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John Madden & Sons Ltd

Ballysheedy Quarry
Substitute Consent Application
Remedial EIAR

Ballysheedy Quarry

rEAIR

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1 INTRODUCTION

1.1 Site Background

Ballysheedy Quarry is located within the townland of Ballysheedy, Gort, Co. Galway approximately 2.5km south west of Gort, Co. Galway. The dormant quarry is located 1km to the west of the M18 road (the Limerick-Athenry motorway).

The location of the site in relation to its geographic surrounds is shown on Figure 1.1 'Regional Site Location Map'.

Ballysheedy Quarry is a limestone quarry owned by John Madden & Sons Ltd. The quarry was operated by Higgins (1994 – 2000) and Goode Concrete (2000 to 2012). The overall quarry in Madden ownership is approximately 12.69ha in area and the operations on the site include three previous permissions for limestone extraction. There are also administration offices, toilets, weighbridge, wheelwash and reception office outside of the application area, to the east of overall quarry. The Substitute consent (SC) area is in the ownership of John Madden & Sons Ltd as well as part of the granted quarry to the east (total 12.69ha).

The quarry has been in operation since the 1994 and was granted planning permission by Galway County Council in 1994. There have been a number of planning permissions for additional quarrying activities and operations at this location since 1994. These are detailed in the Planning Section of this remedial Environmental Impact Assessment Report (rEIAR). The quarry was registered under Section 261 of the Planning & Development Act 2000; Reference QY /46.

A full set of application drawings is included at Appendix 1.1. Drawing No's. 10925-3000 to 10925-3004, enclosed, include the subject area for the leave to apply for substitute consent. This former extraction area is approximately 8.33ha as previously set aside prior to the applicant's purchase and which remains set aside. There is an additional 0.45ha limestone reserve area included bringing the total substitute consent subject site area to 8.78ha as highlighted on Drawing No. 10925-3001. Currently there is no activity on the site.

Part of the substitute consent area was granted under the 1994 application (Pl. Ref. No. 70238), Section 261 Registration (Ref No. QY 46) and Pl. Ref. No. 09/415. A planning permission was sought and granted for a quarry extension to the east of the substitute consent area in 2009, Pl. Ref. no. 09/415. The subject site includes part of this previously permitted area. The boundary of the substitute consent area includes part of 09/415 to provide a suitable buffer for site regeneration.

An application for planning permission was sought and granted for a quarry extension and intensification in 2009. An additional access, the eastern access track, was granted directly to the M18 road construction site PL09/415. The 2009 quarry extension application proposed to revert to the southern access (L8500) following completion of the M18. In

2015, an extension of time to the 09/415 planning permission was sought and granted under Pl Ref 15/724. Issues in relation to the site entrance onto the local road did not arise at the time. Extraction volumes returned to the pre 2009 planning permission/Section 261 limits. Limited extraction within the 09/415 boundary and traffic movements has occurred since the purchase of the site in 2014.

The existing quarry was previously owned and operated by Goode Concrete Ltd. Permission for a quarry at this location was established in 1994 under Pl. Ref. No. 70238 by the previous owner. Quarrying in the area was also established under a five year planning permission (Pl. Ref. No. 09/415) from 2009 but was placed into receivership due to the economic downturn. The site was purchased by John Madden & Sons Ltd. in 2014 from the receiver.

At the time of purchase, our client had a reasonable belief that the subject area was authorised. The valid planning permission under Pl Ref 09/415 formed the basis of the site purchase. The area to the West was set aside then and has remained set aside since. In addition to the Planning History, this belief was informed by the fact that the subject site had been assessed by the Planning Authority under the Section 261A Determination process in 2012 (Ref. QSP46). In the latter case, Galway County Council decided that Substitute Consent was not required at the time. The final note on file from the Planning Officer stated that "I have reviewed this file and it is considered that as this quarry was registered, obtained planning permission under planning references 70238 and 09/415 and that the site is not in use, no further action is required under section 261A".

Furthermore, John Madden & Sons belief that the subject site was not unauthorised was supported by the fact that no enforcement proceedings had been issued by the Council since the Section 261A process was concluded in 2012. The substitute consent site has not been subject to any further extraction since the purchase of lands in 2014. In fact, the subject area has remained as a natural regeneration area since c. 2012. As part of the proposed Substitute Consent, it is intended that the entirety of the subject area will be allowed to continue to regenerate naturally into the future.

On 1st October 2020, Tobin Consulting and John Madden & Sons Ltd. had a pre-planning telephone meeting with the Planning Authority to discuss the preparation of a planning application for future quarrying within the Pl. Ref. No. 09/415 planning footprint, to the east of the subject site (within the ownership of the applicant). However, at this meeting the Planning Officer raised concern with respect to the planning status of the substitute consent subject area. This meeting was the first time the Planning Authority raised a question over the validity of the subject area with our client. This is outlined in the Pre-Planning Minutes attached as taken by TOBIN. The Planning Officer stated that based on aerial photographs, that a much greater area has been extracted than had planning permission under the 1994 Permission. It was considered by the Planning Officer that this would be an issue in the proposed application for future quarrying and would require further study and requires addressing. The lack of planning would mean the Planning

Authority could not process a new planning application, and that proposals would need to be brought to An Bord Pleanála. Leave to apply was granted and we are now proceeding with the application for substitute consent.

The historical aerial photos (OSI and Google Maps) attached demonstrate the geographical extent of the subject quarry area over the years. As can be seen the quarry has remained the same since the aerial photo of 2012, before our client purchased the site in 2014. It is our understanding that the excavation of the subject area took place between 2005-2010 and was primarily carried out to supply the construction of Motorway infrastructure in the area.

The materials extracted from the quarry were used for construction schemes and ongoing maintenance and improvement of the road network. The quarry provided significant employment, both directly and indirectly, in the locality and wider region.

Photo 1 - View of western quarry face

Photo 2- View across quarry looking southwest

Photo 3 - View of northern quarry fence and stockpile

1.2 Background to Remedial EIAR

This remedial Environmental Impact Assessment Report (rEIAR) has been prepared as part of a Substitute Consent application under Section 177 of the Planning and Development Acts 2000 as amended. This remedial EIAR is accompanied by a remedial Natura Impact Statement (rNIS).

A Substitute Consent application is required to assess any potential impacts, including cumulative impacts, that previous quarrying operations within lands at Ballysheedy Quarry may have had on the local and regional environment after both the Environmental Impact Assessment Directive and the Habitats Directive came into effect.

The Ballysheedy Quarry development entails quarrying works within an overall landholding of approximately 12.69ha. Figure 1.2 'Site Layout Plan' includes a site layout plan for Ballysheedy Quarry and highlights the area that was granted planning in 1994 and the worked quarry area outside that planning boundary that has been identified by Galway Co. Co. as the subject of this Substitute Consent application. This area, referred to as the "Substitute Consent" application area is approximately 8.78ha.

This remedial EIAR and accompanying remedial NIS aims to assess the impact, if any, that these additional works have had on the environment at, and surrounding, Ballysheedy

Quarry. In particular, special attention is paid to the potential impacts of the development on nearby proposed Natural Heritage Areas (pNHA) and relevant Natura 2000 sites.

1.3 Company background

John Madden & Sons was established in 1953 by John Madden and incorporated into John Madden & Sons Ltd. in 1975. It continues to be a family run business. They are one of the most experienced road surfacing contractors in the west of Ireland. Their business has steadily expanded over the years and now carries out all aspects of civil engineering works including drainage, lighting and ducting, roads, car-parks, all-weather sports pitches as well as the supply of quarried rock, stone etc. John Madden & Sons have an experienced team of employees. Much of their work is for Local Authorities, Government Departments, semi-state Bodies as well as private clients. Their focus on integrity, quality, safety and client satisfaction is reflected in the amount of business received from clients.

1.4 Need for the development

The substitute consent application for some 8.78 ha of the 12.69 ha former quarry site is being proposed to regularise the site. Due to the liquidation of the previous operator of the quarry (i.e., Goode Concrete Ltd.) the land was purchased by John Madden & Sons Ltd. Based on pre planning meetings with Galway Co. Co., and a grant of leave by An Bord Pleanala granting the same, there is a requirement for Substitute Consent at the site. The site will be allowed to regenerate and rewild naturally.

1.5 Statutory Consent Overview

The basis for substitute consent is set out in Part XA (Section 177A – Q) of the Planning Acts.

1.5.1 Application for Leave to Apply for Substitute Consent

Section 177C of the Act states inter alia:

(1) A person who has carried out a development referred to in subsection (2)…… may apply to the Board for leave to apply for substitute consent in respect of the development.

(2) A development in relation to which an applicant may make an application referred to in subsection (1) is a development which has been carried out where an environmental impact assessment, a determination as to whether an environmental impact assessment is required, or an appropriate assessment, was or is required, and in respect of which –…

… (b) the applicant is of the opinion that exceptional circumstances exist such that it may be appropriate to permit the regularisation of the development by permitting an application for substitute consent.

Section 177D(1) further states:

Subject to section 261A(21), the Board shall only grant leave to apply for substitute consent in respect of an application under section 177C where it is satisfied that an environmental impact assessment, a determination as to whether an environmental impact assessment is

required, or an appropriate assessment, was or is required in respect of the development concerned and where it is further satisfied—…

…(b) that exceptional circumstances exist such that the Board considers it appropriate to permit the opportunity for regularisation of the development by permitting an application for substitute consent.

In considering whether exceptional circumstances exist, Section 177D(2) sets out the following criteria to which the Board should have regard:

a) *whether regularisation of the development concerned would circumvent the purpose and objectives of the Environmental Impact Assessment Directive or the Habitats Directive;*
b) *whether the applicant had or could reasonably have had a belief that the development was not unauthorised;*
c) *whether the ability to carry out an assessment of the environmental impacts of the development for the purpose of an environmental impact assessment or an appropriate assessment and to provide for public participation in such an assessment has been substantially impaired;*
d) *the actual or likely significant effects on the environment or adverse effects on the integrity of a European site resulting from the carrying out or continuation of the development;*
e) *the extent to which significant effects on the environment or adverse effects on the integrity of a European site can be remediated;*
f) *whether the applicant has complied with previous planning permissions granted or has previously carried out an unauthorised development;*
g) *such other matters as the Board considers relevant.*

In November 2021, John Madden & Sons Ltd made an application to An Bord Pleanála for leave to apply for substitute consent in respect of the historical extraction at the site.

The application for leave to apply for substitute consent contains a planning history of the site and outlines the exceptional circumstances which exist to allow the planning status of the site be regularised. These reasons are tracked throughout this rEIAR and are summarised below. Details of the grant of leave to apply are included in appendix 1.1.

Background, History and Exceptional Circumstances

After criticism by the CJEU in Case C-251/06 *Commission v. Ireland*, the Environment (Miscellaneous Provisions) Act 2011 amended Section 4 of the Planning Acts to provide that development is not exempted development under the 2001 Regulations if an EIA for the purposes of the EIA Directive or an appropriate assessment ("**AA**") for the purposes of the Habitats Directive is required.

Developers were allowed a grace period (until 21 September 2012) during which they could either "complete" their development or apply for planning permission. From this date forward, any development – including mineral extraction – which required EIA or AA was subject to a requirement to obtain planning permission.

At all relevant times, the requirement for EIA was described by reference to a "new or extended area".

It is against this background that John Madden & Sons Ltd sought and was granted leave to apply for substitute consent for extraction at the site.

Exceptional Circumstances

The application for leave to apply was granted in circumstances where, pursuant to Section 177D(1) of the Planning Acts, the Board was satisfied that an EIA, a determination as to whether an EIA is required or an AA was required in respect of the Ballysheedy Quarry and where it was further satisfied that exceptional circumstances existed that the Board considered it appropriate to permit the opportunity for regularisation of the development by permitting an application for substitute consent.

In considering whether 'exceptional circumstances' exist, the Board had regard to the matters listed at Section 177D(2)(a)-(g). These are addressed in turn below.

(a) *whether regularisation of the development concerned would circumvent the purpose and objectives of the Environmental Impact Assessment Directive or the Habitats Directive;*

This remedial EIAR and the accompanying remedial NIS is proof of that. As such, the purpose and objectives of the EIA and Habitats Directives are being fulfilled by this application.

However, the reason for that is clear from the legal context. These judgments were delivered after cessation of mineral extraction and completion of rehabilitation.

(b) *whether the applicant had or could reasonably have had a belief that the development was not unauthorised;*

We believe that Maddens had good reason to believe that development was authorised.

1.6 Environmental policy

The key objectives of John Madden & Sons Ltd. Environmental Policy are:

- To comply with applicable environmental legislation and best industry practice;
- To be a good neighbour; and
- To achieve continuous improvement in environmental performance.

John Madden & Sons Ltd. is committed to implementing these objectives by:

- Developing and operating an Environmental Management System (EMS) to assist in implementation of this policy;
- Making available the required financial resources to operate this policy in accordance with BATNEEC principles; and
- Recognising that the successful implementation of this policy depends on the ongoing commitment of all those working in the organisation, including all employees and all contractors.

An Environmental Management System (EMS) for the quarry was developed. The following

are some of the more relevant aspects, which are covered in the EMS for the site:

Environmental Monitoring:
A monitoring system was introduced in accordance with relevant planning conditions imposed by the local authority, to ensure compliance with guidelines, thresholds and procedures.

Environmental Reviews:
As part of the EMS, regular internal assessments of all aspects of the effectiveness of environmental measures was carried out and used in assessing the success or otherwise of the environmental measures.

Management Awareness and Training:
Management and employees participated in awareness and training programmes, which reflect the long-term commitment of the industry to the environment and its neighbours.

Good Housekeeping:
Plant, the site office and the material storage and maintenance building were kept in a good state of repair. Plant and buildings were maintained.

Inspections relate specifically to protective measures where relevant, which were incorporated to ameliorate dust, noise and visual impact.

1.7 Background Work for the Environmental Impact Assessment Report

All contributors to this EIAR undertook comprehensive investigations of the site and surrounding area, during the course of the baseline studies.

1.8 Consultation and Scoping

As part of the Section 261(A) process, Galway County Council advertised in local newspapers in 2011 that a review of quarries was being undertaken in County Galway. This process allowed for submissions from all competent bodies, prescribed bodies and interested parties. No further action was determined by Galway County Council at the time.

In accordance with Section 4 of the Advice Notes on Current Practice *in the preparation of Environmental Impact Assessment Reports (EPA, 2003)*, TOBIN undertook a process of consultations with Galway County Council; various statutory bodies and interested parties. The primary objective of involving competent bodies, statutory bodies and interested parties in the EIA process is to aid scoping of the EIA and to allow all parties to highlight issues of concern prior to completion of the application. All concerns raised in the course of the project and impact assessment are addressed in this environmental statement. Table 1.2 lists the various parties consulted to date. A number of response have not been received at the time of writing due to the limited time available.

Table 1.2 List of Consultees Contacted During the EIA

Consultee	Date of Correspondence
NPWS, Development Applications Section	April 2022
National Roads Authority	April 2022
An Taisce	April 2022
Inland Fisheries Ireland	April 2022
Health and Safety Authority	April 2022
Environmental Protection Agency	April 2022
The Heritage Council	April 2022
National Monuments	April 2022

1.9 Procedure and Structure of Environmental Impact Assessment Report (EIAR)

The consequences of any major project are presented in the form of an Environmental Impact Assessment Report (EIAR). This Remedial EIAR contains information on the scale and nature of the development at Ballysheedy Quarry, a description of the existing environment, potential impacts that may have arisen as a result of the development at this location and an assessment of the impact and mitigation measures that have been implemented to protect the receiving environment.

