ storage unit;
- a canteen;
- a pump house;
- and a water tank.

9.3.2 'Impacts which are Occurring'

This related to impacts arising from unauthorised development from June 2019 to the present. It should be noted that there has been a complete cessation of quarrying operations at the site since June 2019.

9.3.3 'Impacts that can be Reasonably Expected to Occur'

The final stage of the assessment is to consider the significant effects, or impacts, that can reasonably be expected to occur as a result of the development for which substitute consent is required in providing restoration of and post restoration of the site, considering both the prospect of immediate

remediation. or the alternative of continued operations under separate consent following consideration and approval by the Competent Authority.

It is important to highlight that whilst consideration of ‘impacts that can be reasonably expected to occur’ is a requirement under substitute consent legislation, consideration of potential landscape and visual impacts cannot confidently be predicted in the absence of proposals which may for example involve lateral extension into currently unquarried lands.

Establishment of the baseline conditions involves a combination of both ‘Desk and Field Study’.

9.3.4 Desk Study

Desk studies generally involve analysis and interpretation of available print material relating to a sites context and the subject development within that context. It is a way of focusing the study prior to detailed site investigation.

Although general in nature the desk study stage of the project assists in the clarification of the following:

- **The general topography, vegetative cover, visible groundwater, and sites of potential historic or cultural interest.**

Study of the available map information indicated that the site is located on the south-eastern side of a localised elevation “Knockmaa Hill” which contrasts with the wider context of gently undulating lowland.

OS 1:50000 mapping indicates that within 5km radius of the site there is little in terms of significant structure vegetation, with the exception of Knockmaa Hill complex which has a well established mix of deciduous and coniferous tree cover.

Several historic/archaeological sites have been highlighted within 5km around the application area. Of note is the elevated cairn complex at Knockmaa Hill which is relatively close to the subject site.

- **Identification of primary investigation area or Zone of Theoretical Visual Influence (ZTVI);**

Although the ZTVI is calculated and generated using topographical data, it is generally accepted that such models do not necessarily reflect the actual visual catchment on the ground, it is therefore crucial that the topographically generated ZTVI is refined through detailed site survey and analysis. – The ZTVI have been undertaken for this application which illustrate the potential extend of visibility (visual envelope) of the key development features including previously permitted and unauthorised for comparison.

- **The potential relationship between the development and any residential settlements, dwellings and the surrounding transportation network;**

Although not all dwellings are individually identifiable on the OS 1:50000 map, it is sufficiently detailed for the desk study to reveal that the site is located in an area which has a relatively low population concentration.

Population is concentrated in Tuam 7km to the Northeast and elsewhere as sporadic ribbon settlements primarily located along the surrounding minor roads.

- **Designations, protected areas and significant viewpoints;**

The site does not lie within a landscape designation.

9.3.5 Field Study

Desk studies are important to establish the basic approach to landscape and visual assessment and for setting out principal issues/ areas to be investigated. However, it is only through field work that an accurate understanding of potential influence of a development can be fully determined.

Most importantly field study helps to clarify the eye level visual envelope of unauthorised development by refining the computer generated ZTVI model to more accurately reflect the actual visual influence perceived on the ground.
The area was visited and surveyed during early Spring with foliage cover at its lightest. It should be noted that as foliage cover increases into Summer the subject site would be less visible. The influence of foliage cover has been broadly factored into the findings, with a worst case scenario considered – i.e vegetation cover at its lightest.

In addition to the information revealed during the desktop analysis, the field study work investigated and considered a number of critical issues, which have been factored into the assessment conclusions:

- Confirmation of the landscape character and sense of place, quality and value of the surrounding;
- Localised topography variation and woodland / hedgerow cover.
- Effects of localised planting, stone wall, earthworks and boundaries associated with residential properties;
- Relationship of other operations throughout in the area
- Consideration of operations in low light conditions
- Potential eye level perceptions (Local residents – Frequent, Passive Tourism - Occasional;
- General landscape dynamic (assessing the potential pressures and evolution of surrounding landscape).

9.3.6 Landscape Character Baseline

As outlined above a broad landscape characterisation study of County Galway has been prepared and is contained within the County Development Plan. The site is within the Northeast Galway (Tuam environs) No.5 Landscape Character Area (LCA).

The key characteristics of this LCA are as follows:

- "The landscape is flat, fertile pastoral land bound with field hedgerows.
- There is little or no coniferous forestry or deciduous woodland.
- There are no areas of particular scenic value."

Landscape Value & Sensitivity

The Northeast Galway Tuam LCA has been classed as having an overall landscape value rating of **Low**. The key Cultural, Socio-Economic and Environmental values are summarized in the table below.

This LCA also generally has a low Landscape Sensitivity of Class 1 - Low with a few small pockets of Class 2 - Moderate Landscape Sensitivity.

Table 6-5 from the County Development Plan (as re-produced overleaf) sets out the overall landscape value of LCA 5.

TABLE 6-5: Landscape and Landscape Character Assessment for Galway: Landscape Value Table for Northeast Galway Tuam LCA (No. 5)

Cultural Values (Overall Low)	Socio economic Values (Overall Low)	Environmental (Overall Low)
• **Landscape Aesthetics/Sense of place** • **Historical Features** • **Protected/Designated Landscape**	• **Value to local economy** • **Sense of community** • **Education** • **Public Recreation**	• **Water Quality** • **Soil Type** • **Air Quality** • **Biodiversity**
• Flat open agricultural landscape of fields bounded by hedgerows. • Random clusters of mature trees. • Overall not a highly scenic area. • Loughs are distinctive landscape elements but are generally visible only at short range. Summerville Lough is particularly scenic. • Views of Knockmaa mountain for up to 8 km radius. • Views generally to the hills south of the N63. • Views of the Cathedral of the Assumption in Tuam for up to a 3 km radius. • 10 National monuments to be found in this area. • Designated landscapes as follows; Esker (0.25 sq km) - NR Lakes (approx 4 sq km) – NHA Bogs (approx 35 sq km) – NHA Turloughs (approx 8 sq km) – NHA	• Agriculture as main form of rural employment in this area. • A number of small urban settlements may also provide limited employment opportunities. • There is a large amount of linear residential development along the National Primary and Third Class Roads in this extended area. This equates to high property ownership in this area. • This area does not have much potential for large scale tourism development. A number of smaller loughs could be designated for passive recreation. • Good road network in this area, Tuam and Headford would be the principal centres of employment	• Rivers include Abbert, Grange, Clare, Black and Sinking • Tuam is the largest settlement in area • Traffic is heavy on N17, N83, N84 • Air emissions dispersed from vehicles, industry, domestic fuel burning and agriculture, reduces air quality. • Flat to undulating Lowland. Degraded grey Brown Podzolic. Shallow Brown Earth's and Rendzinas and Basin Peat • Biodiversity is medium in certain areas for example 47.25sq km are of national importance.

Development Recommendations for the Northeast Galway (Tuam Environs) LCA:

The Landscape Character Assessment for Galway has suggested a number of recommendations for potential future development within the Northeast Galway (Tuam Environs) LCA No.5, including:

3.13 Development is prohibited in the areas (primarily bogs) that carry a nature designation

3.14 In the class 1 area, the landscape is generally flat therefore height restrictions should apply to built development in to avoid long distant visual intrusion. This area has very little woodland or forestry present, and owing to the low scenic value of the area may be suitable for commercial forestry development. Large scale development should be screened by either new commercial forestry or mixed deciduous woodland. 3.15 Due to the rural nature of this class 1 area, scattered development which cannot be screened by forestry should be of natural stone or render with colour finish to be sympathetic to the colours of the existing landscape.

3.16 New development should be surrounded by hedgerow to reinstate sections; lost during construction and to continue the ecological corridor effect.

9.3.7 Local Landscape Character

The landscape of the localised study area (i.e Within the visual envelope) largely supports the characteristics identified within the wider LCA 5, such as relatively flat landform, however the landscape around Knockmaa along with lands to the North relating to the former Castlehacket demesne retain good tree cover.
Further, whilst LCA 5 description suggests there are no areas of particular scenic value, the landscape of Knockmaa and to the North associated with the former demesne of Castlehacket is established and mature, therefore considered relatively attractive and clearly of value locally if not regionally.

There are many small ribbon developments found along the network of local and national roads within the local area.

Sensitivity to change: **Low to Medium.**

9.3.8 Visual baseline

When establishing the extent of the development's visibility there are a number of recognised stages including the generation of Zone of Theoretical Visibility (ZTVI) models, field work and site intervisibility studies.

However, these become less relevant when considering the extent of visibility relating to the unauthorised development which has already occurred, simply because the actual extent of visibility can be witnessed and considered directly.

As a basic visual principal, all development typologies in the landscape become less perceptible with distance. This simply equates to a reduction of the significance of potential visual impacts as one move further away.

Viewpoint Distance 0-2km

Although it is difficult to quantify, it is acceptable to state that a site located approx. 2km or less from a viewer is considered close enough to allow identification of significant detail. Any positions within this range with open uninterrupted views of a development would generally receive the greatest visual impacts.

Viewpoint Distance 2-5km

At this distance, visibility of a development site becomes more general, with viewers in open uninterrupted positions able to identify general form, colour/tone and textural contrast, but losing the more focused detail achievable from closer positions. Effects at this distance are generally less than those found between 0-2km.

Viewpoint Distance 5-15km+

Beyond 5km visual prominence quickly diminishes. In certain circumstances/light conditions etc have potential to allow certain types of development and material finishes to be perceived. The development

increasingly becomes part of the general background/distance views. Upwards of 15km distance and developments quickly become minor features within the landscape and considered imperceptible to the average human eye. The development in effect becomes part of the general background/distance views.

Figure 9.1 illustrates the identified ZTVI (Zone of Theoretical Visual Influence) created by the unauthorised elements of the operation.

The visibility assessment in this case has concentrated on publicly accessible areas primarily within the first distance category (0-2km).

The undulating topography and the existence of field boundaries, combined with clusters of woodland vegetation greatly reduce the potential extent of visibility, however, views from local road L2112 present the greatest opportunity to encounter visibility of the unauthorised elements associated with the site along with elevated lands around Knockmaa Hill from which portions of the unauthorised elements can also be witnessed.

As illustrated in Figure 9.1 the ZTVI is relatively compact, with the main focus on lands and local roads to the South, primarily within a 2km radius.

9.4 Assessment of Impacts - (Description of Unauthorised Development)

Whilst the application area for the substitute consent covers McTigue Ltd entire operation at Cartron of 8.46Ha, not all of this area is occupied by unauthorised works as illustrated in Plate 9.0 below.

The unauthorised elements which form the basis of this assessment consist of the following:

1 3No. localised areas of extraction:

Area 1	=	16327m2	(1.63Ha)
Area 2	=	3221m2	(0.32Ha)
Area 3	=	1562m2	(0.16Ha)
TOTAL	=	21110m2	(2.1Ha)

2 Extension to existing garage/workshop approved under planning ref no. 06/3299 - (Height c.9m)

3 additional workshop/ storage unit - (Height c.8m)

4 a canteen - (Height c.3m)

5 a pump house - (Height c.2.7m)

6 a water tank

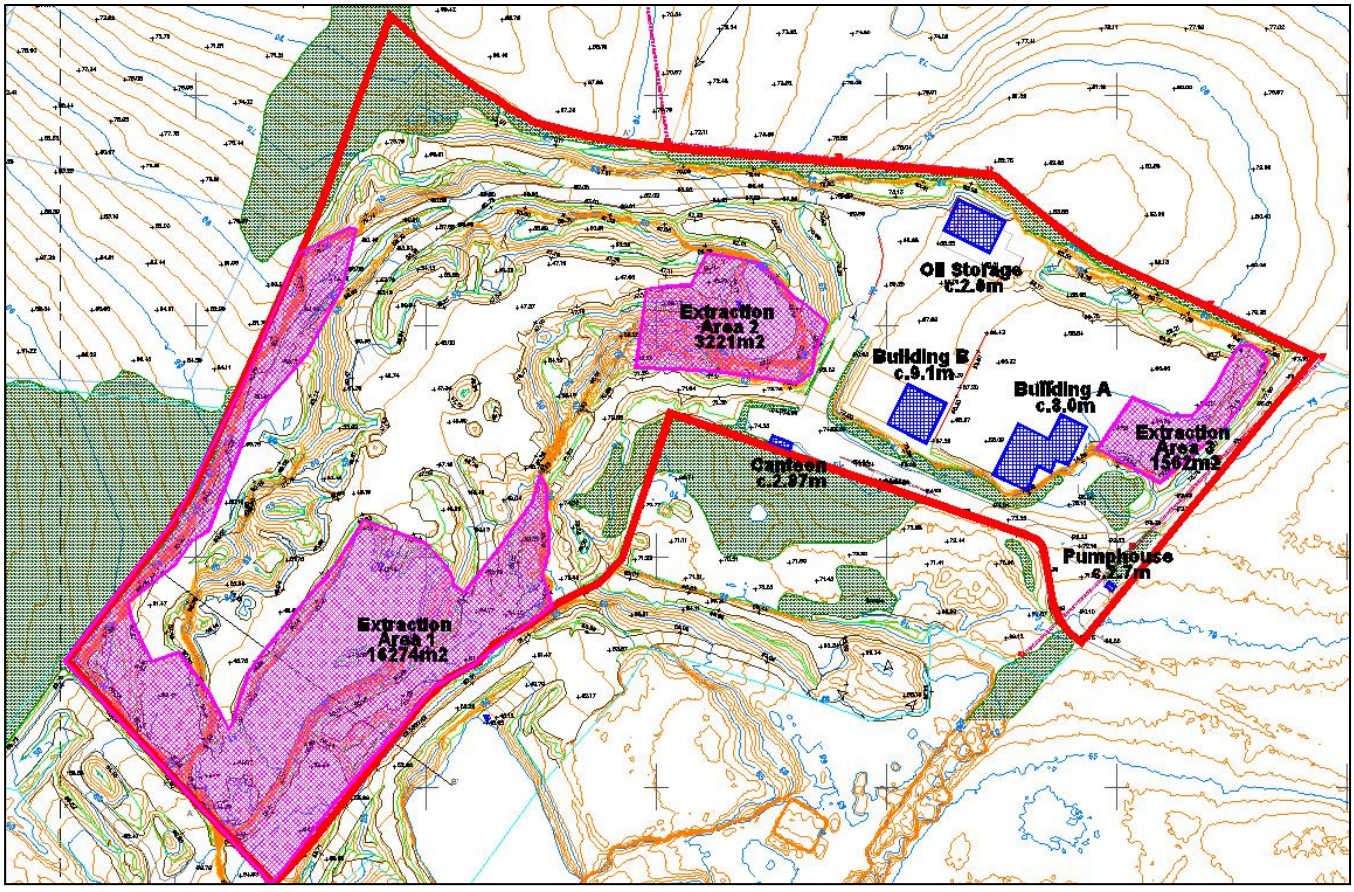


Plate 9.0 – Location of Unauthorised Development

Red Line	Site Area- 8.46Ha
Magenta	Unauthorised Extraction- 2.1Ha
Blue	Unauthorised Structures