The structure and content of the EIAR has been based on the following documents, as published by the Environmental Protection Agency:

- Advice Notes on Current Practice in the preparation of Environmental Impact Statements (2003); and
- Guidelines on the information to be contained in Environmental Impact Statements (2002,2017, 2022).

This Remedial EIAR provides for:

- A description of the site and the existing environment;
- A description of the development;
- The impacts, if any, that may have resulted from the development;
- An assessment of the impact and the mitigation measures; and
- A non-technical summary.

The minimum information that must be contained in an EIAR is specified in Part X of the Planning and Development Act, 2000 and Schedule 6 of the Planning and Development Regulations, 2001. The structure and content of this EIAR has been based on the legislative

requirements as set out in Part X of the Planning and Development Act, 2000 and Part 10 of the Planning and Development Regulations, 2001 and the guidance documents by the Environmental Protection Agency as outlined above.

The overall EIAR is arranged in three volumes, as follows:

- Volume I: Non-Technical Summary;
- Volume II: Environmental Impact Assessment Report; and
- Volume III: Appendices.

Volume I: Non-Technical Summary

This document provides an overview and summary of the main EIAR using non-technical terminology. It is a means for non-professionals to review the information included in the main EIAR document. It is a stand-alone document and should offer a concise summary of the existing environment, characteristics of the development and any impact that the development may have had on the receiving environment.

Volume II: Main EIAR

Volume II of the EIAR contains the main text body and is divided into a number of chapters. Chapters 1 and 2 include an overall Introduction and Description of the Site and the Development. The specialist chapters (Chapters 3 to 12) include:

Section 1: Introduction;
Section 2: Description of Site and Existing Environment;
Section 3: Potential Impacts from the Development *(Possible Impacts from Previous Works)*; and
Section 4: An Assessment of the Impacts and the Mitigation Measures.

Introduction

This section will include background to the assessment and will describe the study methodology in carrying out the assessment.

Existing Environment

In describing the receiving environment, an assessment is made of the context in which the development is located. This takes account of any other existing developments.

Potential Impacts from the Development (Possible Impacts from Previous Works)

This section allows for a description of the specific, direct and indirect impacts, which the development may have had on the receiving environment and may still be having on the environment with potential for future impact. This is done with reference to Receiving Environment and Characteristics of the Development, while also referring to the magnitude, duration, consequences and significance of the development during the operational phases.

Assessment of the Impacts and the Mitigation Measures

This includes an assessment of the actual impact, if any, that the development had on the receiving environmental and the effectiveness of the mitigation measures that were in place during the period of development and the effectiveness of the current mitigation measures.

Volume III: Appendices
All supporting documentation and references, referred to in the EIAR text body (Volume II) are included in this volume.

1.10 Contributors

TOBIN Consulting Engineers are the lead consultants in the processing of the Substitute Consent Application (Remedial EIAR and NIS). A number of reports from the 2009 EIS were reviewed for the EIAR as they are relevant to the Substitute consent process. The main phase of quarrying activity was in 2009/2010. The relevant inputs of the various members of the Study Team are as follows:

Table 1-3 Study Team and Contributors

Planning	James O'Donnell, Declan Meehan (TOBIN)
TOBIN Consulting Engineers (Scientists and Engineers)	Project Management, Production, Evaluation and Reporting, Planning, Noise and Vibration, Climate, Socio-Economic, Air Quality, Ecology, Water, Soils & Geology, Water, Traffic and Interaction of the Foregoing.
Dr. Richard Crumlish	Archaeology and Cultural Heritage

All contributor reports are given in their entirety in the main EIAR text body of Volume II. Supplementary information is provided in the Appendices, within Volume III.

1.11 EIA Methodology

The primary objective of the of the Environmental Impact Assessment Directive (Council Directive 2011/92/EU) on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU (together, the "EIA Directive"), is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for environmental impact assessment (EIA), prior to development consent being awarded, of public and private developments that are likely to have significant effects on the environment.

Directive 2014/52/EU provides a definition of environmental impact assessment as being a process consisting of:

The preparation of an environmental impact assessment report (EIAR);

The carrying out of consultations required to inform the EIAR;

The examination by the competent authority of the information presented in the EIAR and any supplementary information provided, where necessary, by the developer and relevant information received through consultations with the public, prescribed bodies and any affected Member States;

The reasoned conclusion by the competent authority on the significant effects of the project on the environment; and

The integration of the competent authority's reasoned conclusion into any development consent decision.

The EIA Directive is transposed into Irish legislation through a number of statutory measures, including the Planning and Development Acts 2000 to 2021, European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 and the Planning and Development Acts and Regulations 2000 to 2021.

The original EIA Directive 85/337/EEC came into force on the 27th June 1985 and was transposed into Irish legislation when the European Communities (Environmental Impact Assessment) Regulations, 1989 and the Local Government (Planning and Development) Regulations, 1990, came into effect on the 1st February 1990. The requirement for EIA in Ireland was implemented in 1988.

For the purpose of this EIA, John Madden & Sons Ltd is the 'developer' proposing the regularisation of the historical extraction via an application for substitute consent and An Bord Pleanála is the 'competent authority' that will undertake the EIA and decide whether to grant consent for the project.

The following Diagram 1.1 illustrates the EIA Process as outlined in the EPA Draft Guidelines (2017).

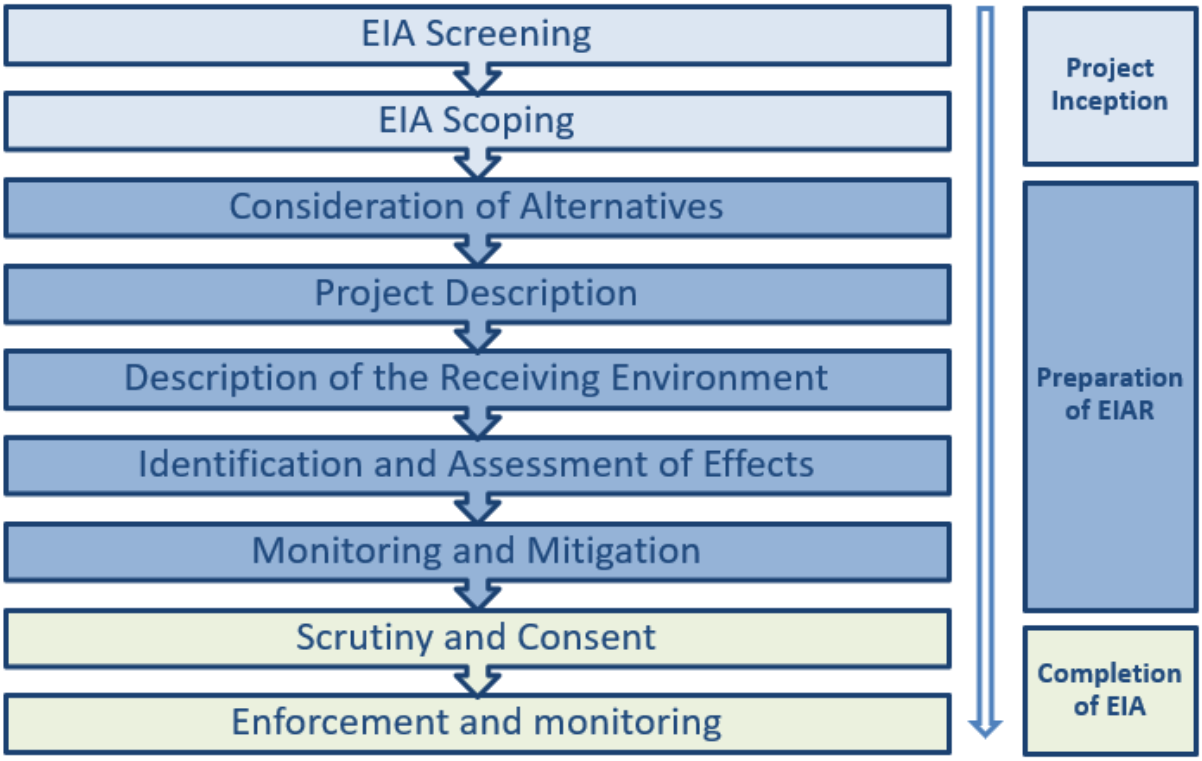


Diagram 1.1: EIA Process

1. *EIA and Planning Legislation in Ireland*

In determining the requirement for EIA, the EIA Directive and its transposing legislation in Ireland differentiates between the projects that always require EIA and those for which an EIA may be required. These projects are listed in Schedule 5 Part 1 and Part 2 of the Planning and Development Regulations 2001, as amended (hereafter referred to as 'the Planning Regulations').

Schedule 5, Part 1 Projects, are projects which are considered as having significant effects on the environment and require an automatic EIA.

Schedule 5, Part 2 Projects, are projects where national authorities have to decide whether an EIA is needed. This is done by the "screening procedure", which determines the effects of projects on the basis of thresholds/criteria or a case-by-case examination. The projects listed in Part 2 are in general those not included in Part 1 which may be considered to have a lesser environmental impact.

- *EIA Screening*

In the context of the project, the most relevant project type identified in Schedule 5 is Part 2 Paragraph 2(a) which relates to:

" Mineral extraction which would involve a new or extended areas of 5 hectares or more".

This application is made to regularise historical extraction is required when interpreting the provisions of the EIA Directive. This rEIAR has been prepared to support the Substitute Consent application for the site.

○ EIA GUIDANCE

The rEIAR methodology draws upon a number of EIA principles, regulations and guidance documents, including:

- Draft Guidelines on the Information to be contained in Environmental Impact Statements (EPA, September 2015);
- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, August 2017);
- Draft Advice Notes on Preparing Environmental Impact Statements" (EPA, September 2015);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DHPLG, 2018);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment, (European Commission, 2013); and
- Receptor specific guidance documents (e.g., Ecological Impact Assessment (EcIA) guidance issued by the Chartered Institute of Ecology and Environmental Management (CIEEM).

In addition to the above general guidance and principles on EIA, additional sector specific guidance is followed in the assessment of individual environmental factors. These guideline documents are set out in the methodology section of the relevant Chapters.

5 SCOPING AND CONSULTATION

EIA Scoping was carried out in accordance with relevant guidance set out above. This was carried out informally and in anticipation of a leave for substitute consent decision from An Bord Pleanála.

EIA scoping correspondence was submitted to relevant statutory and non-statutory bodies in May 2022 (by mail) for review and comment. Consultation letters were issued to the following parties inviting comment on the rEIAR for the substitute consent application:

- Galway County Council, including the Environment Department, Heritage Office and Planning Department;
- Department of Agriculture, Food and Marine;
- Department of the Environment, Climate and Communications;
- Department of Housing, Local Government and Heritage;
- Department of Rural and Community Development;
- Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media;
- Department of Transport;
- Environmental Protection Agency;
- Office of Public Works;
- The Northern and Western Regional Assembly;
- An Taisce;
- Inland Fisheries Ireland;
- Fáilte Ireland;
- Irish Water;
- Transport Infrastructure Ireland;
- National Parks and Wildlife Services;
- Sustainable Energy Authority of Ireland;
- Health Service Executive; and
- Geological Survey of Ireland.

The consultation letter explained the purposes of the substitute consent - being effectively a form of retrospective consent being applied for with the aim of regularising the planning status of historic mineral extraction at the site.