9.4.1 Summary of Landscape Impacts

The purpose of landscape assessment is to establish the sensitivity of specific landscape resources and describe the significance of changes to that landscape as a result of the development. More importantly it should identify opportunities during the design process focused on minimising potential landscape and visual impacts through positive intervention. This can include exerting influence on the development layout and arrangement or determining the most sympathetic operational approach to a proposal, i.e. suggested phasing, direction and sequence of extraction, sensitive placement of builds and structures. These are referred to a ‘primary mitigation measures’

However, in relation to development which has already taken place (unauthorised), primary mitigation measures are not possible. In this scenario mitigation opportunities become limited to ‘secondary measures’ which are designed to address residual negative effects of a final development proposal. For example this can include targeted screening measures such as earthworks or planting.

Landscape and visual impacts are intrinsically linked; therefore, measures to reduce landscape impacts will generally assist with reduction of visual impacts and vice versa.

It is understood that structures and building will be decommissioned at the end of quarry operations at the site with the entire site restored for biodiversity benefit.

Weighing up the various factors and descriptions as outlined in the Landscape Assessment Criteria Tables held at Appendix 9.2, in particular the application site’s location outwith any recognised landscape designation area, the natural screening created by topography, the woodland associated with Knockmaa Hill, and the relatively low numbers of impacted population, it is concluded

that the landscape sensitivity of the area should be generally classed as **Medium-Low.**

Medium-Low - Landscape characteristics or features which are reasonably tolerant of change without determent to their present character
No designation present or of little local value.
An example of an un-stimulating landscape or set of features
(Extract from Table 9.1 Landscape Sensitivity Criteria)

Landscape sensitivity is combined with the magnitude of change generated by a development to establish the overall impact / effect. In addition to the Criteria Tables above, magnitude of change is influenced by the following:

- Potential for mitigation.
- Development typology
- Duration of development
- Existing precedence of quarrying / processing operations in the area.
- Form of buildings and structures – i.e Do they appear as agricultural structures familiar to the region.
- The population numbers impacted are considered low.
- Full decommissioning and restoration proposed.

With reference to Table 9.3 Landscape Magnitude Criteria it is considered that the unauthorised elements of the development fall within the **Very Low** category as defined below:

Very Low - Little perceptible change

Table 9.7 below covers both landscape impacts which have occurred Jan 2015 – June 2019 and landscape impacts which are occurring June 2019 to present.

		Sensitivity				
		High	**High - Medium**	**Medium**	**Medium - Low**	**Low**
Magnitude	**Very High**	Major	⟷	Major	⟷	Mod-major
	High	Major	⟷	Mod-major	⟷	Moderate
	Medium	Mod-major	⟷	Moderate	⟷	Minor
	Low	Moderate	⟷	Minor	⟷	Negligible
	Very Low	Minor	⟷	**Negligible**	⟷	Negligible/None

Table 9.7 Assessment of landscape impacts Occurred and Occurring

When combining **Medium / Low** landscape sensitivity with a **Very Low** magnitude of change, the landscape impacts which have occurred between Jan 2015 and June 2019 generated by the unauthorised elements of this development are considered **Negligible.**

The landscape impacts which are occurring (June 2019 to present) from the unauthorised elements of this development are considered **Negligible / None.**

In addition to Landscape impacts which have occurred or those which are occurring, landscape impacts which can be reasonably expected to occur either through restoration /remediation of the site.

Whilst there are many variables - it is considered reasonable to conclude that a scenario of restoration and remediation of the unauthorised development would result in a **Moderate (Beneficial)** impact to the landscape character.

In the event that the alternative scenario is adopted and planning permission is sought under s.34 of the Planning and Development Act 2000 (as amended) for future quarrying, without sight of specific proposals it would be

inappropriate to predict potential landscape and visual impacts. However should a scenario of future extraction be limited to the existing extraction footprint such as the case with potential deepening, it is possible to suggest that such future workings are unlikely to result in any significant landscape and visual impact. In any event, any scenario which involves future works would be subject to a separate environmental assessment.

9.4.2 Summary of Visual Impacts

Visual impacts are illustrated by assessment from specific viewpoints. Figures 9.3-9.7 illustrate key identified visual receptors, with potential visual impacts assessed from these positions. Table 9.8 below provides a summary of Visual Impacts from each of the selected viewpoints.

Viewpoint No.	Receptor Type	Visual Sensitivity	Magnitude of Change	Effect /Impact
Viewpoint 1	Public Road – Sequential Residential	High	Very low	Minor
Viewpoint 2	Public Road – Sequential Residential	High	Very low	Minor
Viewpoint 3	Public Road – Sequential Residential	High	Very low	Minor
Viewpoint 4	Public Road – Sequential Residential	High	Very low	Minor
Viewpoint 5	Scenic Viewpoint	High	Very low	Minor

Table 9.8 Summary of Visual impacts (Have occurred Jan 2015 – June 2019)

Viewpoint No.	Receptor Type	Visual Sensitivity	Magnitude of Change	Effect /Impact
Viewpoint 1	Public Road – Sequential Residential	High	Very low	Negligible/None
Viewpoint 2	Public Road – Sequential Residential	High	Very low	Negligible/None
Viewpoint 3	Public Road – Sequential Residential	High	Very low	Negligible/None
Viewpoint 4	Public Road – Sequential Residential	High	Very low	Negligible/None
Viewpoint 5	Scenic Viewpoint	High	Very low	Negligible/None

Table 9.9 Summary of Visual impacts (Occurring June 2019 to Present)

Visual effects which have occurred (Jan 2015 – June 2019) from the unauthorised elements of the development at the selected visual receptors range from **Negligible** to **Minor.**

Visual effects which are occurring (June 2019 to present from the unauthorised elements of the development at the selected visual receptors are **Negligible** to **None.**

As viewers move away from these locations, visual sensitivity and magnitude of change will generally diminish, resulting in occurred and occurring visual impacts being **Negligible across** the majority of the ZTVI.

In addition to Visual Impacts which have occurred or are occurring, visual impacts which can be **reasonably expected to occur** through restoration /remediation of the site have been considered and are illustrated in Figure 9.3 - 9.7 - these impacts would be **Minor (Beneficial).**

In the event that a scenario is adopted involving additional extractive works with planning permission sought under s.34 of the Planning and Development

Act 2000 (as amended) for future quarrying, without sight of specific proposals it would be inappropriate to predict potential landscape and visual impacts. However should a scenario of future extraction be limited to the existing works footprint such as the case with potential deepening, it is possible to suggest that such future workings are considered unlikely to result in any significant landscape and visual impact. In any event, any scenario which involves future works would be subject to a separate environmental assessment.

9.5 Mitigating Landscape and Visual Impacts

Guidelines for Landscape and Visual Impact Assessment (3rd Edition) 2013 published by The Landscape Institute and Institute of Environmental Management & Assessment advises that mitigation measures are generally considered under two categories:

1. primary measures that intrinsically comprise part of the development design through an iterative process; and
2. secondary measures designed to specifically address the remaining (residual) negative(adverse) effects of the final development proposals.

In the case of a substitute consent application for unauthorised development 'primary measures' to mitigate impacts may have been missed, therefore with the development already in place reliance is then placed on opportunities to mitigate residual impacts through 'secondary measures' such as targeted screen planting, lighting design to minimize potential light spillage, colour/ finish of vertical structures etc.

As the unauthorised development has negligible to no impact in landscape and visual terms it is concluded that further mitigation measures would offer no significant benefit. However it remains that where possible mitigation should include:

- Augmenting existing boundary planting with additional planting.

- Review of all lighting within the plant to minimise external light spill.
- Restoration to commence at the earliest opportunity in all areas where extraction or operations associated with extraction are no longer occurring.

9.6 Residual Impacts

Topographically the subject site is largely obscured from view from the majority of locations within the surrounding landscape. As described in section 9.6.2 Summary of Visual Impacts, the area which is likely to be exposed to the greatest residual visual impact are from localised stretches of the minor road to the south.

The remaining potential views occurring along the surrounding road network are generally insignificant and where achievable normally only visible at angles to the vehicles forward field of vision (oblique angles). This factor combined with the speed of moving vehicles, distance, fragmentation of views caused by hedgerows, trees, buildings, and local topographical variation etc. reduces the site's overall visual impact.

9.7 Conclusions

The following conclusions have been made based on the above investigation:

- The majority of the 8.46Ha application area is currently permitted and authorised,
- The unauthorised elements relate to 2.1Ha, with a number of ancillary buildings including workshop and canteen.
- The site lies out with any identified landscape designation area.
- It is within the Northeast Galway (Tuam environs) No.5 Landscape Character Area (LCA). The key characteristics of this LCA are as follows:

- *The landscape is flat, fertile pastoral land bound with field hedgerows.*
- *There is little or no coniferous forestry or deciduous woodland.*
- *There are no areas of particular scenic value*

- Population is low in the region, with a low number of properties located within the visual envelope of the development site.
- The most open significant views of the unauthorised development are limited to areas within close proximity of the site - primarily private farm lands.

Landscape Impacts / Effects

- The localised Landscape sensitivity is considered to be **Medium- Low**
- Magnitude of change to the landscape from the unauthorised development is considered **Very Low.**
- Overall landscape impact/effect which have occurred (Jan 2015 – June 2019) are collectively considered **Negligible**
- Overall landscape impact/effect which are occurring (June 2019 to Present) are collectively considered **Negligible /None**
- In a scenario of remediation of the unauthorised development a landscape impact of **Moderate (Beneficial)** would result.
- In the event that a scenario is adopted involving additional extractive works with planning permission sought under s.34 of the Planning and Development Act 2000 (as amended)for future quarrying, without sight of specific proposals, it would be inappropriate to predict potential landscape impacts. However should a scenario of future extraction be limited to the existing works footprint such as the case with potential deepening, it is possible to suggest that such future workings are considered unlikely to result in any significant landscape impact. In any event, any scenario which involves future works would be subject to a separate environmental assessment.

Visual Impacts / Effects

- Visual sensitivity at selected viewpoint is considered **High**
- Magnitude of change from specific key visual receptors are illustrated in Figures 9.3 to 9.7 are collectively considered **Medium** to **Very Low**
- Overall the visual impacts/significance which have occurred (Jan 2015 – June 2019) are collectively considered **Minor.**
- Overall the visual impacts/significance which are occurring (June 2019 to Present) are collectively considered **Negligible** to **None.**
- In a scenario of remediation of the unauthorised development visual impacts would range from **Minor (Beneficial)**
- In the event that a scenario is adopted involving additional extractive works with planning permission sought under s.34 of the Planning and Development Act 2000 (as amended)for future quarrying, without sight of specific proposals, it would be inappropriate to predict potential visual impacts. However should a scenario of future extraction be limited to the existing works footprint such as the case with potential deepening, it is possible to suggest that such future workings are considered unlikely to result in any significant visual impact. In any event, any scenario which involves future works would be subject to a separate environmental assessment.

In conclusion, having considered the above and the impacts that have occurred, are occurring and are reasonably likely to occur as a result of the subject development (including restoration), the effect on the environment from a landscape and visual perspective is not one which is considered to have exceeded the significance threshold.

10.0 WASTE MANAGEMENT

10.1 Introduction

Operations within the application area have involved the exposure of the limestone mineral. Given the nature of the development that has taken place at the site, as described in Section 3, wastes relating to the extraction activities principally have revolved around:

- plant and machinery wastes associated with routine maintenance and repairs and potential accidental fuel and oil spillages; and

- the extractive waste that is an inevitable consequence of quarrying and which is covered by its own regulatory regime in the form of the Extractive Waste Regulations.

The potential for accidental spillages and/or long-term leakage of contaminants from plant and machinery required to facilitate the development and the consequential impacts in terms of water quality is considered to have been fully assessed at Section 6 of this REIAR and therefore is not repeated here.

10.2 Baseline Impacts

The activities relating to the quarrying at the site are not considered to have given rise to any specialist requirements with the matter managed via a series of Good Housekeeping measures as part of an overall management for the site. Although not formalised in a written strategy, the following good practice measures have been employed at the site:

- Identification of the particular wastes likely to occur on the site;
- Identification of who will be responsible for waste management on the site, ensuring he or she has the necessary training and authority to ensure compliance;
- Identification of registered waste carriers and licensed disposal contractors in the vicinity of the site and take appropriate steps to check their licences are valid and their operations meet the required standards for the project, should waste be arising at the site and require removal;
- Ensure that there will be no long-term storage of wastes on site;
- Identification of any likely or possible hazardous waste and procedures for dealing with it;
- Ensure the workforce receives induction and other training in the environmental issues important to the particular project element on which they are working; and
- Introduction of good housekeeping measures to control and minimise waste of materials on site, for example by keeping a tidy site, educating operatives to minimise waste, setting waste reduction targets.

The above strategy was monitored on a regular basis and updated as necessary.

10.3 Impacts that have occurred

No waste related impacts were identified as an environmental concern in the previous assessment of operations at the quarry either in the REIS Chapter or in Board's assessment of the same. The quarrying operations, as detailed at Section 3, have been undertaken within the footprint of the previously active quarry, therefore waste sources in the form of soils/ overburden have not been encountered as a result of the quarrying operations.

Given the limited scale of operations at the site, that the operations have been undertaken in accordance with best practice measures, and that operations have extended over a limited time only, it is not anticipated that there will have been any significant waste management related impacts experienced at the quarry over the SC period.

10.4 Impacts that are occurring

In terms of extractive waste, no mineral extraction is taking place at the site and as such, there are no waste generating activities being experienced. There is therefore no potential for waste related impacts to be experienced at the site.

In terms of waste impacts associated with the use of the on-site workshop/ garage buildings. The management systems for the handling of pollutants continues to be implemented on-site. The waste management systems that are in place continue to provide appropriate management of the associated potential impacts.

10.5 Impacts that can reasonably be expected to occur

There is no scope in the SC process to allow for future working and as such, the scope for waste generating activities is limited. Such activities are considered to be limited to the those associated with the restoration, remediation and decommissioning of the site.

Any impacts associated with decommissioning/ restoration would be short lived with the restoration works carried out over a limited timeframe.

In the event that the alternative scenario is adopted and planning permission is sought under s34 of the Planning and Development Act 2000 (as amended) for future working, given that with the implementation of good practice measures, the previous quarrying operations have not resulted in any adverse

waste-related impacts at the site, it is considered that any such impacts are unlikely to be experienced in the future. In any event, this matter would be the subject of a separate environmental assessment in the future.

It is considered that with the continued application of the good practice measures employed at the site, it would not give rise to any potential waste management related impacts.

10.6 Conclusions

The implementation of good practice measures in relation to waste management and compliance with the Extractive Waste Regulations 2009 has ensured that the unauthorised development has not resulted in a significant effect in any of the three stages of development required to be considered.

11.0 ECOLOGY

11.1 Author of the Report

The desk-top study, fieldwork and reporting for this assessment report have been led by Fionn Murphy BSc, MSc, ACIEEM, an Ecologist with Woodrow Sustainable Solutions. This report has been reviewed by Will Woodrow MSc, MSc (Arch), CEcol, MCIEEM – Company Director, a Chartered Ecologist (CEcol) and full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM).

11.2 Introduction

Woodrow Sustainable Solutions Ltd (Woodrow) was appointed to compile the Ecology REIAR chapter on behalf of Quarryplan and their client McTigue Quarries Ltd. This report accompanies the substitute consent application by McTigue Quarries Ltd. The application seeks the regularistion of unauthorised structures (additional workshop/storage unit, a canteen, a pumphouse and a water tank) and the unauthorised quarrying operations between January 2015 and June 2019 in the Townland of Cartron, some 7 kilometres to the south west of Tuam.

11.2.1 Legislative and policy context

This report has been undertaken with full account of legislation, policy and guidance relating to species and habitat protection, importance and survey protocol. The guiding legislation, policy and guidance includes the following:

- EU Habitats Directive 92/43/EEC, European Communities (Natural Habitats) Regulations 1997, European Communities (Birds and Natural Habitats) Regulations 2011
- Environmental Impact Assessment Directive (2011/92/EU)

- Environmental Impact Assessment Directive (2014/52/EU)
- EU Birds Directive 79/409/EEC
- EPA (2017). Guidelines on the information to be contained in Environmental Impact Statements. Draft report. Environmental Protection Agency, Dublin
- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management (CIEEM).

11.2.2 Impact assessment Methodology

Due to the requirement for a REIAR in this instance, undertaking an Environmental Impact Assessment in a remedial format is more complex; however, the following sections provide a useful summary of the process for undertaking an EIAR, as detailed in CIEEM (2018), which has been adapted for remedial purposes.

11.2.3 Identifying ecological features within the zone of influence

Information acquired during the desk-study and field surveys determines the ecological features potentially affected by the unauthorised development, and as such occur within its ‘zone of influence’. The zone of influence depends on the type of development that has taken and is taking place, the presence of ecological connections and pathways, and ecological receptors that may be sensitive to such impacts.

Those ecological features within the zone of influence such as nature conservation sites, habitat or species are evaluated in geographic hierarchy of importance. The following categories are used (NRA, 2009).

Importance	Criteria
International Importance	• 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. • Proposed Special Protection Area (pSPA). • Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). • Features essential to maintaining the coherence of the Natura 2000 Network • Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. • Resident or regularly occurring populations (assessed to be important at the national level) of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. • Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). • World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). • Biosphere Reserve (UNESCO Man & The Biosphere Programme) • Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). • Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). • Biogenetic Reserve under the Council of Europe. • European Diploma Site under the Council of Europe. • Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	• Site designated or proposed as a Natural Heritage Area (NHA). • Statutory Nature Reserve. • Refuge for Fauna and Flora protected under the Wildlife Acts. • National Park. • Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. • Resident or regularly occurring populations (assessed to be important at the national level) of the following: - Species protected under the Wildlife Acts; and/or - Species listed on the relevant Red Data list. - Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.
County Importance	• Area of Special Amenity. • Area subject to a Tree Preservation Order. • Area of High Amenity, or equivalent, designated under the County Development Plan. • Resident or regularly occurring populations (assessed to be important at the County level) of the following: - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; - Species protected under the Wildlife Acts; and/or - Species listed on the relevant Red Data list. - Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. • County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared. • Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.

Importance	Criteria
	• Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (Higher Value)	• Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; • Resident or regularly occurring populations (assessed to be important at the Local level) of the following: - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; - Species protected under the Wildlife Acts; and/or - Species listed on the relevant Red Data list. • Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; • Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (Lower Value)	• Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; • Sites or features containing non-native species that is of some importance in maintaining habitat links.

Table 11.1. Ecological assessment criteria (NRA, 2009)

Only Important Ecological Features (i.e. those features evaluated as being of Local Importance (Higher Value) or greater) within the zone of influence are assessed with respect to potential impact.

11.2.4 Significant, residual and cumulative effects on important ecological features

For the purpose of this REIAR, 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for those ecological features which have been identified as being an important feature of the site ("Important Ecological Features"). 'Significant' effects are qualified with reference to the appropriate geographic scale (CIEEM, 2018).

After characterising the potential impacts of the development and assessing the potential effects of these impact on the 'Important Ecological Features', mitigation measures are proposed to avoid and/or mitigate the identified ecological effects. Assessment of the residual impacts and effects is then

undertaken to determine the significance of their effects on the 'Important Ecological Features'.

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location (CIEEM, 2018).

11.3 Assessment of Baseline Conditions

11.3.1 Site Location

Cartron Quarry is located approximately 7 km south west of Tuam, Co Galway and can be accessed from a side road off the R333. The current quarry site covers approximately 8.46 ha. The geology of this area is mapped as Visean limestone and calcareous shale by the EPA. The quarry is immediately surrounded by improved agricultural fields except for an area of woodland to the north west of the site.

11.3.2 Ecological Survey Methodology

Surveys of the terrestrial ecology at the site were undertaken following specific guidelines for the relevant target species. The importance of the habitats and species present is evaluated using the Chartered Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018).

11.3.3 Desk based review of biological records

Assessment of the 2015 baseline conditions were based on desk-based review of the 'Flora and Fauna' sections within the 2013 REIS (NEO, Planning Consultancy Services, OCM, Dixon Brosnan, Gabriel Dolan & Associates) for substitute consent, along with viewing of sequential ortho-imagery.

For the additional baseline assessment, a desk-based review of biological records for the area was undertaken utilising information available from the National Biodiversity Data Centre (NBDC). The assessment of post 2019 conditions was undertaken including reference to a 2020 Ecological report compiled by Woodrow Sustainable Solutions Ltd.

11.3.4 Field Surveys

The quarry site was visited in April 2021 by Fionn Murphy (BSc., MSc.) for the purpose of ascertaining current baseline conditions. This was augmented by a 2020 Ecological assessment carried out by Woodrow Sustainable Solutions which included the deployment of static bat detectors. Ecological surveys undertaken included surveys for habitats (Fossitt, 2020), terrestrial mammals, bats (foraging and roosting), breeding birds, amphibian and Invasive Alien Species (IASs).

11.4 Designated sites with potential ecological/hydrological connections to the development

The revised EPA Draft Guidelines (EPA, 2017) states in section 3.3.5 that:

"A biodiversity section of an EIAR, for example, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement, but it should refer to the findings of that separate assessment".

This approach has been adopted and the conclusions of the accompanying RNIS (Woodrow, 2021) are referenced. No part of the application site lies within a designated Special Area of Conservation (SAC) or Special Protection Area (SPA), nor is there a direct hydrological connection between the application site between any SAC or SCA. There are five natura 2000 sites within 15km of the quarry site and 17pNHAs.

Site name	Site code	Summary of qualifying features	Closest distance from Development Site	Potential Ecological/ Hydrological Connections
Lough Corrib SAC (NPWS, 2017)	000297	• Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] • Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea [3130] • Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140] • Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] • Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] • Active raised bogs [7110] • Degraded raised bogs still capable of natural regeneration [7120] • Depressions on peat substrates of the Rhynchosporion [7150] • Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae [7210] • Petrifying springs with tufa formation (Cratoneurion) [7220] • Alkaline fens [7230] • Limestone pavements [8240] • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] • Bog woodland [91D0] • *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]	3.5 km	No. There is considered to be no potential source-pathway-receptor linkage to this Site. As such, this site does not lie within the zone of influence of the proposed development.

Site name	Site code	Summary of qualifying features	Closest distance from Development Site	Potential Ecological/ Hydrological Connections
		• *Austropotamobius pallipes* (White-clawed Crayfish) [1092] • *Petromyzon marinus* (Sea Lamprey) [1095] • *Lampetra planeri* (Brook Lamprey) [1096] • *Salmo salar* (Salmon) [1106] • *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] • *Lutra lutra* (Otter) [1355] • *Najas flexilis* (Slender Naiad) [1833] • *Hamatocaulis vernicosus* (Slender Green Feather-moss) [6216]		
Shrule Turlough SAC (NPWS, 2021a)	000525	• Turloughs [3180]	10.9 km	No. There is considered to be no potential source-pathway-receptor linkage to this Site. As such, this site does not lie within the zone of influence of the proposed development.
Cloughmoyne SAC (NPWS, 2019)	000479	• Limestone pavements [8240]	13.7 km	No. There is considered to be no potential source-pathway-receptor linkage to this Site. As such, this site does not lie within the zone of influence of the proposed development.
Mocorha Lough SAC (NPWS 2019a)	001536	• Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae [7210]	14.8 km	No. There is considered to be no potential source-pathway-receptor linkage to this Site. As such, this site does not lie within the zone of influence of the proposed development.

Lough Corrib SPA (NPWS, 2021)	004042	• Gadwall (*Anas strepera*) [A051] • Shoveler (*Anas clypeata*) [A056] • Pochard (*Aythya ferina*) [A059] • Tufted Duck (*Aythya fuligula*) [A061] • Common Scoter (*Melanitta nigra*) [A065] • Hen Harrier (*Circus cyaneus*) [A082] • Coot (*Fulica atra*) [A125] • Golden Plover (*Pluvialis apricaria*) [A140] • Black-headed Gull (*Chroicocephalus ridibundus*) [A179] • Common Gull (*Larus canus*) [A182] • Common Tern (*Sterna hirundo*) [A193] • Arctic Tern (*Sterna paradisaea*) [A194] • Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] • Wetland and Waterbirds [A999]	9.2 km	No. There is considered to be no potential source-pathway-receptor linkage to this Site. As such, this site does not lie within the zone of influence of the proposed development.

Table 11.2. Natura 2000 Sites in the potential Zone of Influence of the proposed development

Knockmaa Hill pNHA is situated within 0.5km of the development with its ecological features of interest being deciduous woodland and limestone pavement. Dust deposition from quarrying has the potential to impact upon plant communities, leading to habitat degradation. As a result of control measures on site, dust deposition from the quarry was measured as being well below deposition limits (NEO *et al*. 2013). As a result of this, the separation distance from Knockmaa Hill pNHA and high local precipitation, dust is not considered to be a potential source of impact. Quarrying activities,

which are limited to the application site do not have the potential to impact this pNHA.