Figure 1-1 Regional Site Location Map

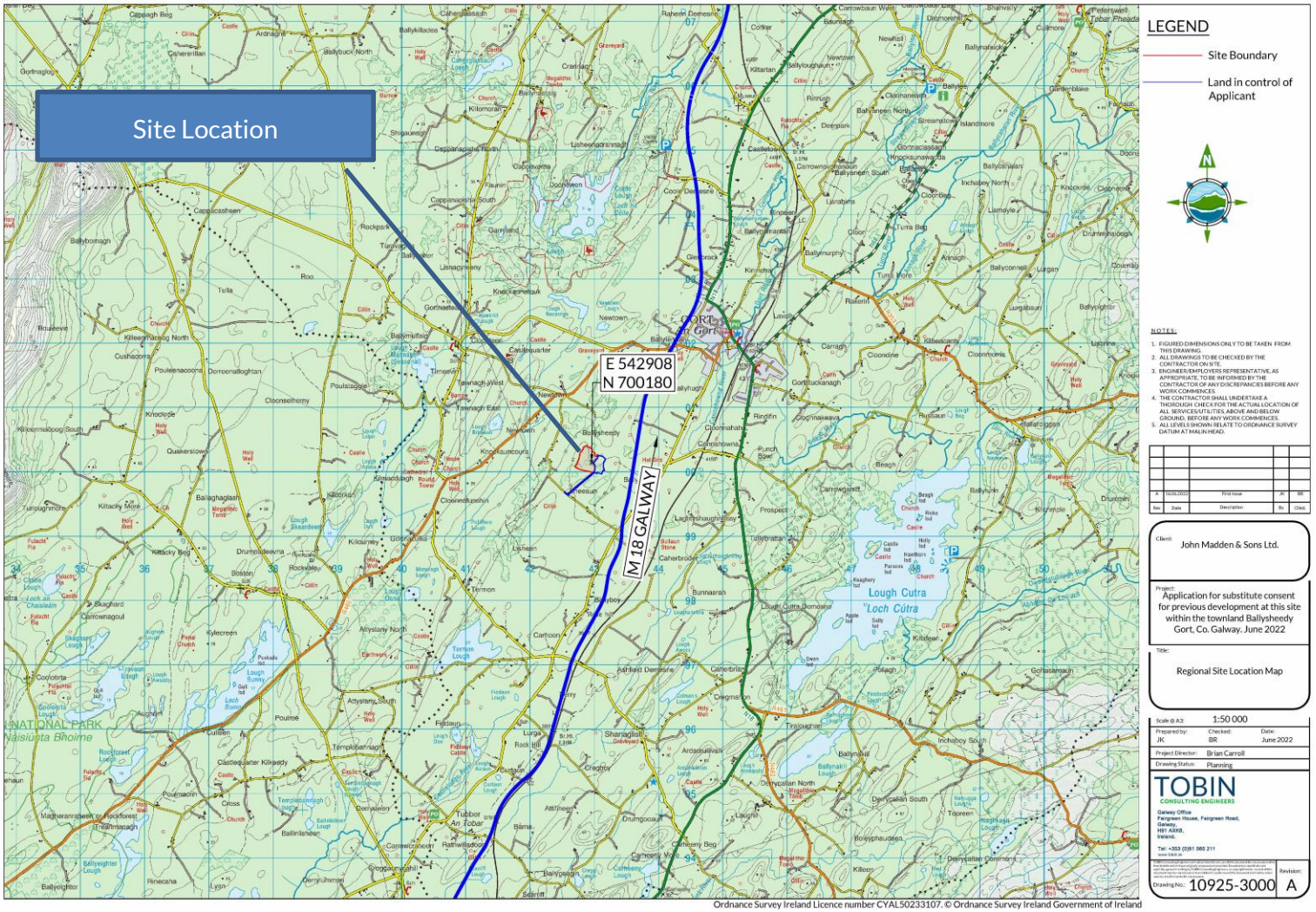


Figure 1-2 Site Location Map

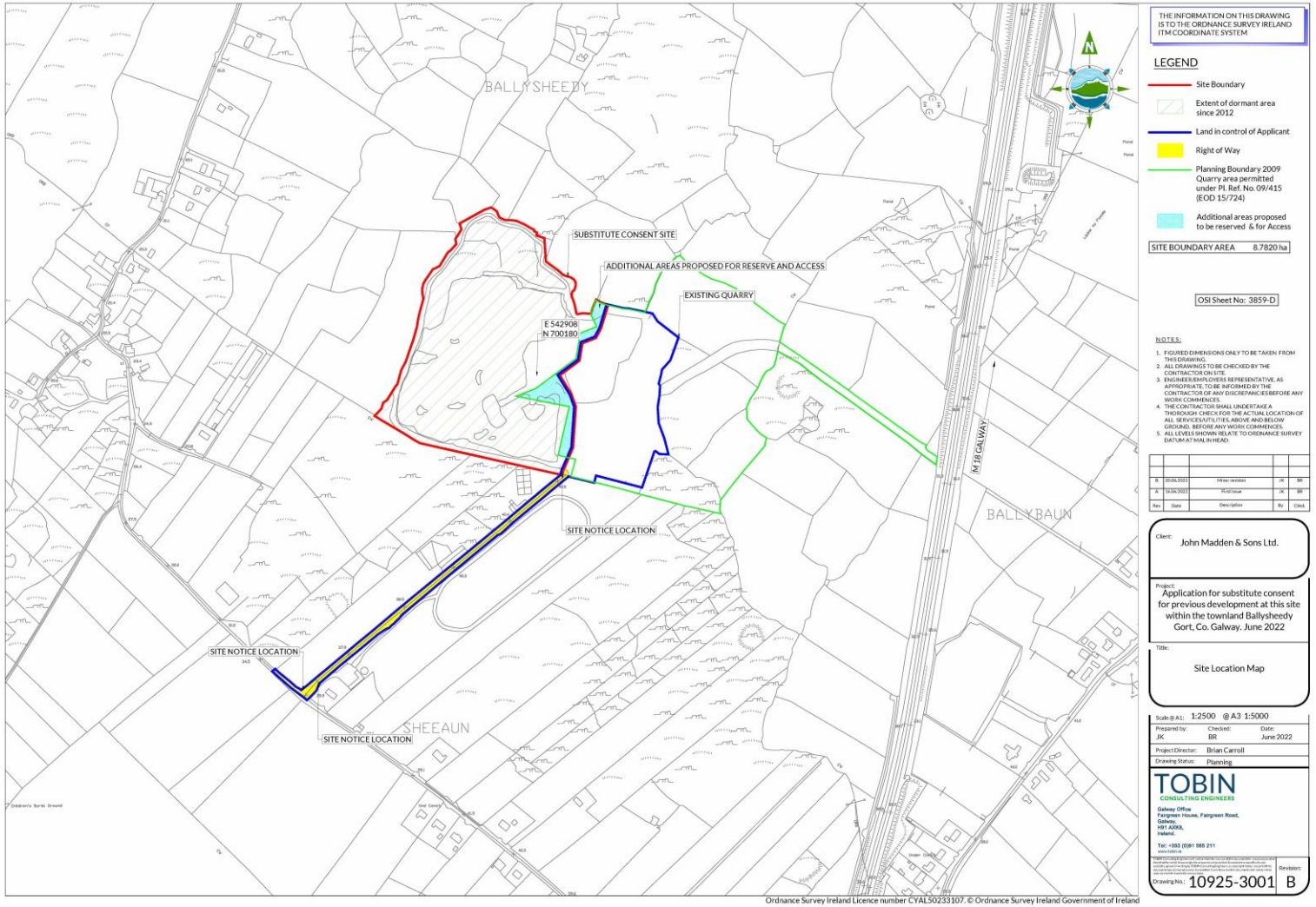


Figure 1-3 Existing Site Layout

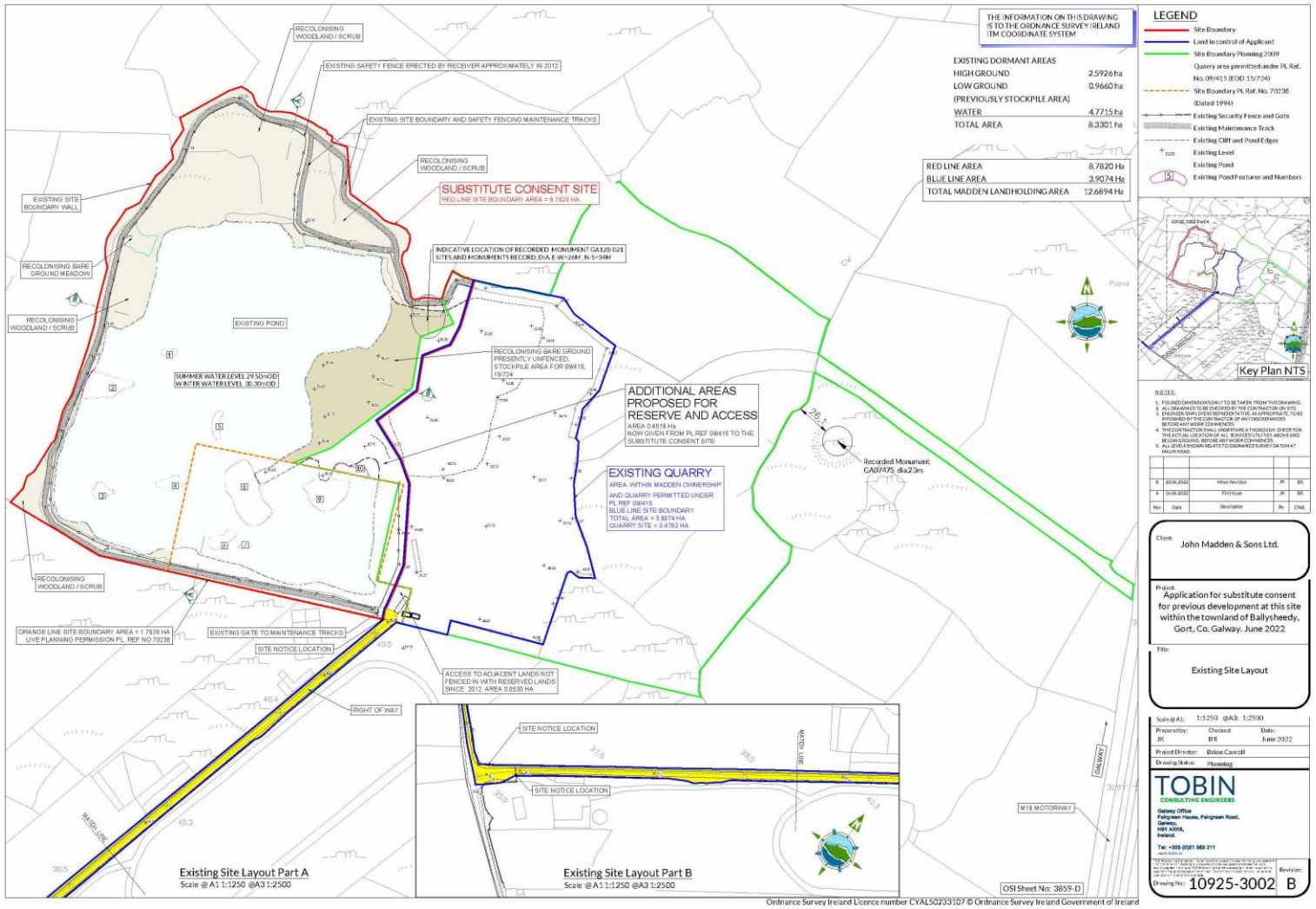


Figure 1-4 Site Layout including reserve area

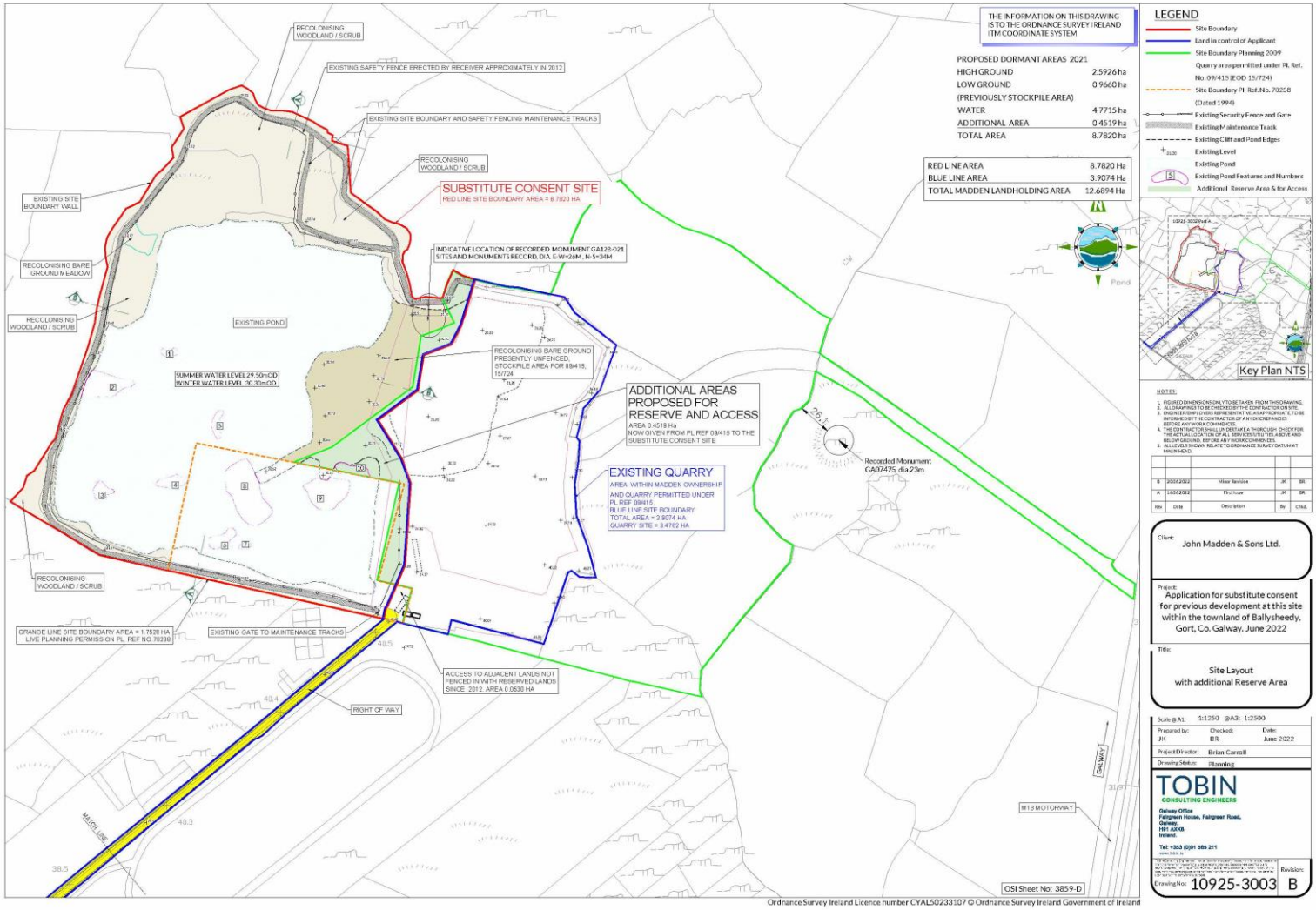
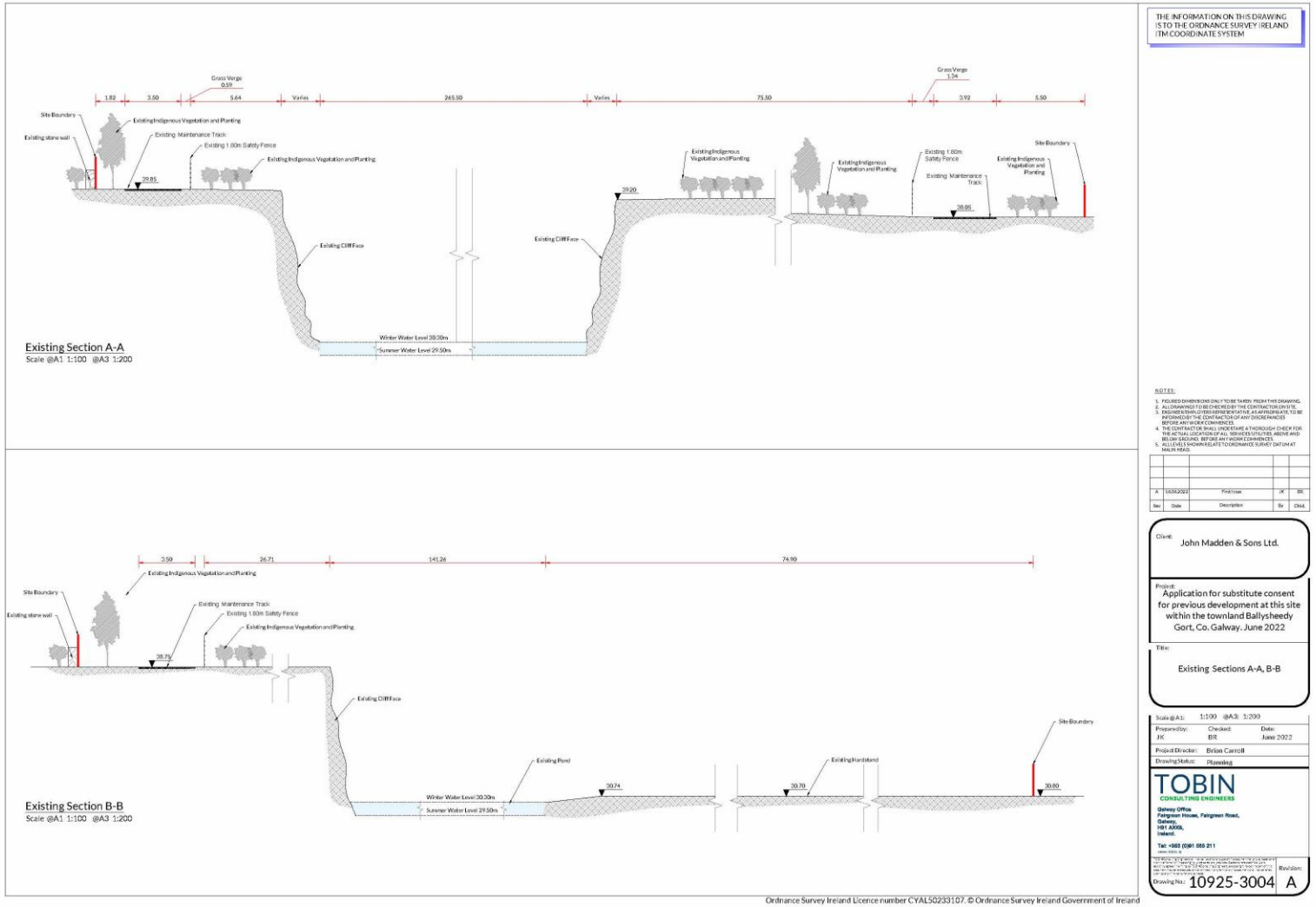


Figure 1-5 Site Cross Section



2 DESCRIPTION OF THE EXISTING SITE AND DEVELOPMENT TO DATE

2.1 Existing Environment and Infrastructure

The substitute consent site is located approximately 2.8km southeast of the village of Gort, Co. Galway.

The adjacent existing quarry, for which permission for the extraction of aggregate has been granted by Galway County Council (Planning Ref.: 09/415 and 15/724), is dormant.

There are 14 residential properties located within a 0.5km radius of Ballysheedy Quarry. These properties are shown on Figure 4.1 and are located along the L8500 and local roads to the west, north and south of the quarry boundary. There are also a number of farm buildings in the vicinity of Ballysheedy Quarry which would be expected as this is a primarily agricultural area.

The quarry is located within the Galway Bay South East Catchment (Hydrometric Area 29). The closest surface water features to the north of the site include Newtown/Coole Lough (2km N) and Drumminacloghaun Stream (1km W), to Lough Termon (1.1km SE) and 3km to the south, the Castlelodge River (a tributary of the River Fergus).

The quarry development entails 2 dormant quarrying works areas within an overall landholding of approximately 12.69 ha. As outlined in Chapter 1 above, the first area of the quarry was extended pre 2012 beyond the boundary of the area then permitted. The second area ("the existing quarry") operated as permitted by the final Planning Permissions of 09/415 and 15/724 until the later permission expired. The first area is referred to as the "Substitute Consent" application area.

Figure 1.2 and Figure 1.3 illustrate the overall layout and cross section of the quarry and the area of the quarry that is the subject of this remedial EIAR i.e., the Substitute Consent application area.

The topography of the site varies from 26mOD at the lowest point of the quarry (near the centre of the extraction area) to the highest point of the quarry near the southern boundary of the site (approximately 44mOD). The entrance of the quarry is at approximately 34mOD.

Infrastructure associated with the existing limestone quarry comprises landscaped earthen berms surrounding most of the quarrying area, offices and associated canteen facilities, and a weighbridge. The field boundaries are comprised of a mixture of hedgerows and fencing.

Regular monitoring of various environmental parameters is carried out by The operator. environmental officers, approved contractors and accredited laboratories for The operator. as part of the operations at Ballysheedy Quarry, including the quality of surface and groundwater,

air, noise levels, dust emissions and vibrations due to blasting. Results of this monitoring are presented in the relevant section of this remedial EIAR.

2.2 The Operation

2.2.1 Plant and Equipment

All quarrying plant and equipment that were used within the existing quarry are of a fixed and mobile nature. Mobile plant was used within the site for primary and secondary crushing and screening. Fixed plant included a weighbridge, wheelwash office etc. All fixed plant was located outside of the substitute consent area.

2.2.2 Working Hours

The hours of operation at Ballysheedy Quarry for extractive activities, as agreed with Galway County Council, are 07:00 to 20:00 Monday to Friday and 07:00 to 16:00 on Saturdays. There were no quarry operations or associated activities on Sundays or public holidays.

2.2.3 Site Security

The quarry security includes post and wire fencing (in addition to hedgerows and trees in places) around the entire boundary of the site and a stone wall to the south of the L8500, along the entrance. The boundary to the north of the L8500 is tree lined and also marked by a stone wall. Warning signs have been placed at perimeter fencing regarding danger and the on-site quarrying operations.

Additional to the security measures employed, the natural setting of the site aids site security. The existing hedge line, scrub and trees along the southern, eastern and western boundaries of the quarry naturally prohibits unauthorised entry.

The security measures employed ensure that accidental entry to the site is prohibited. Regular inspections of the site security arrangement are undertaken by site operatives and repaired immediately if any damage is noted.

The quarry was subject to routine visits from the Health and Safety Authority. John Madden & Sons Ltd. has an excellent history of compliance in terms of site safety.

2.2.4 Employment

Approximately 6 personnel were employed directly on an annual basis at Ballysheedy Quarry. Permanent employees included quarry personnel, administration staff and maintenance personnel.

In addition, indirect employment was also generated as a result of the quarrying and aggregate production, in terms of contract aggregate transport drivers, suppliers of products and services, such as fuel and oil suppliers, machinery suppliers, etc.

2.2.5 Traffic Control

Traffic initially accessed the facility directly at the permitted and approved site entrance (PA 70238) located on the local road to the south of the site and the M18 construction access road between 2009 and 2011. Entry to the quarry is in a queued formation. The weighbridge was reserved for outgoing loads, therefore there was no significant delays entering the site and backups on the public road are not a problem at this location. In additional the site entrance is via a long access road.

2.2.6 Working Method

The working method comprises the controlled blasting of rock, followed by loading and hauling and crushing and screening to produce various grades of rock and aggregate.

Limited blasting was undertaken on the site. Blasting and blast control measures have been carried out in strict protocol, which has been developed during the lifetime of operations within the site.

Prior to a blasting event, the rock face was profiled and a contract driller drilled a number of holes in a multi-row format, which are set back from the rock face. The blasting work has been carried out to date by experienced shot-firers who determine the type and quantity of explosive required, supply and place the explosive and manage and supervise the blasting operation.

Noise and vibration readings for the blasting operations were within regulatory limits based on the available information. This aspect of the operation is discussed in more detail in Chapter 9.

Blast warning sirens were sounded within the site to alert neighbours of a blast event and neighbours are also advised of the blast. As per standard protocol, Garda Siochana attended at the site during blast events to ensure the security of explosives. Regular health and safety checks are carried out by relevant bodies to ensure all on-site procedures are adhered to. The blast control protocol has evolved over the lifetime of the quarry.

Blasted rock was loaded onto a dump truck by wheel loader and transported to the mobile plant where it is crushed and screened to produce various grades of stone products. Primary stone products are stock-piled directly by the plant and loaded onto road trucks as required. Surplus secondary stone products were stock-piled for use later.

2.2.7 Fuel Storage

All fuels and oils were stored on site in a dedicated bunded fuel storage shed. These ASTs held the fuel supply for all tipper company road trucks operating from the site and mobile plant working within the site. The capacity of the bunded shed was more than 110% the volume of the ASTs. This was removed from site in 2012.

Based on the site visits there was no physical, olfactory evidence of contamination on the site. There was no sheen or contamination in the site pond.

2.2.8 Sewerage and Waste Water Treatment

Foul water was discharged to a septic tank located to the south of the substitute consent site. Foul water comprised only domestic-type waste. The septic tank was maintained and in good working order.

2.2.9 Water Management

There are no surface water streams on site. Water features within Ballysheedy Quarry comprises of a flood floor /pond at the topographical low to the west of the substitute consent site. Water falling on the site flows to the surface water pond (which is comprised primarily of surface water runoff and minor infiltration of groundwater seepage. There are no surface water discharges from the site. The previous operator pumped surface water within the site to the north of the site where it infiltrated back to ground. No pumping was undertaken since 2014.

Water was recycled for ancillary activities and dust suppression. Groundwater recharge to the underlying aquifers is diffuse (rainfall) through the limited overlying quaternary deposits or directly into the aquifers where bedrock is present i.e., within the quarry. Although this is a karstic environment, there are no point sources/sinks, such as swallow holes etc. recorded within the landownership boundary our noted during the 2014 -2022 site walkovers. Details of nearby karst features are included in Sections 6 and 7 of this rEIAR.

Stormwater peakflows are attenuated by the capacity of sumps on the quarry floor. The flooded floor provides a significant area for settlement of water runoff from the quarry and the attenuation of suspended solids. Water clarity is excellent with 1.5-2.5m as measured using Seechi disks in May 2022.

2.2.9.1 Road Management

The operator cleaned, when necessary, any dirt and debris from any road surfaces soiled as a result of spillage due to haulage to and from the site. Limited haulage onto the Local road occurred as part of the previous applications.

2.2.10 Solid Waste Management

The operator minimised production of waste and where appropriate considered its beneficial use, including recycling. All waste was dealt with in accordance with the relevant legislation and other controls in place. Good practice is achieved when recycling used oils and greases, batteries, tyres, scrap metal and timber. No significant waste was noted on site.

2.2.11 Access and Transport Routes

The existing access to Ballysheedy Quarry is from the local road to the south of the site L8500.

Access into the quarry is via a long recessed access that can accommodate heavy vehicles leaving and entering the entrance simultaneously. Visibility at the entrance is in excess of the

recommended 80m visibility from a setback of 2.4m as set out in the NRA DMRB for roads within an 80km/hr speed zone.

There was an additional entrance associated with the quarry on the east of the site – used for the purposes of the M18 construction.

3 PLANNING

3.1 Introduction

This chapter examines the planning history and planning and development context of Ballysheedy Quarry, Ballysheedy, County Galway. This chapter includes a review of national, regional and local policy and Section 261A legislation. This review illustrates that the development in question is consistent and complies with the most recent national, regional and local planning policy as well as national guidelines and best practice.

Ballysheedy Quarry is located in the Gort hinterland, approximately 2.8 km southwest of the town. It is situated in the townlands of Ballysheedy. The quarry was managed by John Madden & Sons Ltd since 2014. A flooded floor (c.5hectares) occupies a large portion of the quarry.

The quarry was granted planning permission in 1994 and was registered under Section 261 of the Planning and Development Act 2000 under reference QY/46 in 2007.

3.2 Site Planning History

Part of the substitute consent area was granted under the 1994 application (Pl. Ref. No. 70238), Section 261 Registration (Ref No. QY 46) and Pl. Ref. No. 09/415 as extended under Pl. Ref. 15/724. A planning permission was sought in 2009 and granted in 2010 for a quarry extension to the east of the substitute consent area, Pl. Ref. No. 09/415. The subject site includes part of Pl. Ref. 09/415 to provide a suitable buffer for site regeneration and to allow access for the maintenance of the lower ground areas of subject site.

A full set of application drawings is included at Appendix 1.1. Drawing No's. 10925-3000 to 10925-3004, enclosed, include the subject area for the leave to apply for substitute consent. This subject area is approximately 8.78ha of largely dormant quarry since prior to the applicant's purchase with some stockpiling areas and which are now also dormant. The additional 0.45ha dormant area included from the more recent planning permission area brings the total substitute consent subject site area to 8.78ha as highlighted on Drawing No. 10925-3001. Currently there is no activity on the site.

An application for planning permission was sought and granted for a quarry extension and intensification under Pl. Ref. 09/415. A temporary eastern access track was granted directly to the M18 Crusheen to Gort Road construction site. The Crusheen to Gort road was completed in 2010. The 2009 quarry extension application proposed to revert to the southern access following completion of the M18 Gort to Crusheen road. In 2015, an extension to the 09/415 planning permission was granted under Pl. Ref. 15/724. Issues in relation to the site entrance onto the local road or this substitute consent area did not arise. Extraction volumes returned to the pre 2009 planning permission/Section 261 limits. Limited extraction within the Pl. Ref.

09/415 boundary and traffic movements has occurred since the purchase of the site in 2014 and up until the expiry of Pl. Ref. 15/724 in 2020.

The subject site and existing quarry were previously owned and operated by Goode Concrete Ltd. Permission for a quarry at this location which was established in 1994 by the previous owners. Quarrying in the area was permitted under planning permission (Pl. Ref. No. 09/415). The site was purchased by our client John Madden & Sons Ltd. in 2014 from the receiver.

At the time of purchase, our client had a reasonable belief that the subject area was accepted by planning 09/415 as not being unauthorised. The valid planning permission under Pl. Ref. 09/415 formed the basis of the site purchase. The majority of the area to the West was dormant then and has remained dormant since other than for some stockpiling of material on the low area shown on the accompanying planning report. This area was shown in the 09/415 planning drawings as a stockpile area and shown as required for the completion of the extraction of the live 1994 permission to the south under Pl. Ref. No. 70238. The 09/415 permission was permitted to be extended in 2015 under Pl. Ref. 15/724 further reinforcing the applicant's belief that there were no issues. In addition to the Planning History, this belief was also informed by the fact that the subject site had been assessed by the Planning Authority under the Section 261A Determination process in 2012 (Ref. QSP46). The final note on file from the Planning Officer stated that no further action was required under section 261A.

John Madden & Sons purchased an operable quarry under Pl. Ref. 09/415 and operated that quarry and extended the planning permission under Pl. Ref. 15/724 so they considered the site planning and registration compliant. The use of the 09/ 415 permission and the extension of same under Pl. Ref. 15/724 was not queried by planning or registration authorities at any stage.

Furthermore, John Madden & Sons belief that the subject site was not unauthorised was supported by the fact that no enforcement proceedings had been issued by the Council since the Section 261A process was concluded in 2012.

The substitute consent site has not been subject to any further extraction since John Madden & Sons purchased the lands in 2014. In fact, the vast bulk of the subject area has remained as a natural regeneration area since c. 2012. As part of the proposed substitute consent, it is intended that the entirety of the subject area including the original dormant area and the additional sections will be allowed to continue to regenerate naturally into the future.

On 1st October 2020, Tobin Consulting Engineers and our client had a pre-planning meeting by telephone with the Planning Authority to discuss the preparation of a planning application for future quarrying on a reduced scale and within the Pl. Ref. No. 09/415 planning footprint, to the east of the subject site (within the ownership of the applicant). However, at this meeting the Planning Officer raised concern with respect to the planning status of the substitute consent subject area. This meeting was the first time the Planning Authority raised a question over the subject area with our client. This is outlined in the Pre-Planning Minutes as then recorded by

TOBIN. The Planning Officer stated that based on aerial photographs, that a greater area has been extracted than had planning permission under the 1994 Permission. The Planning Officer gave the view that the lack of adequate planning in the dormant area would mean the Planning Authority could not process a new planning application albeit on adjacent lands which had permission, and that proposals would need to be brought to An Bord Pleanála. James O'Donnell, Planning Consultancy Services were engaged and proposals were developed. In this context and in the interest of due diligence, together with the absence of alternatives, this application for leave to apply for substitute consent to An Bord Pleanála has been prepared.

The historical aerial photos (OSI and Google Maps) attached demonstrate the geographical extent of the subject quarry area over the years. As can be seen the quarry extent has remained the same since the aerial photo of 2012, which was before our client purchased the site in 2014. It is our understanding that the bulk of the excavation of the subject area took place between 2005-2012 and was primarily carried out to supply the construction of Motorway infrastructure in the area.

The dormant area was fenced by the receiver and made safe circa 2012. Since purchase John Madden & Sons have maintained the fencing and the fence maintenance tracks on the dormant areas to assist in the regeneration and for health and safety reasons and have maintained insurance on same accordingly. In light of the issue raised by Galway County Council they would like to resolve the planning status of the dormant areas so that they can continue to maintain them as it is a matter of health and safety and as some confirmation will be required so they can continue to insure these lands which have significant hazards.

3.3 Legislative Context

In 2008, the European Court of Justice (Commission v Ireland, C-215/06) ruled that the facility to apply for retention must be removed from cases where developments require either environmental impact assessment, a determination as to whether an EIA was required or an Appropriate Assessment. Subsequently, the Planning and Development (Amendment) Act 2011 provides an opportunity for quarries with certain legal/planning issues to apply for 'substitute consent' in order to substantiate their activities and normalise their status. Under Section 261A of the Planning Act (a continuation and strengthening of Section 261), local authorities are obliged to examine which quarries should have been, but were not, subject to an EIA, screening for EIA or AA. The quarry operators must then make an application of substitute consent, which is lodged with An Bord Pleanála.

Substitute consent operates in a similar way to planning permission. If a developer fails to apply for substitute consent, or if the Board refuses an application, then this renders the quarry unauthorised and subject to enforcement action.

Section 261A area (Substitute Consent Area), Ballysheedy Quarry

Under QY/46, Ballysheedy Quarry was registered with Galway County Council. The quarry was operated locally prior to Madden's purchasing the quarry in the late 2014.

Aerial photographs of the quarry show that some expansion took place on lands in the western section of the quarry, beyond the area for which the 1994 planning permission was granted. Galway County Council, in the Section 261A Quarry Assessment Report, estimates this area as approximately 8 hectares. Based on a survey conducted in 2022, this area is now estimated at 8.3ha.

The Council state that this expansion was never assessed in accordance with the EIA Directive or the Habitats Directive.

Determination and Decision by Galway County Council
According to Galway County Council's Section 261A Quarry Assessment Report, under Section 261a (2)(a)(i) it was determined that:

- *No further action was required.*

3.4 National Guidelines

Quarries and Ancillary Activities Guidelines for Planning Authorities (2004)

Guidelines were published by the Department of the Environment, Heritage and Local Government under section 28 of the Planning and Development Act 2000, which requires both planning authorities and An Bord Pleanála to have regard to them in the performance of their functions. While primarily addressed to statutory planning bodies, the document is intended to also provide assistance to owners and operators of quarries to which section 261 of the Act applies.