Site Name	Features of conservation interest	Source-receptor linkage	Site code
Knockmaa Hill pNHA	Deciduous woodland and limestone pavement	No	001288
Lough Altore pNHA	Lowland wet grassland, freshwater marsh and reed-beds	No	000224
Rathbaun Turlough pNHA	Turlough with wet and dry grassland	No	000215
Knockavanny Turlough pNHA	Turlough with high floral species diversity	No	000298
Killower Turlough pNHA	Lowland grassland, wet, dry and improved heath and reedswamp	No	000282
Turlough O'Gall pNHA	Turlough with limestone grassland	No	000331
Belclare Turlough pNHA	Turlough with area of bog	No	000234
Lough Hacket pNHA	Lake with reed swamp, freshwater marsh and lowand wet grassland	No	001294
Lough Corrib pNHA	Large lake with bog, woodland and limestone pavement	No	000297
Castle Hackett Souterrain pNHA	Winter hibernation site for lesser horsehoe bat	No	002038
Turlough Monaghan pNHA	Turlough with dense vegetation community	No	001322
Turloughcor pNHA	Lake with wet and dry grassland used by wintering birds	No	
Rathbaun Turlough pNHA	Turlough with sedge/heath grassland and limestone outcrops	No	000215
Shrule Turlough pNHA	Turlough with limestone outcrops	No	000525
Mocorha Lough pNHA	Wetland complex with fen habitat	No	001536
Cloughmoyne pNHA	Fen and lake habitat	No	000479
Rostaff Turlough pNHA	Turlough with wetlands	No	000385

Table 11.3. Summary of proposed national heritage areas within zone of influence of proposed development

The concluding statement of the accompanying remedial Appropriate Assessment Screening Report (RAASR) is as follows:

'The Screening for Appropriate Assessment has identified that, on the basis of best scientific knowledge, there has been and will be no significant effects on any European Sites as a result of this proposal, taking account of the sites' conservation objectives, either individually or in combination with other plans or projects. Consequently, it is considered that there is therefore no requirement to progress to Appropriate Assessment in this case.'

11.4.1 Baseline Conditions 2015 (Pre unauthorised quarrying)

Cartron Quarry was an existing, functioning quarry prior to the 2015 commencement of unauthorised extraction and presence of unauthorised structures which include a garage/workshop extension, workshop/storage unit, canteen, a pumphouse and a watering tank. The REIS (NEO, Planning Consultancy Services, OCM, Dixon Brosnan, Gabriel Dolan & Associates, 2013) which accompanied a 2015 Substitute Consent application, describes the receiving environment, based on site visits conducted in 2013. This document, in combination with a review of historic satellite imagery and biodiversity records for the period have informed the baseline description of the site.

Protected Species

The application site is located within the National 10 km Grid Square M34, and the National 2 km Grid Square M34U. Given the lack of hydrological connectivity with the surrounding environment, a 2km grid square was deemed sufficient. All protected species data were collated from the 2 km grid square M34U, and bat records from the 10 km grid squares M34[7]. Any invasive species recorded in these areas are also noted. Furthermore, a map showing habitat suitability for bats[8] is shown in figure 11.2.

[7] National Biodiversity Data Centre (NBDC) (2020): https://maps.biodiversityireland.ie/Map [accessed 29.04.2021]

[8] National Biodiversity Data Centre (NBDC) (2020): https://maps.biodiversityireland.ie/Map [accessed 29.04.2021]

Species	Scientific Name	Habitats Dir. (Annex II / IV)	Birds Dir. (Annex I)	Wildlife Act	Red List Status[9]	Birds of Conservation Concern (2014	Likelihood on site	Most recent record	Record Source
Brown long-eared Bat	*Plecotus auritus*	Y	-	Y	LC	-	1	2007	NBDC
Soprano pipistrelle	*Pipistrellus pygmaeus*	Y	-	Y	LC	-	1	2009	NBDC
Common pipistrelle	*Pipistrellus*	Y	-	Y	LC	-	1	2009	NBDC
Natterer's bat	*Myotis nattereri*	Y	-	Y	LC	-	2	2001	NBDC
Lesser noctule	*Nyctalus leisleri*	Y	-	Y	LC	-	1	2006	NBDC
Common kestrel	*Falco tinnunculus*	N	N	Y	LC	Amber	2	2011	NBDC
Common starling	*Sturnus vulgaris*	N	N	Y	LC	Amber	2	2015	NBDC
Wood pigeon	*Columba palumbus*	N	N	Y	LC	-	2	2015	NBDC
Greater white-fronted goose	*Anser albifrons*	N	N	Y	LC	Amber	4	2011	NBDC
Northern lapwing	*Vanellus*	N	N	Y	NT	Red	4	2011	NBDC
Rough earwort	*Scapania aspera*	-	-	-	LC	-	3	2014	NBDC
White earwort	*Diplophyllum albicans*	-	-	-	LC	-	3	2014	NBDC
Great plait-moss	*Hypnum lacunosum var. lacunosum*	-	-	-	-	-	3	2014	NBDC
Spiral extinguisher-moss	*Encalypta streptocarpa*	-	-	-	LC	-	3	2014	NBDC
Green-tufted stubble-moss	*Weissia controversa var. controversa*	-	-	-	LC	-	3	2014	NBDC
Eurasian red squirrel	*Sciurus vulgaris*	-	-	Y	LC	-	4	2007	NBDC
Cherry laurel	*Prunus laurocerasus*	Invasive species					3	2011	NBDC
Sycamore	*Acer pseudoplatanus*	Invasive species					1	2015	NBDC

Table 11.4. Species of conservation interest recorded in the National Grid squares M34U, and bats recorded in the 10 km squares M34. Invasive species are indicated in pink (Source: National Biodiversity Data Centre)

Key to likelihood of species presence (note – for birds this relates to nesting or foraging within the site): 1 = Confirmed; 2 = Likely; 3 = Possible; 4 = Unlikely

Key to Red List Status: CR = Critical; NT = Near threatened; VU = Vulnerable; LC = Least Concern

Habitats (pre-2015)

The 2013 REIAR identified nine different habitats based on fieldwork conducted in 2013 using classifications by Fossitt (2000). This provides the clearest account of the habitat composition of the site prior to the commencement of unauthorised quarrying in 2015. This habitat composition is displayed in Figure 11.1.

Active quarry (ED4) represented the largest amount of cover area of the site prior to 2015, while the north east of the site was predominantly covered in Buildings and artificial structures (BL3). Recolonised bare ground (ED3) was present to much of the site's western margin, in addition to an area on its southern boundary. Areas of Scrub (WS1) existed along much of the site boundary. To the south east of the site, bunds supported an area of dry meadows and grassy verge (GS2) habitat. A small, narrow area of amenity grassland (GA2) was situated near the entrance of the site. A stone wall (BL1) stood along the southern edge of the quarry site while a there was hedgerow (WL1) to the south (described as 'defunct hedge').

The 2013 report gave a brief account of each habitat, transcriptions of which are given below:

Dry meadows and grassy verges (GS2)

'A bund to the south-east of the site supports tall coarse grasses including Cock's-toot (Dactylis glomerata), Tufted-hair grass (Deschampsia caespitoso), False oat grass (Arrhenatherum elatius), red fescue (Festuca rubra), creeping bent (Agrostis stolonifera) and crested dog's-tail (Cynosurus cristatus). Herbs present include red clover (Trifolium pratense), ragwort (Senecio jacobaea), dandelion (Taraxgum agg.), colt's-foot (Tussilago farfara), germander speedwell (Veronica chamaedrys), creeping buttercup (Ranunculus repens), common mouse-ear (Cerastium fontanum) and ribwort plantain (Plantago lanceolata). Bryophytes were not surveyed extensively, but species present

[9] The IUCN Red List of threatened Species (2020): https://www.iucnredlist.org/ [accessed 29.04.2021]

include Calliergonella cuspidata, Kindbergia proelonga, Brachythecium rutabulum and Dicranella varia.'

Amenity grassland (GA2)

'Species poor grassland present in small landscaped areas at the entrance to the quarry and the car park'

Scrub (WS1)

'The top edges of the quarry and some areas of the boundaries were scattered with Gorse (Ulex europaeus), with Bramble (Rubus fruticosus) and Willow (Salix spp.)'

Other Artificial Lakes and Ponds (FL8)

'A small area of standing water that has formed in the floor of the quarry'

Hedgerow (WL1)

'A defunct hedgerow comprised of Ash (Fraxinus excelsior), Blackthorn (Prunus spinasa) and Hawthorn (Crataegus monogyna) was present along the south-western boundary of the site.'

Recolonising bare ground (ED3)

'Areas where quarry material has been stored or bunds have been created along the boundary of the site are now re- colonising with vegetation. The cover of vegetation varies, but forms over 50% cover to qualify for this category. Species recorded in these areas include Yorkshire fog (Holcus lanatus), crested dog's-tail, glaucous sedge (Carex flacca), dandelion, common mouse-ear, colt's-foot, bulbous buttercup (Ranunculus bulbosa), red clover, spear thistle (Cirsium vulgare), barren strawberry (Potentilla sterilis) and selfheal (Prunella vulgaris). Bryophytes recorded include Calliergonella cuspidota, Ctenidium molluscinum and Dicranella varia. In addition to these species, some areas are being colonised by scrub, withgGorse the most prominent species, but with bramble, willow and ash also present in small quantities'

Active Quarries and mines (ED4)

'*This habitat refers to the quarry floor, walls and any areas of gravel or spoil that are subject to frequent disturbance*.'

Stone wall (BL1)

'A dry stone wall was present along the boundary in the south-west corner.'

Buildings and other artificial surfaces (BL3)

'*Artificial surfaces associated with the quarry works, including a vehicle maintenance area in the north-east of the site'*

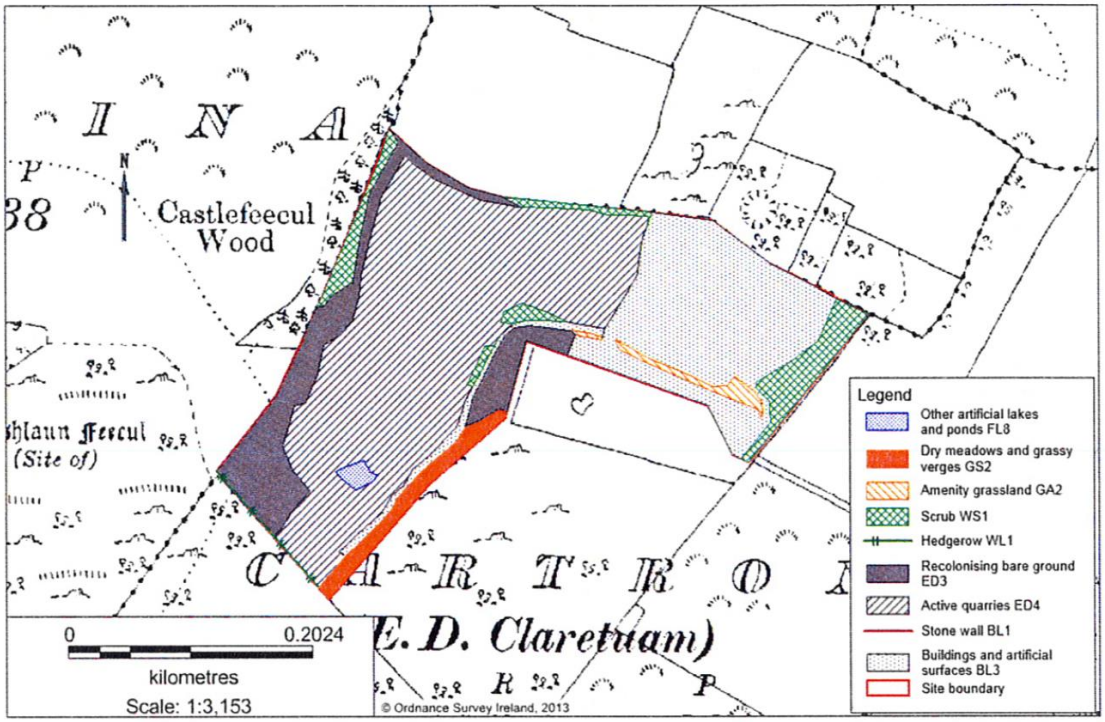


Figure 11.1 2015 Baseline Habitat Map of Quarry Site

Terrestrial Mammals

During field surveys conducted in 2013, there were no signs of mammal activity, with the exception of rabbit droppings which were present to the south of the site. Red squirrel was noted as being present in the locality during the

desk study of biodiversity records (NBDC), however, there was no suitable habitat present in the quarry site.

Bats

The 2013 surveys did not identify potential roost features in the quarry area, and hence no formal bat studies were conducted. However, biodiversity records for the time indicate the presence of five species in the local 2km grid square. This fact, in combination with the presence of mature trees with roost potential, just outside the northwest boundary of the active quarry area indicates that there was probable bat activity in the vicinity of the site, despite conclusions reached by the 2013 REIS.

Birds

The previously referenced 2013 REIS chapter did not appear to include a substantial bird survey. The report referenced sightings of chaffinch (*Fringilla coelebs*), Robin (*Erthacus rubecula*) and great tit (*Parus major*). Biodiversity records indicated the presence of one red listed species (lapwing), however, the site does not contain suitable habitat for this species. Later surveys suggest that a broader diversity of species was present and likely breeding on or in close vicinity to the site.

Reptiles and Amphibians

No signs of reptile or amphibian activity were reported as a result of 2013 surveys.

Invasive Species

No invasive species were noted as a result of the 2013 surveys.

11.4.2 Baseline Conditions- Post 2019

The information contained in this section is intended to portray a baseline of site conditions since the cessation of quarrying activities in 2019. This is

informed by satellite imagery, a 2020 ecological assessment (Woodrow, 2020) and field surveys conducted in April 2021.

Habitats

The 2021 surveys revealed changes in the habitat composition of the site (Figure 11.2), with a reduction of scrub (WS1) and recolonised bare ground (ED3) habitat, as well as the removal of the pre-existing dry meadow and grassy verge (GS2) habitat. The quarry pool recorded in 2013, has been expanded to several times its initial size, with the creation of a second, deeper pool to the south of the site, near the main quarry entrance. It should be noted that these quarry pools dry out in summer/autumn months.

Active Quarries and mines (ED4)

The quarry walls, floor and gravel areas did not appear to support plant life.