Aggregates are a 'significant natural resource' but can give rise to 'land use and environmental issues' which need to be controlled and mitigated by the planning system. The guidelines set out to 'identify those issues and to suggest best practice in dealing with them'. Environmental impacts and best practice/mitigation measures are examined for noise/vibration, dust, water, natural heritage, landscape, traffic, cultural heritage and waste management.

Ballysheedy Quarry has been operating in accordance with these guidelines in considering all environmental impacts and implementing mitigation measures to the highest standard.

Environmental Management in the Extractive Industry (EPA, 2006)

These environmental management guidelines by the Environmental Protection Agency are intended to complement existing guidance and be of assistance to operators, regulatory authorities and the general public. The aim of these Guidelines is to assist in the implementation of the Statutory Requirements under Section 261 of the Planning Acts, as well as lead to a harmonized regulatory approach to the authorisation and supervision of such activities.

These guidelines represent a summary of current environmental management practices for quarries and ancillary facilities. The guidelines are intended to provide general advice and guidance in relation to environmental issues to practitioners involved in the planning, design,

development, operation and restoration of quarry developments and ancillary facilities.

Ballysheedy Quarry operated within these guidelines.

Environmental Code (ICF, 2005)

The Irish Concrete Federation (ICF) is the trade organisation for the aggregate and concrete products industry in Ireland. They first published their Environmental Code in 1996. It was updated in 2005. It has become a guidance document for its members and quarry operators. The objective of this Code is to ensure that all ICF members will:

- Carry out the business of aggregate extraction, processing, delivery, reinstatement and associated concrete production in a manner which minimises adverse effects upon the environment and the local community;
- Operate to those standards required by law and good industry practice;
- Conserve resources by the efficient use of energy supplies and raw materials;
- Ensure that employees and contractors perform their duties in a manner consistent with these environmental policy objectives;
- Respect the legitimate concerns and interests of the community; and,
- Be committed to good environmental management practice.

According to the ICF the environmental impacts that must be addressed include, noise, ecology, archaeology, ground vibration, dust and air quality, water management, fuel/ chemical storage, waste management, good housekeeping, visual impact, transport, after-use, energy and public safety.

3.5 Planning and Development Context

3.5.1 National Development Plan 2040

The *Ireland 2040 Our Plan – National Planning Framework* was published in 2018. The NPF was developed to succeed the National Spatial Strategy. It provides a framework for national planning, pulling together relevant Government policies and investment on national and regional
development. It will have a focus on economic development and investment in housing, water services, transport, communications, energy, health and education infrastructure.

In terms of agriculture National Policy Objective 23 aims 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'.

National Policy Objective 25 states that 'The Department of Rural and Community Development, the Department of Agriculture, Food and the Marine, and other relevant

Departments and Agencies will continue to invest in rural Ireland, including through the Rural Regeneration and Development Fund, and will work together to establish a mechanism to co-ordinate structures for funding rural development to align with other national strategies'.

3.5.2 National Spatial Strategy 2002-2020

The National Spatial Strategy (NSS), published in 2001 was a 'twenty-year planning framework designed to achieve a better balance of social, economic, physical development and population growth between regions.' The NSS, following on from EU spatial planning guidelines (e.g., ESDP, 1999), uses a polycentric approach to planning and development, allowing for stronger regional cohesion through the designation of gateways and hubs and greater economic linkages.

County Galway was noted as being part of the West region. Ballysheedy Quarry is located in a rural area designated 'village strengthening and rural area opportunities'. The closest County Galway town is Gort, which is noted as having an 'urban strengthening opportunity'. The NSS identifies the town of Tuam as an important 'hub' town, while Athenry and Loughrea present opportunities for development. The quarry is located directly beside a 'national transport corridor', and close to the transport corridors leading out of the 'gateway' of Galway. This places the Gort area in a strategic position in the context of regional development opportunities.

The Ballysheedy Quarry works were in line with the growth and spatial planning objectives of the NSS for the West Region. Construction materials such as aggregates and coated stone were and are essential raw materials required to facilitate the objectives of the NSS.

3.5.2 Regional Plans

The Regional Spatial and Economic Strategy (RSES) of the NWRA provides a high-level development framework for the Northern and Western Region, that supports the implementation of the National Planning Framework (NPF) and the relevant economic policies and objectives of Government. It provides a 12-year strategy to deliver the transformational change that is necessary to achieve the objectives and vision of the Assembly.

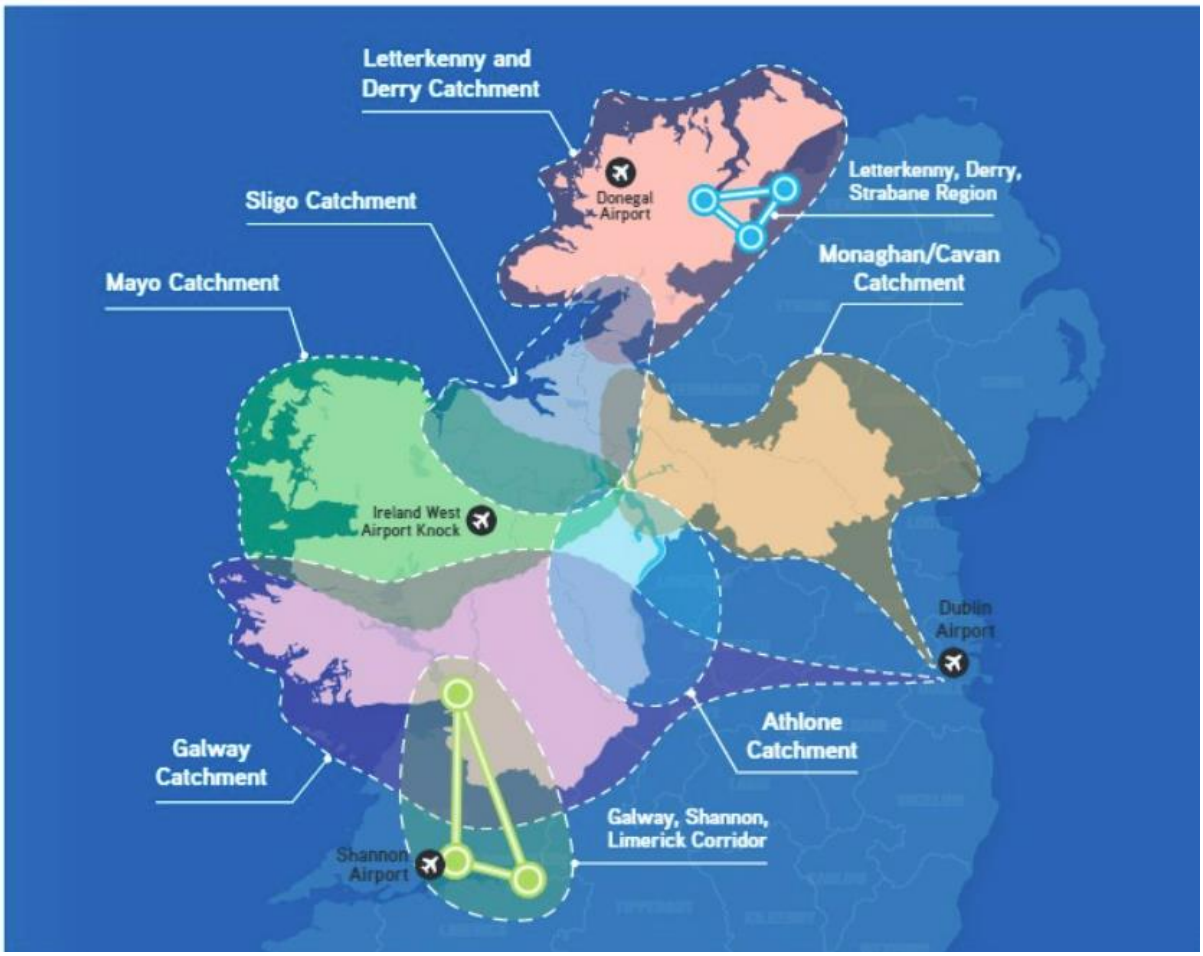


Figure 4-1: Map of NWRA and Six sub Regions –

3.5.2.1 NWRA and Atlantic Economic Corridor

The Atlantic Economic Corridor (AEC) is driven by business representatives and communities and supported by national, regional and local government and State agencies. The AEC is defined in the NPF as one of the shared goals in the National Strategic Outcomes. It is a key enabler of economic growth.

The initiative seeks to consolidate and align the State capital investment programme with the potential investment of the private sector to strengthen this part of the region's economic contribution and make it a better place in which to live and work.

It provides an opportunity to create an accelerated, more responsive pathway for regional development in Ireland. Improved connectivity will be vital to unlocking the economic and social potential of the Atlantic region. That includes physical improvements in road, rail and other transport infrastructure but also the digital connectivity that has the power to transform and energise rural areas. These opportunities are outlined explicitly in National Strategic Outcome 2 of the NPF and implicitly in the delivery of the National Broadband Plan.

Figure 4-2 Atlantic Economic corridor

The AEC aims to build and increase collaboration that maximises its assets, attracts investment and creates jobs and prosperity. The overarching objective of the AEC concept is to maximise the Atlantic region's assets and connect the economic hubs, clusters and catchments of the region to generate a value proposition of scale which will attract investment, support job creation and improve quality of life for those who live in the region. Specifically, the AEC proposal seeks to:

-Increase Gross Value Added (GVA) through the creation of high value-added jobs.

-Develop a well-skilled labour pool, which will attract both Irish and foreign-owned enterprises to the region.

-Increase the competitiveness of the region to support economic growth.

-Get the best from the region's existing and potential economic infrastructural assets (e.g. roads, gas networks, ports, rail, broadband, etc.).

-Ensure that enterprise property in the region is available and fit for modern investment.

-Drive research and innovation in the public and private sector to increase opportunities for the

region.
-Involve communities in delivering growth in the region.
-Retain and increase the share of the national population settling in the Atlantic region.
-Improve the quality of life for the people of the region.

3.5.3 Galway County Development Plan 2015-2021

The Galway Development Plan 2015 – 2021 which expired on the 19th of June 2022, outlines a no. of policies and objectives relating to Mineral Extraction The site is located within a rural area and Chapter 6 of that plan deals with services, including Section 6.20 deal with Mineral Extraction and Quarries and Section 6.21 which sets out the policies and objectives relating to mineral extraction and quarries. Section 6.20 of the Plan notes that: 'Quarrying and other extractive industries are recognised as important to the local rural economic development of the County in terms of generating employment and providing raw material to the construction industry. The Plan further states that the Council will facilitate harnessing the potential of the area's natural resources while ensuring that the environment and rural and residential amenities are appropriately protected.' 3.1.2. Section 6.21 sets out the policies and objectives for quarrying which include protections for Natura 2000 sites as well as encouraging the sustainable reuse of quarries. 3.1.3. Chapter 13 of the Plan deals with Development Standards and DM Standard 37 deals with Extractive Development.

3.5.4 Galway 2022-2028 Galway County Development Plan

The Galway 2022-2028 Galway County Development Plan came in to effect on the 20th of June 2022. Section 4.14 of the plan deals with Mineral Extraction and Quarries
The following objectives are of relevance.

MEQ 2 Protection of the Environment

The Council shall require the following in relation to the management of authorised aggregate extraction

(a) All quarries shall comply with the requirements of the EU Habitats Directive, the Planning and Development (Amendment) Act 2010 and by the guidance as contained within the DoEHLG Quarries and Ancillary Facilities Guidelines 2004, the EPA Guidelines 'Environmental Management in the Extractive Industry: Non-Scheduled Minerals 2006 (including any updated/superseding documents) and to DM Standard 19 of this Development Plan;

(b) Require development proposals on or in the proximity of quarry sites, to carry out appropriate investigations into the nature and extent of old quarries (where applicable). Such proposals shall also investigate the nature and extent of soil and groundwater contamination and the risks associated with site development works together with appropriate mitigation.

(c) Require Development Proposals to assess the potential impact of extraction in areas where geo-morphological interest, groundwater and important aquifers, important archaeological features and Natural Heritage Areas are located;

d) Have regard to the Landscape Character Assessment of the County and its recommendations;
(e) Ensure that any quarry activity has minimal adverse impact on the road network and that the full cost of road improvements, including during operations and at time of closure, which are necessary to facilitate those industries are borne by the industry itself.
(f) Ensure that the extraction of minerals or aggregates does not adversely impact on residential or environmental amenity.
(g) Protect all known un-worked deposits from development that might limit their scope for extraction

MEQ 3 Sustainable Management of Exhausted Quarries

Encourage the use of quarries and pits for sustainable management of post recovery stage construction and demolition waste, as an alternative to using agricultural land, subject to normal planning and environmental considerations.

MEQ 4 Landscaping Plans

Ensure that all extractions shall be subjected to landscaping requirements and that worked out quarries should be rehabilitated to a use agreed with the Planning Authority which could include recreational, biodiversity, amenity or other end-of-life uses. The use of these rehabilitated sites shall be limited to inert waste and sites shall be authorised under the appropriate waste regulations.

Chapter 15 of the CDP 2022-2028 details the standards required with regards to proposed Extractive Development- 15.3.5 Extractive Development.

3.5.5 Landscape Character Assessment

According to the Galway Landscape Character Assessment, Ballysheedy Quarry, Gort is located in Area 4 South East Galway (Clarinbridge to Gort). The landscape character assessment identifies the landscape as flat to undulating with hedgerows as field boundaries but generally without mature trees. The Landscape Value Rating Map places the site within an area of Low Landscape Value rating. Gort lies on the divide between this and the Medium Value Rating area to the south. The Landscape Sensitivity Rating map (Map/Figure 3 in the LCA) places the site in an area with a low landscape sensitivity rating but with nearby pockets of moderate sensitivity. These are below the overall ratings for Landscape Character Area 4, where the overall landscape value rating is medium and landscape sensitivity rating is moderate (class 2) with pockets of high (class 3).

(b) Require development proposals on or in the proximity of quarry sites, to carry out appropriate investigations into the nature and extent of old quarries (where applicable). Such proposals shall also investigate the nature and extent of soil and groundwater contamination and the risks associated with site development works together with appropriate mitigation.
(c) Require Development Proposals to assess the potential impact of extraction in areas where geo-morphological interest, groundwater and important aquifers, important archaeological features and Natural Heritage Areas are located;
d) Have regard to the Landscape Character Assessment of the County and its recommendations;
(e) Ensure that any quarry activity has minimal adverse impact on the road network and that the full cost of road improvements, including during operations and at time of closure, which are necessary to facilitate those industries are borne by the industry itself.

(f) Ensure that the extraction of minerals or aggregates does not adversely impact on residential or environmental amenity.
(g) Protect all known un-worked deposits from development that might limit their scope for Extraction

3.6 Conclusion

The planning history of the quarry and a review of Galway County Council's Section 261A Quarry Assessment Report demonstrate the need to apply substitute consent to Ballysheedy Quarry. Expansion of the quarry took place that was not subject to assessment under the EIA Directive or Habitats Directive. Substitute consent, if granted, will authenticate the status of Ballysheedy Quarry and regularise quarrying activity in accordance with the Planning and Development Act 2000 (as amended). The quarry operated in a sustainable and environmentally sound manner with due regard to the local community consistent with both the company's own Environmental Management System.

This chapter demonstrates that Ballysheedy Quarry is consistent with aims and objectives of local and national policy including Galway County Development Plan, the National Spatial Strategy 2002-2020 and the NDP2040. Ballysheedy Quarry has been an integral part of the growth of the region to date.

4 HUMAN HEALTH AND POPULATION

4.5 Introduction

Human beings and their socio-economic environment are an essential element in the EIA process. Quality of life must not be degraded as a result of a development and both the short and longer term impacts on the local population must therefore be addressed at this stage. The purpose of this chapter is to examine the socio-economic conditions in the area surrounding Ballysheedy Quarry, County Galway.

It should be noted that reference will be made only to the existing environment as a means of assessing any impact that development in the past at Ballysheedy Quarry may have had on the local and regional area. This chapter will focus on population, employment and tourism and amenities. The issues of water quality, dust, noise and traffic are dealt with individually in Chapters 7, 9, 10 and 12 respectively.

4.5.2 Methodology

A desk-based assessment was carried out and the following documents were consulted:

- National and Regional Planning Policy (NSS, NDP, RPGs);
- Galway County Development Plan;
- Central Statistics Office (CSO) online database (2020);
- National Monuments Service *Map Viewer* (2022);
- Fáilte Ireland website (2022); and
- Ordnance Survey maps and satellite imagery.

4.6 Existing Environment

Ballysheedy Quarry is located in the rural hinterland of Gort, approximately 2.8km southwest of the town. The L8500 is located 0.3km to the south of the quarry, with M18 located to the east of the site. The topography of area is largely 'lake and drumlin' landscape, with a number turloughs present in the surrounding area. The land consists predominantly of well drained pastureland with turloughs and extensive woodland. The River Drumminacloghaun and its tributaries flow 1km west of the site and flows into the Newtown Turlough and its floodplain.

4.6.2 Site Description

The quarry is bounded to the west, north by grasslands and south west by scrubland and wooded vegetation with some clearances for agricultural land. The eastern edge is bordered by a quarry and to the south east by where the terrain changes to more open grassland. Population is low in the immediate vicinity with minor ribbon development apparent along the local road network.

4.6.3 Land Use

Although there are some significant tracts of woodland and hazel scrub, the land surrounding Ballysheedy Quarry is primarily used for livestock grazing and small-scale agriculture. According to the County Galway Landscape Character Assessment, Ballysheedy Quarry is located in the Clarinbridge - Gort lowlands.

A survey of all properties surrounding the quarry was carried out in March 2022 to assess the proximity and significance of sensitive receptors in the area (see Figure 4.1). Within a 0.5 kilometre radius of the quarry there are approximately 14 residential dwellings, with the most prominent cluster occurring to the 0.4km west of the site (linear development). There has been little development in this area in recent years and the majority of these properties have been established in the area for decades.

There is limited commercial activity apart from a truck service centre immediately south of Ballysheedy Quarry and some large agricultural buildings evident throughout the area. Small-scale agricultural activity (livestock and horses) was evident in the area on the day of surveying and this appears to be the prevailing industry here.

4.6.4 Population

According to the Census 2011 Gort had a population of 2,644, consisting of 1,296 males and 1,348 females. The population of pre-school age (0-4) was 240, of primary school going age (5-12) was 249 and of secondary school going age (13-18) was 171. There were 334 persons aged 65 years and over. The number of persons aged 18 years or over was 2,016.

According to the Census 2016, Gort town has a population of 2,994 an increase of 13% since 2011 while the Environs of Gort recorded a <5% increase. The site is located in the Beagh ED area which has a population of 705, an decrease of 1.3%, Killinny has a total of 455, an increase of 6% while the Loughrea LEA has a population of 39,346, an increase of 12.1% since 2011.

Overall, the population of County Galway is 179,390, which represents a 2.4% increase in 5 years, continuing the growth trend between 1991 and 2006 (average 3% increase per annum).

4.6.5 Employment

Employment is an important indicator of the economic standing of an area.

The Quarterly National Household Survey (QNHS), published by the Central Statistics Office, provides details of unemployment on a regional level. County Galway is located in the Western Region, which had an unemployment rate of 16.6% and a participation rate of 60.5% in the third quarter of 2012. The participation rate is the number of persons in the labour force expressed as a percentage of the total population (over the age of 15 years). The figures show that the West Region has a higher unemployment rate than the State. There were 2.6 million persons in the Labour Force in Q4 2021 and this was up by 8.9% (214,800) from Q4 2020. The participation rate in Q4 2021 stood at 65.1% up from 60.6% a year earlier. Participation rates by region are detailed below.

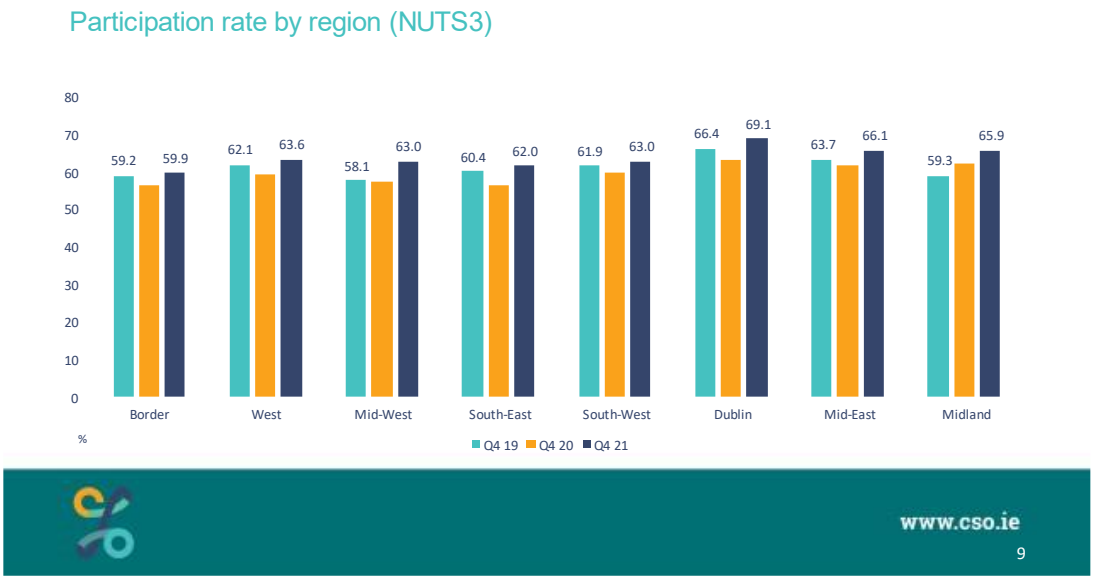


Figure 4-1 CSO data - regional participation rate

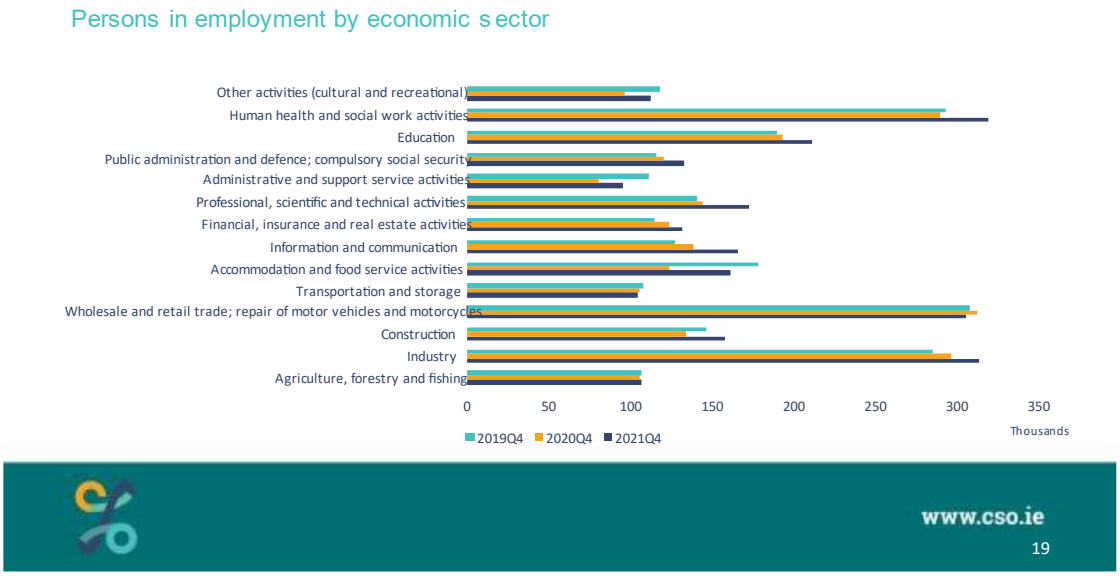


Figure 4-2 CSO data – employment by sector

The CSO also publishes Live Register figures. These figures are not strictly a measure of unemployment as they include persons who are legitimately working part time. However, they can be used comparatively to provide an overall trend within an area. The recent live Register is impacted by Covid/ PUP with seasonally unadjusted figures are shown below:

Table 4-1 Live Register (2021)

	Live Register Total	Seasonally Adjusted	Pandemic Unemployment Payment (PUP)	Employment Wage Subsidy Scheme (EWSS)	Total [1]
April 2021	177,969	180,000	386,659	311,138	845,022
March 2022	178,996	181,000	n/a	263,770	436,056
April 2022	177,004	177,100	n/a	n/a	n/a
Change in month	-	-3,900	n/a	n/a	n/a
Change in year	-965	-	n/a	n/a	n/a

[1] Estimated total number of persons (excluding overlaps) on the Live Register or benefitting from the PUP, or the EWSS

The regional figures show that County Galway and the West Region are consistent with current national trends in that there has been a slight decrease in people signing on between 2021 and 2022.

Ballysheedy Quarry was a substantial employer in the wider area and provides a vital economic status to what is otherwise a sparsely populated rural region. John Madden & Sons Ltd. employs approximately 50 personnel on an annual basis at their various quarries. Permanent employees include quarry personnel, administration staff and maintenance personnel.

Indirect employment was also generated as a result of the quarrying and aggregate production, in terms of contract aggregate transport drivers, concrete block readymix concrete drivers, suppliers of products and services, such as fuel and oil suppliers, machinery suppliers, etc.

4.6.6 Tourism and Amenity

According to the Fáilte Ireland preliminary figures for 2019 (the most recent pre covid data available in the public domain), Overseas tourists to Ireland in 2019 grew by 0.7% to 9.7 million. Overseas tourists from Britain grew by 0.2% while North America dipped slightly by -3.1%. This was offset by Mainland Europe recording growth of 2.8% and other long haul markets growing by 3.4% in 2019. Mainland Europe accounts for 37.3% of our overseas tourists and is not our single largest source market, with Britain accounting for 36.0% of overseas tourists to Ireland. Details of the west region in identified in table below.

Table 4-2 2019 Tourism West of Ireland data

Region	Numbers(000's)	Market Revenue(€m)

Britain	342	112
Europe	812	238
North America	647	264
Other		
Other Areas	142	39
All Overseas	1,943	653
Northern Ireland	113	48
Domestic	1,848	370

Galway county encompasses some of the key tourism destinations in the country; it has traditionally maintained a high ranking among the most visited counties. Galway City and County attracted 1 million domestic visitors in 2018 and generated €175million, with the number of international visitors attracted at 1.729million visitors generating €626 million in revenue (GCDP).

Kylemore Abbey receives 560,000 visitors annually, Connemara National Park at 240,000, Dún Aonghasa at 130,000 and Leenane Cultural Centre at 92,000.

There are five national, long-distance walking trails route through the region. They include the Burren Way, East Galway Way, Western Way and Mid Galway Way. In addition to the marked routes there is a network of country roads, forest paths and mountain and coastal trails. The west coast of Galway provides ample opportunity for shore and deep sea angling. These areas are regarded as prime sea fishing territory. Galway also contains several national and regional cycle routes. Significant tourist attractions include Coole Park, Thoor Ballylee, Kilmacduagh Monastic Settlement and Gort Golf Course. Gort is also close to the Burren.

The Gort Local Development Plan 2008-2014 provides 60Ha hectares comprising of children's playgrounds, flood plains, formal parks and play areas. It is intended that new walkways will be developed and promoted in the Gort hinterland. Objective CF9 – Amenity Network (refer to Maps 2A/2B) Support the establishment of an accessible network of greenway linkages and amenities that provide safe and attractive circulation routes for pedestrians and cyclists for the enjoyment and recreational use of the entire community. This network will include an amenity walking circular route along the Kinincha Road returning via the river bank to George's Street. The network will also link together community facilities, amenities and built heritage features in the Plan Area and surrounding areas. The quarry is not visible from the Burren way or the Gort Amenity Walkway from the Substitute Consent site.

4.7 Conclusion

This chapter has examined the prevailing socio-economic environment pertaining to Ballysheedy Quarry. The population, employment and tourism and amenity context show that there has been and continues to be a need for jobs and investment in the local area. The quarry supported not only the local economy but contributed to the N18 construction and other

adjacent public works. A quarry development must not harm the local landscape, environment or residential amenities, as specified in the Regional Planning Guidelines, Galway County Development Plan and Gort Development Plan among other policy documents.

With regard to the local community the operation of the quarry did not have a direct negative impact on any tourism and amenity sites and will have assisted in boosting local employment figures at a time of record unemployment levels (2008 – 2012) while simultaneously aiding the economic recovery of the West region, with spin-off benefits to the Sheeaun community in particular and wider assistance to the Irish economy in general.

5 BIODIVERSITY

5.5 Introduction

This chapter reports on the results of assessment of any significant effects on biodiversity as a result of extraction activities at the Ballysheedy Quarry.

A description of the mitigation measures envisaged and/or or used to avoid, prevent, reduce, or if possible, offset any identified significant effects on the environment and where appropriate, of any monitoring arrangements, are then discussed. Due to the retrospective nature of the assessment, this chapter will focus on existing or pre-existing measures used in order to mitigate the likely significant effects of historic extraction. Any residual effects are also assessed.

Chapter 4 (Project Description) provides a full description of the project and describes the extractions activities that commenced in 1994 until 2012 in the bulk of the area and 2020 in the minor additional access area.

This chapter presents an Ecological Impact Assessment (EcIA) of the existing Ballysheedy Quarry development and should be read in conjunction with the site layout plans and project description section (Chapters 1 and 2) of this Remedial Environmental Impact Assessment Report (rEIAR).

It is important to highlight that this current EcIA was conducted for past works within a former quarry and not for any proposed new works. The site consists of the Substitute Consent application area within the overall landholding, as per Figure 1.2. For completeness other quarry habitats/ ecological receptors are considered.

The main aim of the exercise is to determine if any likely impacts have arisen to biodiversity on the site, and possible ecological receptors linked to the site, from all quarry activity to date. In particular ground water habitats (such as wetlands) in the vicinity of the site and surrounding wetlands are considered.

Ballysheedy Quarry is located in Gort, Co. Galway approximately 2.8km southeast of Gort village, within the townlands of Ballysheedy and Sheeaun .

An ecological survey of the site was conducted by an experienced ecologist from Tobin Consulting Engineers (>17years) on the 15th of February 2022.

Key works implemented included;

- Identification and mapping of habitat types;
- Review of aerial imagery available from Ordnance Survey Ireland.
- Identification of predominant plant and animal species within each habitat;
- Protected mammal and bird survey.

- Identification of any rare or threatened habitats, if present, potentially impacted upon by the development.
- Ecological appraisal of ponds at Ballysheedy Quarry and offsite discernible aquatic receptors relevant.

A remedial Natura Impact Statement is included as a separate document with this SC Application. The NIS considers impacts from quarry activity on Natura 2000 sites.