Buildings and other artificial surfaces (BL3)

The northeast of the site is occupied by built surfaces and structures relating to quarrying and vehicle maintenance.

Scrub (WS1)

Small areas of scrub were sporadically present on the edges of the quarry floor area and behind the buildings in the northeast of the site. These consisted predominantly of gorse (*Ulex europaeus*), hawthorn (Crataegus monogyna),bramble (*Rubus fruticosus*), butterfly-bush (*Buddleja davidii*) and willow (*Salix spp*.).

Recolonising bare ground (ED3)

This habitat has developed on areas of stored quarry material which are not accessible by quarry vehicles, hence experiencing less disturbance and over 50% of vegetation cover. Species included barren strawberry *(Potentilla sterilis),* dandelion *(Taraxacum spp),* nettle *(Urtrica dioica),* greater plantaine *(Plantago major),* common vetch *(Vicia sativa ssp. Segetalis),* dock *(Rumex spp.), charlock mustard (Sinapis arvensis).* Areas which would formerly been

classified as Recolonising bare ground have become scrub as butterfly-bush (*Buddleja davidii*), willow (*Salix spp*.) and gorse (*Ulex europaeus*) have come to dominate.

Other Artificial Lakes and Ponds (FL8)

Two pools exist within the confines of the application site. The first, to the north of the site is deep and crater-shaped, surrounded by high cliff faces on three sides. The second, to the southwest of the site is shallow and has a larger surface area, with high cliffs to its southeast side. Neither pool has been colonised by aquatic vegetation. There were no signs of amphibian activity.

Amenity grassland (GA2)

A narrow strip of amenity grassland lies parallel to the quarry entrance. This contained a typical species assemblage for this habitat, grasses, daisy *(Bellus perennis),* dandelion *(Taraxacum spp)* and clovers *(Trifolium spp.)*

Ornamental/Non native shrub (WS3)

Areas of dense butterfly-bush (*Buddleja davidii*) -dominated scrub have formed along the north-eastern wall of the quarry site.

Stone wall (BL1)

A dry-stone wall is present along the south-western boundary of the site, elevated above the quarries area.

Reptiles and Amphibians

Quarry pools were visually surveyed in April 2021 for reptile and amphibian activity. No sign of activity was noted during surveys. No submerged vegetation had yet formed and pools are known to dry out for much of the year, creating unfavourable conditions for smooth newt (*Lissotriton vulgaris*). While some habitat features on site such as stone wall provide potential habitat for common lizard (*Zootoca vivipara*), the high level of activity on site and improved agricultural surroundings means the species is unlikely to

occur. Overall, the site is considered to be of low suitability for reptiles and amphibians.

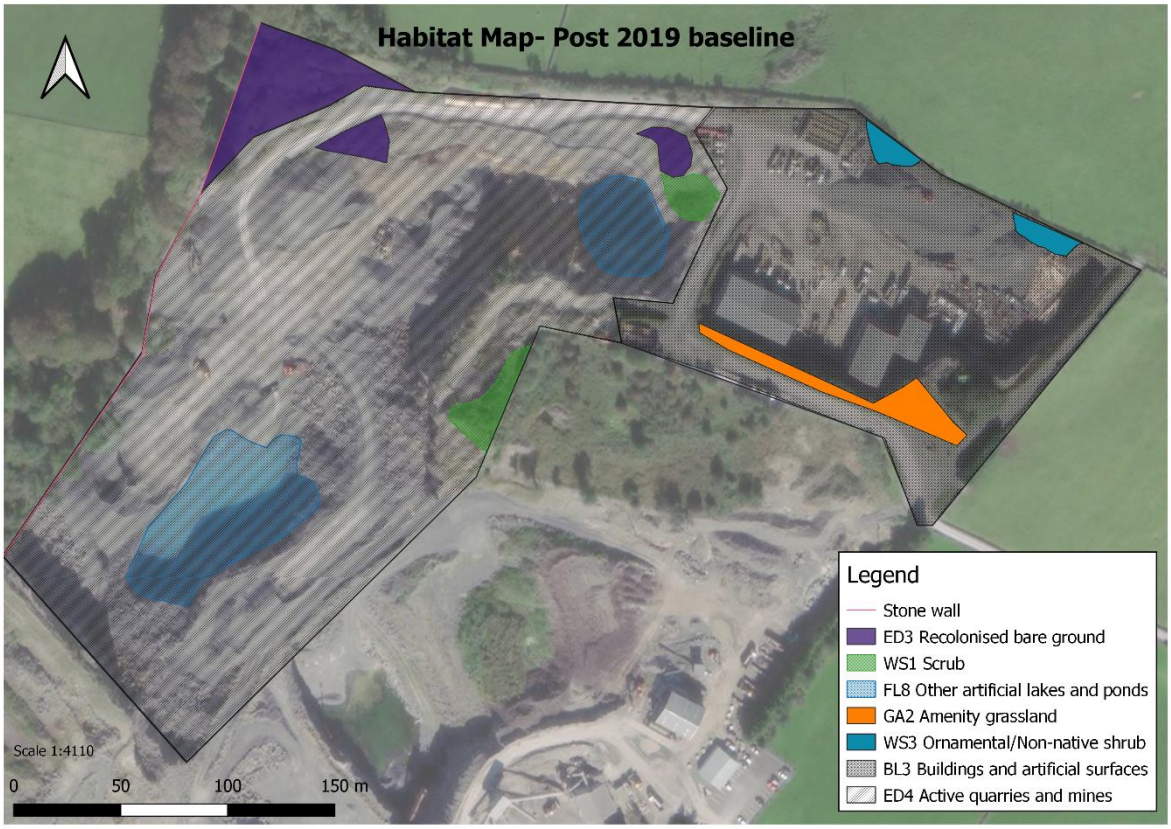


Figure 11.2. Post 2019/Current day baseline habitat map of quarry site

Bats

A 2020 survey (Woodrow, 2020) identified several trees just outside the application boundary, showing cracks in the bark and gaps from broken branches, thereby providing moderate suitability as potential roost features. Following a two-week deployment of static bat detectors, the following species were recorded outside the fringes of the application site;

- At least one unidentified Myotis sp.;
- Common pipistrelle (Pipistrellus pipistrellus);
- Soprano pipistrelle (Pipistrellus pygmaeus);
- Leisler's bat (Nyctalus leisleri);

- Brown long-eared bat (Plecotus auritus); and
- Lesser horseshoe bat (Rhinolophus hipposideros).

Only one to five passes of the lesser horseshoe bat were recorded at each unit over the entire deployment period. Pipistrelle social calls were recorded near the Application Site, suggesting that the areas adjacent to the Application Site is likely to be used by pipistrelles as a mating area during autumn.

Birds

An April 2021 a bird walkover survey noted the presence 10 different species either on site or occupying site boundaries. The majority of activity was associated near the main quarry entrance to the east of the site. Peregrine falcon, listed under Annex I of the EU Birds Directive was observed flying over the edge of the site, in the direction of the south west rock face at Mortimer's Quarry. Checks for fouling or other signs of nesting on the cliff faces of the application site did not yield signs of breeding. A pair of the red listed (BoCCI 2020-26), grey wagtail (*Motacilla cinerea*) were observed feeding near the more easterly of the two quarry pools. There is potential that this species is breeding onsite, utilising nooks and crannies in the exposed rock faces. Other species observed were green listed passerines and corvids and included blackcap (Sylvia atricapilla), bluetit (*Cyanistes caeruleus*), hooded Crow (*Corvus cornix*), pied wagtail (*Motacilla alba yarrellii*), willow warbler (*Phylloscopus trochilus*), blackbird (*Turdus merula*), house sparrow (*Passer domesticus*) and starling (*Sturnus vulgaris*).

Invasive Species

Butterfly-bush (*Buddleja davidii*), a medium impact invasive species has established around some of the fringes of the quarry floor.

11.4.3 Evaluation of important ecological features within the zone of influence

Table 11.5 below summarises the Important Ecological Features of interest within the zone of influence of the development. Habitats and species have been assessed based on their ecological importance and summarised in Table 11.5 overleaf. Receptors deemed to be of Local importance (Higher value) or higher will be assessed for impacts.

Reptiles and amphibians were not included for assessment as there were no signs of activity recorded during either survey year and the quarry pool which was present during baseline conditions was small and known to dry up completely in the summer season. The two pools which currently exist on site are newly created/expanded and are too new to have yet been colonised.

Badger was not included for assessment as there was no viable habitat within the application area, which is an open quarry site. Furthermore, there were no signs of badger activity observed during the 2013 and 2021 survey years and no historical records within the 2km grid square.

Important Ecological Feature	Evaluation (NRA, 2009)	Justification
Habitat		
Stone wall (BL1)*	**Local Importance (Higher Value)**	Has the potential to provide habitat for a range of species such as invertebrates, reptiles and small mammals.
WS1 Scrub (2013)*	**Local Importance (Higher Value)**	An extensive are of scrub to the east of the site would have provided nesting and foraging habitat with some connectivity to the broader landscape
WS1 Scrub (2021)*	Local Importance (Lower) Value)	Offers some cover and limited foraging habitat for mammals and suitable nesting locations for breeding birds, however sections are small, with sparce coverage and high fragmentation.
Dry meadows and grassy verges (GS2)	Local Importance (lower Value)	While holding higher species diversity than the surrounding area, this small area of habitat was not considered of significant conservation value
FL8 Other artificial lakes and ponds*	Local Importance (Lower) Value)	Anthropogenic habitat of low ecological value, showing no macrophyte colonisation
Hedgerow (WL1)	Local Importance (Lower) Value)	Described as 'defunct', it is likely this feature provided little ecological value and is common in the wider area
GA2 Amenity grassland*	Local Importance (Lower) Value)	Habitat of limited extent/connectivity and diversity
BL3 Buildings and artificial surfaces*	Local Importance (Lower) Value)	Anthropogenic habitat of low conservation and ecological value

ED4 Active quarries and mines*	Local Importance (Lower) Value)	Due to the active nature of the site at the time of both baselines, limiting ecological value
ED3 Recolonised bare ground*	Local Importance (Lower) Value)	Higher plant species diversity than surrounding habitats but low wildlife value
Ornamental/Non-native shrub	Local Importance (Lower) Value)	Predominantly composed of the invasive *Buddleja davidii,* of low value to local wildlife
Species		
Bats	**Local Importance (higher value)**	Due to a variety of species which may use to site to forage
Birds	**Local Importance (higher value)**	The availability of nearby habitat may support rare and sensitive species

Table 11.5. Important Ecological Features and their Evaluation. *indicates presence for both 2013 and post-2019 baselines. Habitats with different values in both baseline years are separated for the purpose of this table

11.5 Impact assessment of important ecological features within the zone of influence

The methodology set out in Section 11.2.2 is applied to Important Ecological Features which have been evaluated in Section 11.3.

The Planning and Development Act (as amended) instructs under Section 177(F)(1), that the potential impacts on designated areas, habitats and species are considered under the three phases of the development, including:

1. Impacts which have occurred
2. Impacts that are occurring
3. Impacts that can reasonably be expected to occur

11.5.1 Impacts which have occurred

The following impact sources have been judged as having had the potential to arise over the baseline period (2015-19).

Contamination of surface water / ground water

In the absence of control measures, chemicals and materials stored and used on the site during quarry operations (such as fuel, oils, cement, sand, aggregate and concrete), had the potential to result in the contamination of surface water run-off as well as groundwater, consequently resulting in the degradation of water quality in the vicinity of the site. However, a review of the EPA's unified GIS viewer[10] indicated that there were no surface water bodies in the vicinity of the application site. Furthermore, no off-site discharge of waters was required at the quarry with rainfall naturally percolating into the quarry floor.

Mineral extractions at the application site over the period of January 2015-June 2019, occurred above the water table, which is c. 20mAOD (see Section 6). The 'Water Environment' section of this REIAR concluded that there were no dewatering or sub-watertable works, and hence no drawdown related impact on groundwater levels or waterbodies. Fuel for the on-site machinery was stored in a bunded tank in the north eastern part of the site. Vehicles were fuelled from the fully bunded and enclosed double skin tank within the north eastern part of the quarry adjacent to the workshop area. Fuel was transported to plant and machinery at the working face via a double skinned bowser which was filled within the bunded area surrounding the tank in the north eastern part of the site. No fuel was stored within the quarry floor and operatives have been trained in best practice for refuelling of machinery and also in emergency procedures. The 'Water Environment' section of this

[10] https://gis.epa.ie/EPAMaps/ (Accessed 20/04/21)

REIAR has assessed the impacts associated with the operation of the quarry on groundwater as being imperceptible.

Habitat loss and fragmentation

Ground clearance works to facilitate quarrying activities have resulted in the loss and fragmentation of areas of scrub (WS1), hedgerow (WL1), dry meadows and grassy verges (GS2) and recolonized bare ground (ED3) in the period between 2015 and 2019.

Dust deposition on flora

In the 2015-2019 period, crushing and screening operations occurred at the face of the quarry. These activities, in combination with the delivery of materials have the potential to generate dust in the absence of mitigation. Fugitive dust is typically deposited within 100 to 200m of the source; the greatest proportion of which, comprising larger particles (>30microns) is deposited within 100m. Large amounts of dust deposited on vegetation over a prolonged period results in adverse effects on plant productivity, which can lead to degradation of sensitive habitats. Prevailing weather conditions have a bearing on how much dust is generated and deposited, with factors such as rainfall supressing the agitation of dust and may also have cleansing effect, washing deposits of foliage.

The ‘Air Quality & Climate section of this REIAR highlights that monitoring of dust deposition along the shared boundary with Mortimer’s quarry over this period, demonstrated that there have been no exceedances in the industry standard 350 mg/m^2/day limit value. As a result, dust settlement on foliage is not considered to result in a significant impact.