5.6 Methodology

This chapter has been prepared having regard to the following plans and policy documents:

- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011), as amended. With particular reference to the Third Schedule of the European Communities Regulations 2011 (S.I. No. 477 of 2011) which deals with invasive species;
- The EIA Directive 2011/92/EU, as amended by Directive 2014/52/EU;
- European Union (EU) (Environmental Impact Assessment and Habitats) (No. 2) Regulations 2015 (S.I. No. 320/2015);
- Environmental Liabilities Directive (2004/35/EC);
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, herein referred to as the Habitats Directive;
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds, herein referred to as the Birds Directive;
- The EU Water Framework Directive (2000/60/EC);
- The Wildlife Acts 1976 to 2021 (as amended), herein referred to as the Wildlife Acts;
- The Flora (Protection) Order 2015 (S.I. No. 356 of 2015);
- Relevant fisheries legislation up to and including the Inland Fisheries Acts 1959-2017, as amended;
- Relevant policies in Ireland's 3rd National Biodiversity Action Plan, 2017 – 2021 produced by the Department of Culture, Heritage and the Gaeltacht; and
- Objectives relevant to ecology and biodiversity in the Mayo County Development Plan 2018-2024.

The potential for effects on Biodiversity was assessed, taking into consideration the habitats and species that were likely to be affected by the quarry activities at the site. This approach included consideration (as appropriate) of the following guidance documents:

- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine Version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester;
- EPA (2017). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Draft, August 2017;
- NRA (2008). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes;
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes. (Revision 2, National Roads Authority);
- Smith, G. F., O'Donoghue, P., O'Hora, K., & Delaney, E. (2011). Best Practice Guidance

for Habitat Survey and Mapping. Ireland's Heritage Council: Kilkenny, Ireland;
- Fossitt (2000). A Guide to Habitats in Ireland. The Heritage Council;
- Gilbert, G., Stanbury, A., Lewis, L., (2021). Birds of Conservation Concern in Ireland 2020-2026. Irish Birds 9:523-544; and
- SNH (2016). Assessing Connectivity with Special Protection Areas (SPAs).

5.7 Study Area and Zone of Influence

The study area for this retrospective biodiversity assessment comprised the Sheeaun site and surrounding areas. The current guidance on ecological assessments (CIEEM, 2018) states that: "*The 'zone of influence' for a project is the area over which ecological features may be affected by biophysical changes as a result of the project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries*" and that "*The zone of influence will vary for different ecological features depending on their sensitivity to an environmental change.*" The Zone of Influence (ZoI) was therefore defined through a desk-based assessment with regard to the sensitivity of habitats and species likely to be present / previously recorded in the locality of the site, areas with connectivity (physical, hydrological, or ecological) and potential impacts which may have arisen from extraction and ancillary works on site. The spatial extent of impacts which would have occurred during the operational phase are summarised hereunder.

5.7.2 Habitat loss/degradation

Direct physical damage to habitats would have occurred within the footprint of the extraction activities. As such the spatial limits of direct habitat loss would have been confined to the areas of extraction and related activities.

The deposition of dust may have resulted in the degradation of habitats and vegetation within site.

5.7.3 Dust

The Institute of Air Quality Management provide guidelines; 'Guidance on the Assessment of Dust from Demolition and Construction' (Holman et al., 2014), which prescribes potential dust emission risk classes to ecological receptors. The guidelines specify that receptor sensitivity is 'High' up to 20m from the source and reduces to 'Medium' at 50m. Therefore, following a precautionary approach, the ZoI for air quality impacts is considered to be a 100m radius from any dust generating activities.

The spatial extent for habitat loss and degradation due to dust would have extended to 100m from the site worked areas.

5.7.4 Surface Water

The Sheeaun site is located in the Galway Bay south east Water Framework Directive (WFD) catchment. The Shannon Estuary North catchment is located 0.5km to the south of the site. The ZoI for potential impacts on surface water quality in the receiving freshwater environment is

confined to the Kilchreest_010 River subcatchment, downstream of the site. The distance downstream is defined by the current biological condition of the accepting waterbody and its capacity to accept and assimilate sediment and other pollutants.

5.7.5 Ground Water

The groundwater ZoI for potential impacts on groundwater quality in the receiving freshwater environment is limited due the limited permeability on the site. Infiltration and exfiltration at the site are limited with no significant connection to the regional karstic groundwater flow noted in the area. Groundwater which infiltrates slowly to ground, recharges locally to ground. The lack of water level variation and lack of karst features in the supports the view of low exfiltration/infiltration.

5.7.6 Noise

Noise from activity onsite had the potential to cause disturbance to resting, foraging, and commuting qualifying and special conservation interest species. Individual species will elicit differing behavioural responses to disturbance at different distances from the source of disturbance. Below is a summary of the documented zones of influence for varying species.

- Mammals: Transport Infrastructure Ireland (TII) (formally the National Roads Authority) has produced a series of best practice planning and construction guidelines for the treatment of certain protected mammal species (i.e., otter), which indicate that disturbance to terrestrial mammals would not extend beyond 150m. The TII Guidance is produced in respect of road developments, however, the TII guidance documents were produced in consultation with the NPWS and various recognised protected species experts and it is generally considered to be the most appropriate guidance available for impacts from noise on mammals.
- Marine mammals: *'Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters* (DAHG, 2014) sets out measures to minimise the risk of noise related impacts on marine mammals caused by maritime sound-producing operations or activities. The guidance specifies that operations should not commence if marine mammals are detected within a 500m radial distance of dredging / drilling activities or 1000m of blasting activities. At the closest point the coast is located approximately 10km from the Sheeaun site. As such there was no potential for effects on marine mammals.
- Birds: There is wide variability in the documented accounts of the distances at which individual bird species will initiate a flight response to disturbance (caused by the presence of plant and personnel). Cutts *et al.* (2013) notes that different types of disturbance stimuli are characterised by different avifaunal reactions, however as a general rule of thumb, a distance of 300m can be used to represent the maximum likely disturbance distance for waterfowl. This is supported by the findings of Wright *et al.* (2010) which found that noise levels above 60dB resulted in behavioural responses, with birds abandoning the site in response to noise levels above 70dB. Thus, 300m was considered to be a precautionary buffer in defining the ZoI of disturbance effects of birds. Peregrine falcons regularly utilise the site both during operations and since 2020.

Desk Study

A desktop study was undertaken as part of the assessment in order to collate and review

background information relating to extraction at the site. Information was obtained from the following sources:

- A review of existing relevant mapping and databases e.g., species and habitat distribution (sourced from the Environmental Protection Agency (EPA), the National Biodiversity Data Centre (NBDC) and the National Parks and Wildlife Services (NPWS));
- A review of historical aerial mapping from Ordnance Survey, Bing Maps, and Google Earth of the project site was carried out.
- A review of historical data recorded within the 10km grid square which encompasses the Sheeaun supplied by the NPWS's Scientific Unit.
- A review of historical published and unpublished NPWS reports on protected habitats and species including Irish Wildlife Manual Reports, Species Action Plans and Conservation Management Plans;
- A review of all NPWS site synopsises for designated sites within the ZoI of the project;
- Conservation Status Assessment Reports (CSARs), backing documents and maps prepared in accordance with Article 17 of the Habitats Directive;

The ecological desk study for this project comprised of the following elements:

- Identification of all sites designated for nature conservation within 15 kilometres of the application area (refer to Figure 5-1 Designated Conservation Areas);
- Review of available relevant reports for the site including; previous EIS (2009), Galway County Council Determination (2012) and Galway County Council Section 261A Quarry Assessment Report
- A review of the NPWS site synopsis for designated sites mapping[1] of the application area as relevant regarding potential impacts;
- A review of available EPA water quality reports and mapping[2] and Water Framework Directive3 Water Quality data to assess if existing impacts to water quality are potentially arising; and
- Review of Ordnance Survey Ireland (OSI) and Google Earth maps aerial photography in order to determine broad habitats that occur within the existing site. OSI map versions dating from 1995 and 2015 were also reviewed to assess changes in vegetation cover during this period.

Field Survey

The habitat assessment was conducted in accordance with The Heritage Council's *'Best Practice Guidelines for habitat survey and mapping in Ireland'* (2011) and habitats were classified according to The Heritage Council's *A Guide to Habitats in Ireland* (Fossitt, 2000). Aerial photography assisted habitat delineation and interpretation. Plant identification and nomenclature principally follows Webb *et al.* (1996). Rose (1989) further assisted grass and fern identification and nomenclature. The predominant plant species for each habitat type were recorded in order to accurately determine habitats present on the site. Habitats were evaluated according to the Site Evaluation Scheme contained in the Source: Guidelines for Assessment of Ecological Impacts in National Road Schemes (NRA, 2009). During the survey

[1] http://webgis.npws.ie/npwsviewer/
[2] http://gis.epa.ie/Envision/
[3] http://www.wfdireland.ie/

particular attention was paid to determining the presence of possible rare and protected flora species typical of habitats on site.

Bird surveys focussing on species of conservation concern were conducted throughout the Quarry substitute consent site. The presence of bird species was determined through direct sightings or audible calls. While all birds were recorded; the focus was to determine species of conservation concern including species listed on Annex 1 of the EU Birds Directive; and Red and Amber listed species of High and Moderate conservation concern respectively (Bird Watch Ireland Conservation evaluation criteria).

The general mammal survey primarily involved searching the site for evidence/signs of mammals (e.g., tracks, scats, dwellings and occasionally direct sightings). An assessment of the habitats in terms of their importance for mammals was also undertaken.

Checks for protected fauna including Marsh Fritillary, Frogs and Smooth Newt were also conducted. No significant constraints existed to evaluating on-site biodiversity and hence the assessment of impacts.

A range of ecological field surveys have been undertaken at the Sheeaun site between 2007 to 2022. A summary of the ecological surveys which have been undertaken and have been used to inform this assessment are outlined hereunder.

A vegetation study of the site was undertaken in 2008 to determine the condition of the site.
A wide range of ecological field surveys were undertaken at the site by Corvus Environmental on behalf of Goode to inform an Environmental Impact Statement (EIS) of the quarry extension (2008). The survey area included the entirety of the Sheeaun site. The field surveys included:

- Habitat and vegetation surveys were carried out between 2008-2009;
- Breeding and winter bird surveys were undertaken from 2008;
- A bat survey was carried out in July 2008;
- Other mammal, amphibians and reptile surveys were carried out between 2007 and 2008.
- Site walkover, Habitat and vegetation surveys (June 2014)
- Site walkover, bat survey, Habitat and vegetation surveys (June, July 2020)
- Site walkover, Habitat and vegetation surveys (March, June 2022)

During the surveys, particular attention was given to the possible presence of habitats and/or species which are legally protected in Ireland under European or Irish legislation. Photographs from the site visits are included in 5.1. The site visit confirmed that the site is predominantly bare ground with a flood area to the west of the application area. No protected flora was recorded during the site visit. Areas of scrub are developing to the north and northeast of the site. An approximately 1 to 4m water fringe vegetation is slow colonising/developing to the west of the pond.

5.8 Existing Environment (and development to date)

5.8.2 Baseline Evaluation Criteria

The existing ecological conditions are described and evaluated in accordance with standard guidelines. Table 5.1 overleaf details the NRA evaluation scheme (NRA, 2009).The key aim of the ecological evaluation is to highlight "Key Ecological Receptors" as defined in NRA 2009[4]. These are ecological receptors determined to be of Local Importance (Higher Value) or greater. These are the key receptors requiring consideration regarding possible impacts from previous works and appropriate mitigation (if required).

[4] National Roads Authority (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes.

Table 5-1 Site Evaluation Criteria

Ecological Valuation	
Internationally Important	Sites designated (or qualifying for designation) as an SAC or SPA under the EU Habitats or Birds Directives; Undesignated sites that fulfil criteria for designation as a European Site; Features essential to maintaining the coherence of the Natura 2000 network; Sites containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive; Resident or regularly occurring populations of birds listed in Annex I of the Birds Directive and species listed in Annex II and/or Annex IV of the Habitats Directive; Ramsar Site; World Heritage Site; Biosphere Reserve; Site hosting significant species populations under the Bonn Convention; Site hosting significant populations under the Berne Convention; Biogenetic Reserve; European Diploma Site; Salmonid water.
Nationally Important	Sites or waters designated or proposed as an NHA*; Statutory Nature Reserve; Refuge for fauna and flora protected under the Wildlife Acts; National Park; Undesignated sites fulfilling criteria for designation as a 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 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	Areas 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 species of birds listed in Annex I of the Birds Directive, species 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(s) of the habitat types listed in Annex I of the Habitats Directive that do not fulfil criteria for valuation as of International or National Importance; County important populations of species, or viable area of semi-natural habitats or natural heritage features identified in the National of local BAP; 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; 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 Biodiversity Action Plan (BAP); Resident or regularly occurring populations (assessed to be important at the Local level) of species of birds listed in Annex I of the Birds Directive, species listed in Annex II and/or IV of the Habitats Directive, species protected under the Wildlife Acts and/or species listed in 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 of features containing non-native species that are of some importance in maintaining habitat links.

Source: Guidelines for Assessment of Ecological Impacts in National Road Schemes (NRA, 2009)

5.8.3 Designated Conservation Sites

There are no sites designated under the EU Habitats Directive and EU Birds Directive, i.e., Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) located within the footprint of the Ballysheedy Quarry development. In addition, the landholding (including Substitute Consent application area) is not located within a nationally designated sites (Natural Heritage Areas) or proposed Natural Heritage Areas (pNHA). Nearby sites of conservation interest include Termon Lough SAC (001321), Coole Garryland Complex SAC and East Burren Complex SAC (001926).

A Remedial Natura Impact Statement (as per EU Habitat Directive requirements) was completed and the report is attached as separate document to the SC application. Figure 5.1 Designated Conservation Areas illustrates the location of designated conservation sites within 15 kilometres of the application area. Distances from each designated conservation site to the site boundary of Ballysheedy Quarry are provided in Table 5-2.

Table 5-2 Designated conservation areas within 15km of the site

Name	Designation	Approximate distance from site/activity boundary
Termon Lough SAC	SAC	0.65km
East Burren SAC	SAC	0.56km
Coole Garryland Complex SAC	SAC/SPA	1.1km
Lough Cutra	SPA SAC	2.9km
Gortacarnaun wood	SAC	7.1km
Cahermore Turlough	SAC	7.1km
Drummin Wood SAC	SAC	7.5km
Caherglassaun SAC	SAC	5.7km
Carrowbaun, Newhall SAC	SAC	6.9km
Slieve Aughty Mountain	SPA	8.5km
Lough Coy SAC	SAC	7.1km
Galway Bay Complex/Inner Galway Bay	SAC/SPA	11.6km
Peterswell Turlough	SAC	9km
Moyree River System	SAC	8.5km
Ballyogan lake	SAC	8.5km
Sonnagh Bog	SAC	14.5km
Glenree Bog	SAC	13.5km

SAC = Special Area of Conservation (European Designated Site).
SPA = Special Protection Area ((European Designated Site).

No significant impact on Environmental Designations in the area was identified in the previous planning permissions for quarrying at this location. There are no pNHA/NHAs within 10km of the site.