Light pollution impacting on foraging bats

It is likely that the presence of unauthorised quarry structures led to increased Lux levels on the site and has resulted in the illumination of previously unlit

areas. Artificial lighting can attract insects, which in turn can attract some faster flying bat species, like Leisler's bat and pipistrelle species, providing a food source for these species and potentially a competitive advantage over more light sensitive bat species. The slower fly species, like Myotis sp. and brown-long eared bats may be displaced from favoured foraging areas or commuting routes by the introduction of artificial lighting. Artificial lighting can also displace roosting bats.

Disturbance to fauna

Prior to the 2015 baseline period, quarrying activities were already generating ecological disturbance factors including noise, vibration and movement (machinery and human operatives). These activities are likely to have continued at a similar intensity in the period of 2015-19.

Introduction of alien invasive species

It is considered likely that quarrying operations contributed to the introduction of alien invasive species (IAS) to the site. Fragments of the medium impact invasive species; butterfly bush (*Buddleja davidii*) may have been transported to the site on machinery and lead to the propagation of this species.

Shading of habitats by unauthorised structures

The presence of unauthorised structures in the eastern part of the quarry has led to increased shading in some parts of the site. This has the potential for altering species composition in favour of shade tolerant species, however this is not considered a significant impact given the lack of rare or protected plant species or habitats in the area.

11.5.2 Impacts which have occurred on Habitats

Examination of aerial imagery between January 2015 and June 2019 revealed some changes in the habitat composition of the quarry site. The result of this

being primarily the expansion of active quarry floor. To the southwest of the site, this has involved the removal of the entire grassy verge habitat (GS2) and a formerly extensive area of recolonised bare ground. Additionally, an area of defunct hedgerow (WL1) to the west of the site was removed. However, due to the limited connectivity and low ecological importance of these habitat features, this was not deemed significant. New, smaller areas of recolonised bare ground (ED3) have emerged in the northern half of the site.

Most notably, an area of scrub to the east of the site has been removed. This would have provided viable foraging and breeding habitat for a range of species such as chaffinch (*Fringilla coelebs*) and blackbird (Turdus merula). However, given the relatively small area cleared and the abundance of this habitat in the wider area, this is considered to constitute a slight negative effect. There were no alterations to stone wall habitat.

11.5.3 Impacts which have occurred on Fauna

Birds

While no sensitive bird species were recorded as part of the 2015 baseline forming surveys, the precautionary principle is applied with regard to Peregrine and Grey wagtail, two common quarry species which were recorded in the 2021 surveys. While peregrine falcon is listed under Annex I of the EU Birds Directive, the species' conservation concern in Ireland is currently listed as Green; as breeding numbers have recovered from historic declines (Coulhoun & Cummins, 2013). Cliffs in quarries are increasingly being utilised by breeding peregrines and quarries have facilitated the expanding breeding distribution of this species. However, the relatively small quarry faces (<15m in most places) at the application site are considered sub-optimal for nesting peregrine (Moore *et al.* 1997). Furthermore, no evidence of nesting activity was observed during site visits at the Quarry site during the 2021 field surveys. Blasting activities have the potential to disturb breeding bird species and destroy nests of species utilising quarry faces. However, as blasting activities were already in practice prior to this assessment period, this

is not considered to have been a change in site usage and is considered to be part of baseline conditions.

Linear features such as scrub and hedgerow present on the fringes of the quarry site may have provided nesting and foraging habitat for bird species. Many of these features were reduced or removed as a result of quarrying activities between 2015 and 2019. The seasonality of such works is unknown. The abundance of similar habitat in the immediate surrounding area has likely limited the magnitude of any potentially negative effects. This could have resulted in a moderate negative impact on breeding birds using scrub habitat if clearance occurred during the nesting season.

As quarrying activities of a similar intensity were already in practice prior to this baseline 2015-2019 period, it can be concluded that there was no change in levels of noise and disturbance experienced by species.

The built environment (plant, buildings and structures) that is located within the eastern part of the quarry area is of limited value for birds, with the exception of some species that nest on/in man-made structures. By necessity these species become readily habituated to the human activity. The presence of these unauthorised structures throughout this period produced a neutral effect.

Bats

The footprint of the quarried area did not change between the baseline conditions in 2015 and the site's 2019 state. Potential roost features to the north-west of the quarried area remained unaltered by quarrying activities. Furthermore, given that these potential roost features occur at elevation above the quarry floor and that quarrying activities did not take place after 6pm in the period of operation, it is unlikely that significant disturbance occurred during this period. This is of particular importance with respect to potential roosts during the active bat season (likely to be used between the

months of April and October), when dusk emergence and dawn re-entry times fall significantly outside normal working hours.

Artificial lighting can displace roosting bats, however there were no identified potential roost features in the vicinity of these structures, discounting this as a possibility.

The removal of established areas of scrub may have reduced habitat availability for foraging bats. Any loss of small potential foraging areas (such as scrub) was deemed to be non-significant given the abundance of such habitat in the larger area surrounding the site. The creation of quarry pools and new rock faces as a result of quarrying activities may have acted as foraging spaces for bat species.

There are not likely to have been significant impacts on bats resulting from quarrying activity and the presence of unauthorised of quarry buildings over the subject period.

11.5.4 Impacts that are occurring

This section assesses the potential ecological impacts that are occurring post the cessation of quarrying in June 2019 within the McTigue's Quarry site in Cartron.

On-going impact types / sources

Contamination of surface water / ground water

Quarrying activities are not occurring during this period in time, however, the site is still utilised by quarry vehicles. Fuel for the on-site machinery is stored in a bunded tank in the north eastern part of the site. Vehicles are fuelled from the fully bunded and enclosed double skin tank within the north eastern part of the quarry adjacent to the workshop area. Fuel is transported to plant and machinery at the working face via a double skinned bowser which is filled

within the bunded area surrounding the tank in the north eastern part of the site. No fuel is stored within the quarry floor and operatives have been trained in best practice for the refuelling of machinery and also in emergency procedures. The 'Water Environment' section of this REIAR states; '*it is evident that the quarry has continued working without any significant impact upon the water environment'.* As such there are no significant impacts occurring on the surface or groundwater environment.

Dust deposition on flora

While blasting and extraction activities did not occur in this period, other factors such as delivery of materials to the site has some potential to generate dust in the absence of mitigation. Fugitive dust is typically deposited within 100 to 200m of the source; the greatest proportion of which, comprising larger particles (>30microns) is deposited within 100m. Large amounts of dust deposited on vegetation over a prolonged period results in adverse effects on plant productivity, which can lead to degradation of sensitive habitats. Prevailing weather conditions have a bearing on how much dust is generated and deposited, with factors such as rainfall supressing the agitation of dust and may also have cleansing effect, washing deposits of foliage.

Due to control measures which were in operation at the quarry, resulting emissions were far lower than limits specified in EPA, IPCC and waste licences (NEO *et al*. 2013). Dust settlement on foliage is not considered to be a significant impact.

Light pollution impacting on foraging bats

It is likely that the presence of unauthorised quarry structures contributes to increased Lux levels on the site and has resulted illumination of previously unlit areas. Artificial lighting can provide advantageous conditions to certain species while hindering others. As these structures and their lighting schemes were already present in the previous baseline period of 2015-2019, their effect on local bat foraging activity will not have changed.

Disturbance to fauna

While quarry trucks and site traffic were active during this period, quarrying activities at the site have not taken place since 2019. This represents a reduction in disturbance sources for fauna at the site.

Shading of habitats by unauthorised structures

The presence of unauthorised structures in the eastern part of the quarry leads to increased shading in some parts of the site. This has the potential for altering species composition in favour of shade tolerant species, however this is not considered a significant impact given the lack of rare or protected plant species or habitats in the area.

Habitat loss and fragmentation

Quarrying activities have not been undertaken since 2019. As a result, the ground clearance associated with these activities has not occurred over this period.

11.5.5 Impacts occurring on Habitats

As all quarrying works ceased in June 2019, there has been no further removal or alteration of habitats in the application site. There is the potential that habitats such as recolonised bare ground have marginally expanded since quarrying works have halted. No significant negative impacts are occurring in this period.

Disturbance to fauna

Birds

Prior to June 2019, quarrying activities were already generating ecological disturbance factors including noise, vibration and movement (blasting, drilling, machinery and human operatives). Since then, no quarrying activities have occurred, although there is some ongoing use of the site by trucks and loading vehicles.

The cessation of drilling, blasting and rock breaking activities constitute a reduction in disturbance to bird species utilising the site to breed and forage. Although there is ongoing disturbance due to noise and vibration as a result of operations in the adjacent Mortimer's quarry, this still results in reduced potential for the disturbance of breeding species, culminating in a slight positive impact.

Bats

Since 2019, the lack of quarrying activity means there have been no alterations to potential roost features or habitat features of foraging value for bat species.

Continued lighting from the quarry structures to the east of the site could potentially be impacting scavenging dynamics between species, however the lighting scheme does not deviate from the baseline conditions presented for the 2015-2019 period.

There have been so significant negative impacts to bats during this period.

11.5.6 Impacts that can reasonably be expected to occur

This stage of the assessment considers impacts, which can reasonably be expected to occur as a result of the development for which substitute consent

is required. There are two scenarios which can be reasonably expected to occur in this respect:

The first being that the site is restored. This would comprise of the removal of all buildings, plant and machinery the utilisation of existing soil making material available on-site in the to provide suitable conditions for the creation of scrub/woodland with marginal grassland habitat, bare rock/scree and ephemeral ponds (see restoration concept held at Appendix 3.1).

The alternative scenario which may be reasonably expected to occur is that the applicant seeks planning permission under Section 34 of the Planning and Development Act 2000 (as amended) to make best use of the naturally occurring, finite mineral resource at the site via the continued quarrying of the same.

Given the conclusions of the previous SC application, it is clear that the quarry can be operated in an environmentally sustainable manner, with the most intense period in the quarry's history demonstrated not to have resulted in any significant effects upon the environment.

The intensity or extent of any potential future quarrying have not been defined and in any event would be the subject of a separate application accompanied by its own environmental assessment and scrutiny as part of any future planning application, however, the continued working of the mineral and use of the ancillary on-site buildings and structures is considered to be a scenario which may be reasonably expected to occur at the site and therefore is considered within this REIAR.

11.5.7 Scenario A: Site Restoration

While exact impacts cannot be predicted, given the surrounding area and the outline of the existing restoration, the following outcomes are forecasted in relation to this scenario.

Impacts expected to occur on Habitats

The proposed restoration works entail the removal of all quarry buildings and the creation of new woodland, grassland and hedgerow habitats. A shallow pond is expected to be present on the quarry floor in the late winter and early spring months. The transition from built surfaces and active quarry, which are of limited ecological value, to a variety of semi natural habitats with greater connectivity to the broader surrounding area would constitute a significant positive change. This would bring further ecological value to existing features such as rock faces and waterbodies (if retained), providing opportunity for a broad diversity of species.

Impacts expected to occur on Fauna

Site remediation will result in positive impacts for wildlife in the area. As disturbance factors including light pollution dissipate and vegetation cover regenerates, connectivity through the site will be improved and more sensitive species will likely re-colonise the area. Species of conservation interest, including bats and peregrine, which were likely active at the margins of the site during the operational phase of the development will not be negatively impacted by the site remediation process. The quarry cliffs, which provide nesting ledges for a variety of species, will be retained. Foraging and commuting bats in particular will benefit from an increase in vegetation cover within the site. The creation of grassland and woodland areas will also provide potential foraging habitat by mammals, with spoil heaps being potentially colonised by badger setts. This constitutes a significant positive impact.

11.5.8 Scenario B: Continued Quarrying

The extent of any continued quarrying activity on site has not yet been defined, but will be supported by its own environmental assessment to support the planning process. Below is an approximation of potential impacts assuming that the quarry footprint does not change and that activities retain a similar character to previous extraction works at the site.

Continued Quarrying: Impacts expected to occur on Habitats

The 2021 habitat survey revealed the current habitat composition of the site to be of low ecological value due to the small, fragmented nature of scrub and recolonised bare ground habitats. Butterfly-bush (*Buddleja davidii*), a medium impact invasive species, is established on site. Further activities could spread its distribution, both on site and in the wider area. Due to the already low ecological value of habitats on site, continued quarrying would constitute a slight negative impact in this respect.

Continued Quarrying: Impacts reasonably expected to occur on Fauna

While quarrying activities ceased in 2019, there is still a high volume of vehicular traffic at the site, providing sources of noise and dust. Furthermore, the directly adjacent Mortimer quarry has been active during this period. Noise modelling conducted as part of the 'Noise and Vibration' section of this REIAR (Section 8) concluded that the operations at Cartron Quarry have individually and cumulatively operated below the DOEHLG guideline figure for recommended noise levels. As a result, no significant effect is predicted in the scenario that works continue at the quarry in the future. Hence it is not expected to introduce additional disturbance factors to breeding bird species.

There are potential bat roost features to the northwest of the site, with activities from several species being recorded by static detectors deployed in 2020 (Woodrow, 2020). Provided there are no alteration to roost features (which are outside of the red line boundary for this application), the maintenance of the previous operational hours and no changes to the lighting scheme of the quarry, there will be no significant effects on bat species.

Quarry faces are increasingly being utilised by breeding peregrines and quarries have facilitated the expanding breeding distribution of this species. While the 2021 surveys did not confirm the presence of breeding peregrine at the quarry site, an instance of an individual flying over the edge of the site, towards the adjacent quarry was recorded. The existing quarry face within the

Application Site is considered to currently be of a sub optimal height for peregrine nesting. There is however potential for these faces to increase in height by virtue of lowering of the quarry floor by extraction works, hence creating more viable nesting habitat.

Consequently, it is considered that, without mitigation, the extension of quarrying activity within the Application Site has some potential to result in direct impacts to breeding species in the future. This could result in a significant negative impact on breeding bird species. A targeted breeding peregrine survey should be conducted as part of any future environmental studies to support the planning process for the potential continuation of quarrying on site.

11.6 Cumulative Impacts

Cumulative impacts which have occurred have the potential to include wider contribution to habitat fragmentation, cumulative disturbance and cumulative water quality impacts. The major factor which could potentially contribute to cumulative impacts is the directly adjacent Mortimer's Quarry.

Habitat features which were removed or reduced during the 2015-2019 period were contained within the site itself and did not play considerable roles in the connectivity of the broader surroundings. Furthermore, the linear features around the outside of the site perimeter such as treelines and hedgerows have been retained. There is therefore not considered to be any potential for cumulative impacts in this regard.

Disturbance on breeding birds, bats and other fauna have been considered in previous sections to be absent or not significant in the light of baseline conditions which entailed regular quarrying activities. This is not considered to contribute to wider disturbance in a significant extent. The 'Noise and Vibration' (Section 8) chapter of this REIAR found that operations between the

two quarries have consistently operated below the DOEHLG guideline figure for recommended noise levels.

Activities at the application site were deemed not to contribute to groundwater pollution during the quarry's period of activity, showing no physical or olfactory evidence of contamination (NEO *et al.* 2013). The 'Water Environment' section of this REIAR (Section 6) concluded that the quarry has continued operating without significant impact on the water environment. Furthermore, the chapter 6 of this REIAR concluded there will be no lowering of the water table or drawdown related impacts as a result of continued quarry operations. Cumulative impacts on groundwater along with Mortimer's Quarry were also deemed to be negligible in the 'Water Environment' chapter of the 2013 REIS. As there is no pathway for impacts on turlough ecosystems in the same groundwater body, there is no possibility of significant cumulative effects.

There are no other issues that are considered to be relevant with respect to potential in-combination impacts for this site.

11.7 Proposed Mitigation Measures

The following section details measures which can be undertaken in response to potential adverse effects to ecological receptors.

11.7.1 Impacts which have occurred: Consideration of mitigation and enhancement measures

Impacts from the 2015-2019 operation of the quarry have already occurred and as such, cannot be mitigated. Legacy impacts arising from this period, such as the presence of invasive alien species are mitigated in Section 11.7.2 below.

11.7.2 Impacts which are occurring: Consideration of mitigation and enhancement measures

In the period following 2019, quarrying operations at the application site were discontinued. In this period, the invasive butterfly bush has occupied areas at the fringes of the quarry site which once supported native shrub species and scrub. These areas should be removed in order to allow recolonisation by native species, creating habitat features with higher ecological value to wildlife.

11.7.3 Impacts which can reasonably expected to occur: Consideration of mitigation and enhancement measures

This section of the report outlines mitigation and/or enhancement measures which aim to avoid, reduce effects on important ecological features within the zone of influence of the development, in this instance the potential future activities at the quarry site.

Scenario A

As the implementation of this scenario is not expected to result in adverse impacts to ecological receptors, no mitigation measures are proposed.

Scenario B

The following measures should be adopted in order to limit ecological impacts and will no doubt be considered, should an application for further quarrying be submitted:

- Blasting within the quarry will be limited to twice per month during the early breeding season (March to May inclusive). The species and their habitats are protected in law. Any proposal to remove the nest cannot be done so unless under licence. The grant of planning permission does not provide the operator with a pre-requisite to remove the nest site. Prior to the implementation of the phase of development the

operator, will be required to remove the nest under licence and implement mitigation in line with the licensing requirements at that time.

- There will be no felling of trees or clearance of vegetation during the bird breeding season. This will extend from 1 March to August 31 for trees, and 15 September for hedges. Any hedgerows or scrub that fall within the proposal boundary but outside the area to be excavated will be retained.
- Allow scrub to propagate on the margins of the quarry site in areas which will not interfere with areas of material extraction.
- A restoration plan should be implemented for the site for the eventual permanent cessation of quarrying activities. This should involve the removal of all structures and the creation of grassland, hedgerow, woodland and pond habitats.

11.8 Residual Impacts

11.8.1 Residual Impacts: Impacts which have occurred

Quarrying activities during the 2015-2019 period resulted in negative residual impacts on breeding bird species as a result of the removal of scrub habitat- which did not exceed ‘moderate’ in magnitude.

11.8.2 Residual Impacts: Impacts which are occurring

Following the implementation of mitigation measures, notably the removal of the invasive butterfly bush, there are expected to be no ongoing negative impacts. There will be a neutral residual impact.

11.8.3 Residual Impacts: Impacts which can reasonably be expected to occur

Scenario A: The adoption of this scenario would result in a significant positive long term/permanent impact for both habitats and fauna.

Scenario B: After the implementation of mitigation measures, there will be a slight negative impact on ecological receptors limited to the timeframe in which quarrying activities persist. This will then be followed by a significant positive impact upon implementation of the restoration plan.

11.9 Conclusions

Based on the collation of the above information, it is considered that ecological receptors were likely adversely impacted during the 2015-2019 period, primarily as a result of habitat loss and the resulting impact on breeding bird species. This likely resulted in moderate negative impacts on a breeding bird assemblage of Local (higher) Importance. Since the cessation of quarrying activities in 2019, impacts on ecological receptors have been largely neutral.

None of the habitats on this site are of significant ecological importance on a national or European scale. The site holds habitats that are likely to be locally important for foraging and commuting species in the wider area such as birds and mammals (including bats).

No significant negative impacts are considered to have occurred or to be occurring since the 2015 baseline.

There are two broad future management options available for the site. The first, which will result in the restoration of the site and the creation of breeding and foraging habitats, would result in positive impacts to ecological receptors. The second option would result in a return to quarrying operations (subject to planning approval). Under this scenario, there would likely be an ongoing slight negative impact on ecological receptors.

11.10 References

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12.0 TRAFFIC

12.1 Background

The following section considers the traffic impacts associated with the unauthorised development over the SC period.

12.2 Baseline Impacts

12.2.1 Access

The SC application site has been accessed via the approved quarry entrance located on the eastern boundary of the site. The quarry entrance is located c.1.8km south of the R333, along a local unnamed road. The site access lane is shared between Cartron Quarry and the adjacent Mortimer's Quarry.

The previous REIS Traffic Chapter (Chapter 7) describes how the junction on to the unnamed local road was improved as part of a previous consent for Mortimer's Quarry. The chapter details how the required visibility in both directions was achieved as a result of the same, as well as localised road widening, allowing for vehicles to pass as vehicles exited the quarry.

12.2.2 Traffic Movements

Details of previous extraction at Cartron Quarry between 1999 and 2013 are provided at Tables 3.2 and 3.3 of the previous REIS and reproduced as **Tables 12.1 and 12.2** below.

Vehicle Type	Per day Maximum Traffic	Per Day Minimum Traffic
Artics	20 / Day Peak	0/Day Minimum
8 Wheeler	40 Loads per Day	0/Day
6 Wheeler	3/day peak	0/Day
Tractors & Trailer	10/Day Peak	0/Day
Car/Vans/Jeeps	10/Day Peak	6/Day
Please note even at peak production the traffic volume is not the sum of all above. Traffic is subject to seasonal fluctuations and County Council Requirements		

Vehicle Type	Exit Weight (Tons)
Artics	44
8 Wheeler	32
6 Wheeler	26
Tractor/Trailer	14
Vehicle Type	Enter Weight (Tons)
Artics	15
8 Wheeler	12-14
6 Wheeler	10-12
Tractor/Trailer	4-6

Table 12.1 Traffic Movements as detailed in previous REIS

Year	Estimated Quantity of Truck loads per day (6 day week)	Estimated Quantity of Truck loads per week	Estimated Quantity of Truck loads per year @ 48 working weeks	Estimated Average Truck load Capacity	Estimated Total of Extracted Material (Tonnes)
1990-Mid 1999	Information on estimates not Available	Information on estimates not Available.	Information on estimates not Available.	Information on estimates not Available.	Estimated at 4,000
Late 1999	4	24	1,152	20 tonnes	23,040
2000	16	96	4,608	20 tonnes	92,160
2001	18	108	5,184	20 tonnes	103,680
2002	22	132	6,336	20 tonnes	126,720
2003	30	180	8,640	20 tonnes	172,800
2004	34	204	9,792	20 tonnes	195,840
2005	37	222	10,656	20 tonnes	213,120
2006	39	234	11,232	20 tonnes	224,640
2007	38	228	10,944	20 tonnes	218,880
2008	26	156	7,488	20 tonnes	149,760
2009	19	114	5,472	20 tonnes	109,440
2010	16	96	4,608	20 tonnes	92,160
2011	12	72	3,456	20 tonnes	69,120
2012	8	48	2,304	20 tonnes	46,080
Up to end of April 2013	6	36	432 (12 weeks)	20 tonnes	8,640
Est. TOTAL					1,845,860

Table 12.2 Estimate of Extraction rates during previous substitute consent window

Since the granting of SC, the applicant has confirmed that the output from the quarry has averaged 100,000 tonnes per annum.

The primary method of transportation of aggregates off-site over the SC period has been via eight-wheel rigid lorries, each with a capacity of 20 tonnes. Although an articulated lorry and smaller vehicles were used on occasion, eight-wheel rigid HGV's have been the made mode of distribution.

Considering the extraction rate and based on a 20-tonne payload and 275 working days per annum, this equates to an average of 19 two-way trips per

day. Mineral extraction ceased in June 2019 with activities at the site curtailed to ancillary activities, limited mineral processing, staff accessing the on-site vehicles, security checks etc., resulting in a reduction of traffic at the site after this date to negligible rates.

In consideration of the above and all other highways issues and having regard to the existing use of the quarry, which is a finite, fixed resource-based activity, producing aggregates which can only be worked where they occur when weighed up, the Board's direction of 22nd December 2014 concludes that having regard to a range of factors, including the contents of the REIS that:

"the subject development would not be likely to have had/or have a significant effect on the environment"

And that:

"the subject development is not contrary to the proper planning and sustainable development of the area".

12.3 Impacts that have occurred

This assessment of the issues by the Board and the subsequent grant of SC confirms that the principle of the traffic impacts associated with the operational quarry, as detailed in the REIS are acceptable.

The data provided in **Table 12.2** above demonstrates that the local highway network has been able to sufficiently accommodate vehicle movements associated with extraction in excess of 200,000 tonnes per annum without resulting in any significant effects on the environment.

Providing the Board's assessment on the matter, the Inspector's Report for the previous SC application states:

"Overall I would note that the development by its nature will generate traffic and in particular HGV traffic on the road network. The development is however a tied resourced based industry and the network has been upgraded in sections to facilitate free flow of traffic. The development also is within a reasonable distance of the regional and national road network. I consider that the development would not have had an adverse impact on the road network in the area nor would the development endanger public safety by reason of traffic hazard. I would also conclude that no significant impact arises in relation to sensitive receptors in the area directly or indirectly".

The applicant has confirmed that extraction averaged 100,000 tonnes per annum during the SC period, prior to the cessation of mineral extraction, subsequent to which, traffic levels experienced have been negligible. The volumes of traffic and transport movements associated with the SC period have been approximately half of that which was previously assessed and permitted at the site.

Accordingly, it is considered reasonable to assume that if the highway was able to accommodate traffic movements for levels up to 224,000 tonnes per annum and these levels of traffic were authorised by the Board via the grant of SC, in doing so, the board, having considered and assessed the impacts of traffic levels associated with a production rate of c.224,000 tonnes per annum, concluded that the development did not have, or did not give rise to, any significant effect on the environment and would not be contrary to the proper planning and sustainable development of the area.

Given the above, it is considered that if no significant effects on the environment were experienced at a levels of c.224,000 tonnes per annum output and if the development was authorised via the granting of SC, then annual output levels of less than half of that, as experienced during the 3.5 years of extraction during the SC period would not have resulted in a significant effect upon the environment.

12.4 Impacts that are occurring

No mineral extraction is currently taking place at the quarry and as such, traffic levels associated with the site are negligible. There is therefore a negligible impact occurring at the site and on the surrounding highway network in terms traffic impacts.

12.5 Impacts that can reasonably be expected to occur

The quarrying operations have been the primary generator of traffic movements at the site. There is no scope in the SC process to allow for future working and as such, the scope for experiencing significant traffic impacts is limited. The site will be restored in accordance with the submitted restoration scheme. The restoration works will require a small level of traffic movements associated with staff travelling to the site to undertaken the restoration works, the delivery of plants species and removal of structures, machinery etc.

The levels of traffic associated with the same would be negligible in the light of traffic movements previously encountered at the site. The restoration works would be for a limited period, following which, the impacts relating to traffic movements would be diminished.

In the event that the alternative scenario is adopted and planning permission is sought under s.34 of the Planning and Development Act 2000 (as amended) for future working, given that the scale of traffic impacts associated with previous operations have been found acceptable, any future operations which avoided an intensification over and above that previously considered acceptable, are not considered to result in any significant effect upon the environment. In any event, this matter would be the subject of a separate environmental assessment in the future.

12.6 Conclusions

The existing, approved quarry entrance has continued to be utilised during the course of the SC period.

An assessment of highways matters was previously undertaken by the Board during the determination and subsequent granting of SC for the site. Sales data for the quarry over the previous assessment period shows that output peaked at over 224,000 tonnes per annum. The unauthorised development undertaken at the site over the SC period has resulted in average annual outputs of levels less than half that previously assessed and considered acceptable.

Therefore, it is considered that the lower levels of traffic movements experienced during the SC period, did not result in a significant environmental effect in terms of highways impacts. Since the cessation of mineral extraction, traffic levels at the site have been negligible with only low levels anticipated as a result of operations to restore the quarry, following which all traffic associated with the site would be completely diminished. Alternatively, any application for future working at the site and any impacts of traffic associated with the same, would be subject to its own environmental assessment.

13.0 NATURAL RESOURCES

13.1 Aggregate Material

A requirement exists in the Regulations that due regard be addressed to the likely significant direct and indirect consequences that a development proposal would have on the environment which might result from the use of natural resources.

The aggregate and limestone products produced at the site are derived from a naturally occurring, finite resource. The excavated material has been processed on site and used in various building material processes.

The working of the limestone resource is not considered to have given rise to any significant reduction in the volume of the resource in Galway or even specifically within the Knockmaa and Coranellistrum Limestone formations, as referenced in Section 5.

Global environmental issues like fossil fuel use and alternative energy sources are matters subject to national/international treaties and agreements. They are considered outside the scope of this statement, as the cumulative contributions of this particular development to such matters are insignificant in a national context.

The Applicant is considered to have conserved the natural resource by maximising the resource potential by way of ensuring that the end use is maximised with the limestone won at the site utilised in range of products and for a number of different end uses including road surfacing; landscaping; drainage; and construction aggregates; thus making efficient use of this non-renewable resource.

13.2 Soil

All soils had been removed within the areas of quarrying operations as detailed at Section 3, resulting in there being no opportunity for impact on soil resource. The site will be restored in accordance with the restoration scheme provided with the quarry faces dressed and soils and overburden previously stripped from the site utilised in the restoration. The impact upon the soils is considered to be negligible with the restoration proposals seeing the site being restored, utilising site-derived soils and overburden.

13.3 Impacts that have occurred

As detailed at Section 5, the unauthorised works are not considered to have resulted in a significant effect upon the limestone formations as a whole. Extraction has been within previously despoiled lands and therefore no impacts upon soils have occurred.

13.4 Impacts that are occurring

No mineral extraction is taking place at the site and as such no impacts upon the limestone formation or sols are occurring.

13.5 Impacts that can be reasonably expected to occur

With the implementation of the restoration scheme for the site, there will be the associated placement of soil making materials as detailed on the accompanying restoration concept. There will be no further removal of soils or limestone resource.

In the event that the alternative scenario is adopted and planning permission is sought under s.34 of the Planning and Development Act 2000 (as

amended) for future working, as detailed at Section 5, the impact on limestone resource would be negligible in the context of the formation. The impact on soils is considered to be neutral given that limited volumes of soil would be repositioned if quarrying operations were to extend laterally and which would ultimately be used to deliver a beneficial restoration. Should any future workings seek to extend vertically, no soil removal would be required. In any event, this would be the subject of a separate environmental assessment in the future.

13.6 Conclusion

The impact on the geological resource that has occurred during the SC period is permanent but minimal in the extent to which the volume affects the Knockmaa and Coranellistrum Limestone formations.

All soils have been removed within the areas of quarrying operations, resulting in there being no opportunity for impact on soil resource. The site will be restored in accordance with the restoration scheme provided with the quarry faces dressed and soils and overburden previously stripped from the site utilised in the restoration.

14.0 SOCIO-ECONOMIC IMPACTS

14.1 Introduction

This section considers the impact of the development in the context of population/settlement, employment and other socio-economic effects.

14.2 Baseline Impacts

The Applicant is an independently owned and family operated business which has provided a valuable resource in terms of employment and altruistic benefits to and within the local community.

The previous REIS describes how at the time of writing, the quarry employed 10 people, comprising of 4 truck drivers, 4 machine operators (who double up as loader and crusher operators) and 1 full time and 1 part time office staff.

The REIS also describes how indirect benefits occurred down the supply chain and included job creation and the generation of business for haulage companies and subcontractors. Other indirect benefits referenced in the REIS include the purchase of materials and equipment to use on site, the use of local tradesmen for on-site services e.g. IT technicians, electricians, plumbers and surveyors. The use of whom all brought increased revenue to the local economy.

The induced benefits of the development were also previously identified in terms of income being earned by staff employed at the quarry. The REIS describes how the wages earned by locally employed staff was reinvested in to the local economy via everyday spending. This then resulted in the further potential for job creation.

The business has previously supplied quarry products to a range of customers across Galway and Mayo. The business provided aggregates to

personal and commercial customers with a variety of end uses such as road building, housing, drainage and for use in commercial buildings. As part of its mobile crushing business, McTigue Quarries Ltd provides an all-inclusive service which consists of drilling, blasting and crushing. A limited selection of the broader customer base includes Galway Co Co, Roadbridge Ltd, Sisk, OPW, ESB and Balfour Beatty.

14.3 Impact Assessment

14.3.1 Impacts that have occurred

The quarry directly employed 12 employees, to include truck drivers, machine operators, loader and crusher operators and office staff, prior to its closure.

Prior to the cessation of extraction at the site in 2019, Cartron Quarry had an average spend of around €200,000 per annum on external suppliers on goods and services over the working period, as well as contributing to the national and local tax base.

This employment and expenditure is considered to have resulted in a tangible positive impact in this rural location in Co Galway, providing local direct employment and the resultant indirect and induced economic benefits as outlined above. The socio-economic impacts associated with the operation of the quarry over the SC period have been positive.

14.3.2 Impacts that are occurring

The cessation of mineral extraction at the site has led to the termination of the direct, indirect and induced benefits associated with the quarrying of mineral at Cartron Quarry.

The cessation of quarrying at the site, resulting in a loss of local employment and suspension of the local economic benefits associated with the

employment and expenditure into the local economy has resulted in a negative impact upon the local economy. The cessation of mineral extraction at the site since 2019 has resulted in reduced market competition in the Counties of Galway and Mayo, impacting the cost of local aggregates and the viability of construction projects. The socio-economic impacts that are occurring are therefore considered to be negative.

14.3.3 Impacts that reasonably can be expected to occur

When considering the two alternatives that have been assessed throughout the REIAR the outcomes could not be more contrasting.

In the scenario where the site is closed and the quarry restored would have ramifications upon the local economy in terms of employment and expenditure. Cartron Quarry resource has provided a vital source of aggregates for local construction projects. A lack of choice in the local market will result in 2 outcomes. One outcome is that that aggregate products become less affordable due to sustained demand in the local construction sector failing to be met by the reduction in supply from Cartron Quarry. The second outcome is that local construction firms seek to source more affordable aggregates from further afield, resulting in increased haulage impacts both in terms of costs but also in terms of fuel consumption, congestion and vehicles emissions. For both outcomes, the closure of the quarry will adversely affect the viability of construction projects in the County.

The socio-economic impacts of such an action is therefore considered to be negative.

The alternative, that is to be considered fully under a subsequent s34 application would see a continuation of the supply of the resource and therefore a continuation of the business model as previously experienced up until 2019.

It is considered that the contribution towards the continued prosperity of the local community in rural County Galway should not be understated and the potential, for continued socio-economic contributions from the continuation in the supply of mineral from Cartron Quarry, acknowledged.

14.4 Conclusions

The quantifiable socio-economic contribution of the Cartron operation is known and the importance at a local, regional level through employment, expenditure and aggregate supply is established.

Prior to the cessation of mineral extraction activities in June 2019, the quarry provided a local source of employment and expenditure, generating direct, indirect and induced benefits into the local economy. The supply of mineral from the quarry also generated benefits on a regional scale to the local construction sector.

The two alternatives that have been assessed throughout the REIAR provide the most contrasting outcomes in socio-economic terms.

In the situation where the site was closed and the quarry restored, it would have ramifications upon the local economy in terms of employment, expenditure and the viability of local construction projects. The socio-economic impacts of such would be negative.

The alternative is the continuation of the business model as currently experienced, with the associated benefits to the local economy.

It is considered that the contribution towards the continued prosperity of the local in this community in rural County Galway should not be understated and the potential, for continued socio-economic contributions from the continuation in the supply of mineral from Cartron Quarry, acknowledged.

15.0 CULTURAL HERITAGE

Cultural heritage impacts associated with the quarry have been previously assessed as part of the previous SC application and deemed acceptable by the Board. The Cultural Heritage chapter was prepared by Neo Environmental and analysed the potential cultural heritage impacts associated with the operational quarry and involved desk based assessment and a site walkover.

Archaeology, like geology in this instance does not alter in the timeframe, as provided for within this REIAR and accordingly it is considered unnecessary to revisit and update the previously accepted assessment.

The development over the SC period has been focussed within the previously established footprint/ quarry void. There has been no removal of soils from the application area, resulting in there being no opportunity for impact on Cultural Heritage Assets during the timeframe being assessed. The potential for any previously unrecorded archaeological remains which may have survived in situ is considered to be negligible, with any remains likely to have been destroyed by quarrying activities authorised via the previous grant of SC.

15.1 Baseline Impacts

There are no entries on the Sites and Monuments Record ('SMR') within the application site. The nearest entry is recorded on the SMR (Ref GA043-023) c.30m to the north of the site's northern boundary, however it is confirmed to be a redundant record and is no longer scheduled for protection. There are a number of monuments scattered throughout the wider area however the previous REIS chapter describes how none of these are considered to have been affected by the development covered under the previous SC application.

There are a clustering of heritage assets on the elevated locations of Knockmaa Hill and Knockacarriggeen. The impacts upon which have been considered at Section 9.

It is to be noted in the Board's assessment of cultural heritage impacts for substitute consent ref 07.SU.0036, that the Inspector's Report states:

"In relation to cultural heritage I would consider that having regard to the subject site and the documentation on the file it is likely that there would be no direct impacts on the existing archaeological environment. I do not consider that the impact of the development would significantly impact on the cultural heritage of the immediate area".

15.2 Impact Assessment

15.2.1 Impacts that have occurred

Quarrying operations have taken place within previously despoiled lands within the existing quarry void. No soils have been removed as a result of the works and therefore no impacts on Cultural Heritage have occurred during the SC period.

Given that works have been contained within the existing quarry void, the development is not considered to have adversely affected the setting of any historic monuments in the surrounding area including that at Knockmaa Hill, as detailed at Section 9.

15.2.2 Impacts that are occurring

Mineral extraction ceased at the site in June 2019. Accordingly there are currently no potential impacts upon Cultural Heritage.

15.2.3 Impacts that can be reasonably expected to occur

With the potential implementation of the approved restoration schemes for the site, there will be the associated placement of soil against the quarry faces and the restoration of the site. There will be no further removal of soils or limestone resource and therefore no potential for impacts on Cultural Heritage Assets.

The alternative approach that would see further development at the site to be determined by a future s34 planning application, would see the continued exploitation of the limestone resource.

The specific extents of any potential future quarrying have not been defined and in any event would be subject to its own environmental assessment and scrutiny as part of any future planning application.

Depending on any requirement for top soil stripping, any future planning permission would likely require top soil removal be undertaken in accordance programme of archaeological evaluation undertaken by a suitably qualified archaeologist under licence to DCHG to identify any previously unrecorded archaeological remains which may survive in situ and to provide for an assessment of the likely impact of proposed quarrying works on any such remains within the site.

The proposed programme will ensure the identification and appropriate treatment of any archaeological remains which may survive in situ within the boundaries of the proposed development site. Should archaeological remains be identified during archaeological evaluation works, their treatment will be discussed and agreed with the relevant authorities in DCHG.

15.3 Conclusion

Cultural heritage impacts associated with the quarry have been previously assessed as part of the previous SC application. Archaeology, like geology in this instance does not alter in the timeframe covered by this SC application.

Quarrying operations have taken place within the established footprint / quarry void, with no soils having been removed as a result of the works.

It is therefore concluded that there was no potential for impacts to have occurred to cultural heritage assets or their setting during the timeframe to be considered as there was no removal of in-situ virgin material and works were contained with the previously assessed quarry void during this period.

16.0 INTER-RELATIONSHIP OF THE FOREGOING

16.1 Clarification of Information Requirements

The purpose of this Section is to review the inter-relationships, where they exist, of the elements that were deemed to have the potential to have a likely and significant effect and have been the subject of Sections 5 – 15 of this Statement and the Appendices.

It is considered that all of the significant areas have been reviewed in detail and any likely impacts have been recorded and mitigation measures proposed where applicable.

All interactions have been discussed in the relevant Sections. It is considered that to regurgitate these relationships in this Section would be unnecessarily wordy and be contrary to the EPA Guidelines that suggests EIAR's should be focussed.

However, for ease of reference and to indicate the natural overlap between Sections and the topics that have been considered in each Section, Table 16.1 below illustrates the areas of commonality within each Section with respect to the ten topic areas, as provided for by the Regulations.

Table 16.1											
SECT.	SECTION HEADINGS IN REIAR	Human Health	Biodiversity	Population	Soil	Water	Air	Climate	The Landscape	Material Assets	Cultural Heritage
5.0	Geological Assessment				√	√				√	
6.0	Water Environment	√	√	√	√	√		√		√	
7.0	Air Quality & Climate	√	√	√	√	√	√	√		√	
8.0	Noise & Vibration	√	√	√							√
9.0	Landscape	√	√	√					√	√	√
10.0	Waste Management	√	√	√	√	√		√	√	√	
11.0	Ecology		√		√	√	√		√		
12.0	Traffic	√		√	√	√	√	√			
13.0	Natural Resources	√	√	√	√	√	√			√	
14.0	Socio-Economic Impacts	√		√					√		√
15.0	Cultural Heritage	√							√	√	√

Table 16.1 Areas of Commonality as provided for the Regulations