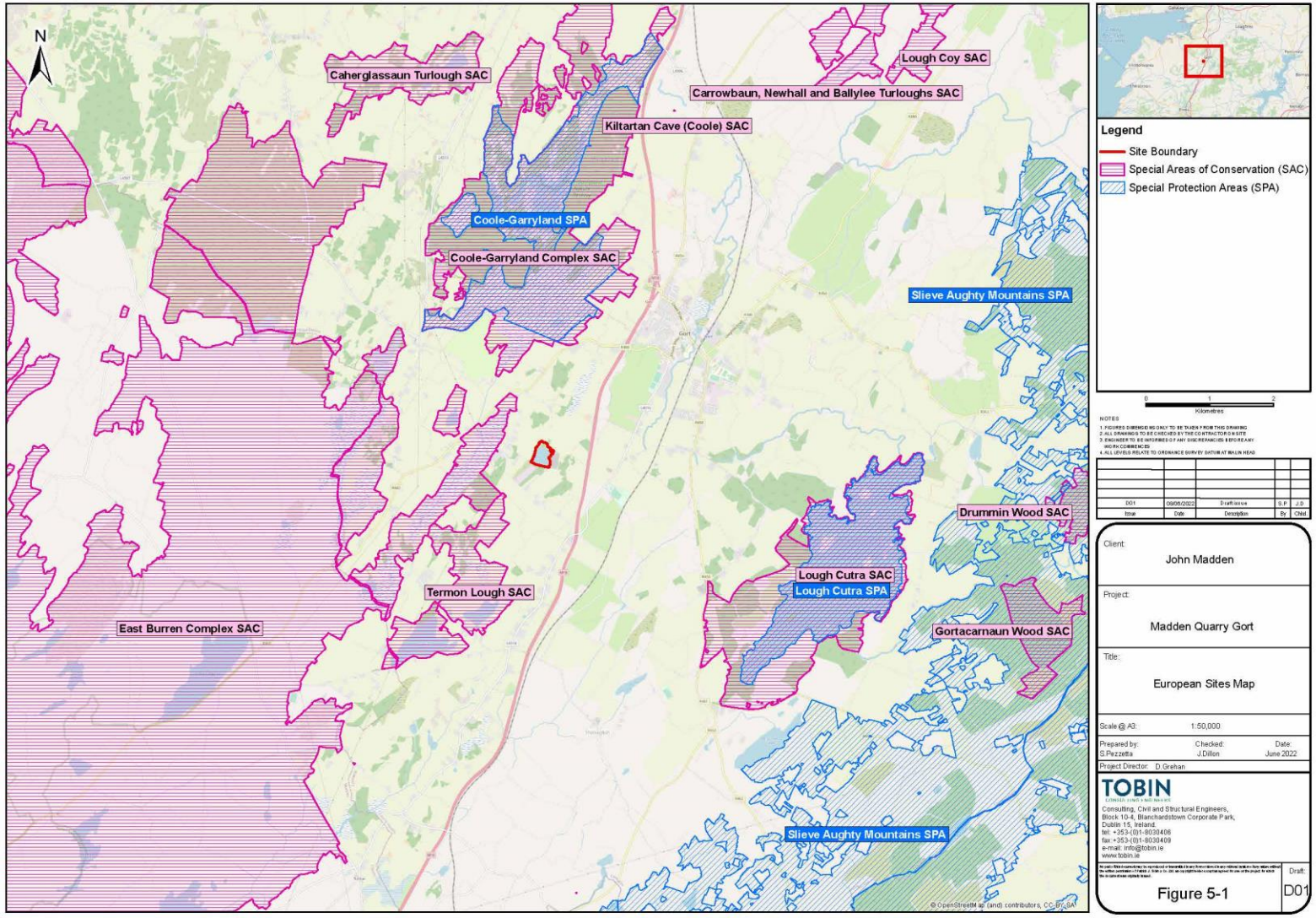


Figure 5-1 Designated Conservation Areas

Rare and Protected Flora

Table 5.3 details rare or protected species which have been recorded in the 2x2km square (M40) which includes the quarry.

Table 5-3 Designated conservation areas located within 15km of the site

Common Name	Status	Category
Alder Buckthorn (Frangula alnus)	Protected	Threatened Species: Vulnerable
Cowslip	(NI)	Species not Considered Threatened in the Republic of Ireland but protected in NI
Devil's-bit Scabious (Succisa pratensis)	(NI)	Species not Considered Threatened in the Republic of Ireland but protected in NI
Blue-eyed-grass	(NI)	Species not Considered Threatened in the Republic of Ireland but protected in NI

The habitat on the quarry site is unsuitable for Alder Bucktorn. No rare or protected flora species are likely to occur in the Substitute Consent application area of the quarry as habitats here are a result of quarrying activities and are highly disturbed. Rare or threatened species such as Devil's-bit scabious (Succisa pratensis), shrubby cinquefoil (Potentilla fruticosa) or pyramidal bugle (Ajuga pyramidalis), hoary rock-rose (Helianthemum oelandicum), autumn lady's-tresses (Spiranthes spiralis), fly orchid (Ophrys insectifera) and frog orchid (Coeloglossum viride), were not detected on the site. No rare or protected flora species were likely to occur in the quarry based on site surveys.

5.8.4 Habitats within Ballysheedy Quarry site

Ballysheedy Quarry is located just off the L8500 local road. This road travels from west to east and connects to the L4516 at the M18 flyover. The quarry area is located to the north of this road. It consists of bare ground and is bordered to the south by an extensive area of scrub and agricultural grasslands. A range of habitats defined largely by their habitat succession state, from bare ground to extensive areas of scrub and patches of grassland are present on the site.

Habitats were classified in accordance with Fossitt (2000). Eight habitat classes and habitat mosaics (habitat consists of a mix of habitat classes) were determined within the quarry site including;

- Active quarry (ED4)
- Building and Artificial Surfaces (BL3)
- Spoil and bare ground (ED2)
- Re-colonising bare ground (ED3)

- Scrub (WS1)
- Ash-hazel woodland (WN2), and
- Other artificial lakes and ponds (FL8)

Ballysheedy Quarry is located within the perimeter of a surrounding access roads, scrub and grassland. The main quarry area consists of a deep depression with a sheer rock face on three quarry facies, with an access track and scrub. The floor of the depression comprises of disturbed ground with heaps of quarried material within a flooded lagoon to the west of the site, and bare ground to the east. Surrounding the quarry void is a range of habitats defined largely by their habitat succession state. These range from extensive areas of spoil and bare ground, Re-colonising bare ground (covered in vegetation), scrub, planted screening and hedgerows/treelines on the site boundary. The northwestern area of re-colonising bare ground is developing areas of scrub and woodland.

Habitats classes and their extents are presented in Figure 5.2 'Habitat Map' and described in subsequent sections.

Re-colonising bare ground (ED3)
This habitat type is developing within re-colonising bare ground habitat (in particular on berms/access tracks on the site boundary. Species include abundant grasses, Yarrow (*Achillea millefolium*), thistles (*Cirsium spp.),* Common Knapweed *(Centaurea nigra),* Hogweed *(Heracleum sphondylium*), clovers *(Trifolium spp.)* and Nettle *(Urtica dioica*).

Scrub (WS1)
An area of scrub exists between the access road and the quarry in the northwest of the site and also near the site entrance. This scrub is dominated by hazel and blackthorn. Scrub is also noted to the south and north of the site. There is an increasing proportion of hazel in the older scrub areas.

Hedgerows (WL1)
A hedgerow forms the boundary of the wider Ballysheedy Quarry site. This hedgerow was made up mainly of Ivy (*Hedera helix*), Hazel (Corylus avellana, Hawthorn (*Crataegus monogyna),* Ash (*Fraxinus excelsior*) and Bramble (*Rubus fruticosus* agg).

Re-colonising bare ground (ED3)
This habitat is extensive on the site and relatively undisturbed with grasses, ragwort, clover and typical species are as per dry meadow and grassy verge habitat.

Spoil and bare ground (ED2)
This habitat occurs in an area of disturbed ground to the east of the quarry site and is of no current ecological value.

Other artificial lakes and ponds (FL8)
This forms the majority of the site with occasional islands of bare ground in the former quarry floor. Water is between 0.5 and 3m deep in the former quarry floor. Water is clear with no

significant inflows with the exception of minor seepages on the exposed quarry face. Small stands of willow, common reed (*Phragmites australis*) and Bulrush (*Typha latifolia*) are present on the margins.

Building and Artificial Surfaces (BL3)
This habitat is used to describe the existing buildings and associated car park at the entrance in the south east of the site and the road which provides access to the quarry and throughout the site. It has no significant ecological value.

Habitats classes and their extents are presented in Figure 5.2 and described in subsequent sections.

Plate 5.1: Dormant Quarry is largely non-vegetated – view looking south-west across quarry.

The lagoon was observed to be of oligotrophic/ mesotrophic nutrient status. It consists of hard clear water and some macrophytes (dominated by *Potamogeton* spp.). Minnows were observed in the shallows. The pond area has potential as a breeding site for Smooth Newt and Frogs. These ponds are evaluated as Local (Higher) value conservation interest.

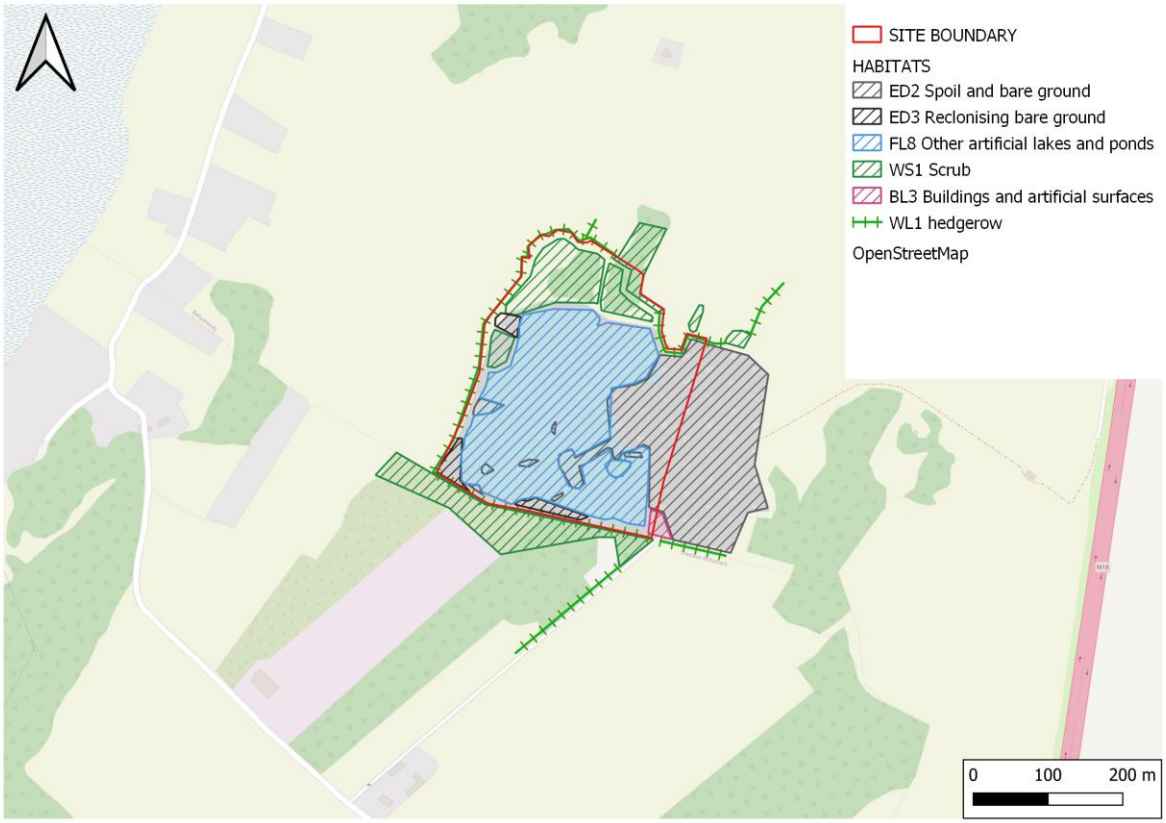


Figure 5-2 Habitat Map

5.8.5 Fauna

Mammals

Multidisciplinary walkover surveys within the Substitute Consent Project found evidence of pine marten on one occasions in 2020. The pine marten (Martes martes) is fully protected in Ireland under the Irish Wildlife Acts 1976 to 2012. It is protected under Annex V of the Habitats Directive. The pine marten is also listed on Appendix III of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention, 1982) of which Ireland has ratified. Records included field signs (scat), which was the recording made on the western boundary/access road. The population is thought to be increasing in Ireland (NPWS 2019). It is therefore considered likely that this species could be present in woodland habitats.

Irish Hare (4 individuals) was observed on the quarry and this species is common in the area. This species was noted on two occasions on an ad hoc basis in grasslands throughout the Substitute Consent site. Sightings typically involved individuals flushed from cover in response to local disturbance. The Irish hare is a quarry species (may be hunted under licence).

Pygmy Shrew (Sorex minutus) are found throughout Ireland in a variety of habitats ranging from areas bordering coniferous and deciduous woodland to any area with good ground cover such as grasslands, heaths, hedgerows, peatlands and sand dunes. They are largely absent from heavily forested areas. Red squirrel occupies a variety of woodland types across much of Ireland. Hedgehogs prefer any area bordering on deciduous woodlands, scrub and open grasslands. They are also known to inhabit hedgerows, meadows and suburban gardens which are open and un-fenced. These three species are protected under the Wildlife Acts 1976 to 2019 and on Appendix III of the Bern Convention. Although desktop study records of these species exist, pygmy shrew, red squirrel, badger and hedgehog were not recorded in the study area during the field surveys. However, given the environment and habitats present, mammals likely to use the quarry at least for foraging purposes include:

Rodents;
Badgers (Meles meles);
Hedgehogs (Erinaceus europaeus);
Stoats (Mustela erminea); and
Foxes (Vulpes vulpes);

Lesser Horseshoe Bat roosts exist at a number of sites close to the quarry including at Termon Lough SAC (<1.1km south of the quarry boundary). Lesser Horseshoe Bat are protected under Annex IV of the Habitats Directive in Europe. No sites suitable as roost sites exist at the quarry.

Bat Survey

Daytime bat potential surveys included an assessment of suitable bat roost sites/habitats within the Study Area and adjacent habitats. A nocturnal bat activity survey was conducted in June 2008, July 2020 and June 2022 by an experienced bat surveyor, familiar with vocal and visual (dusk) signs of bat activity and species identification, including Lesser horseshoe bat (*Rhinolophus hipposideros*). Conditions were suitable for survey (calm, mild and at time of year when bat activity would be detectable). Bats were identified by their ultrasonic calls using a 'Echometer EM3+' ultrasonic recorder coupled with behavioural and flight observations. This recorder allows review of spectrograms in real time and recording of bat ultrasounds for more detailed analysis. The EM3+ allows a user selectable sample rate of 384kHz, the recommended option in areas where Lesser horseshoe bats may be present. The focus of the survey was to detect presence of all bat species, in particular Lesser horseshoe bat (*Rhinolophus hipposideros*), as this species is protected under Annex II and Annex IV of the Habitats Directive and is a qualifying interest of designated conservation sites within the wider study area. Bat activity surveys were conducted as follows:

- The Study Area was surveyed by foot with a heterodyne bat detector (Batbox), where access allowed;
- A 15 minute static activity survey was carried out at each of 3 No. locations within the Ballysheedy Quarry site;
- Fringing Hazel scrub and remnants within the Study Area were surveyed;
- The roadways to the south of the Ballysheedy Quarry site were driven with the bat detector so as to record any signs of bat activity[5].

The presence of lesser horseshoe bat within and surrounding the Substitute Consent site may result in the impact of the populations of this species in East Burren Complex SAC, where the lesser horseshoe bat is a Qualifying Interest species. However, the Substitute Consent site is not expected to impact on the populations and roosts for which the SACs are designated. East Burren Complex SAC has been selected for lesser horseshoe bats because of the presence of two known nursery roosts, a transition roost and four known winter sites, the latter all in natural limestone caves. There are no known roosts on the site. Lesser horseshoe bats core foraging range is 2.5km from their roosts. The site is located >2km from roosts outside the East Burren SAC

Other summer roosts for the lesser horseshoe bat (an Annex II and Annex IV species), did occur within 2km of the Substitute Consent site.

[5]Roche, N., Langton, S. and Aughney T. (2012) Car-based bat monitoring in Ireland 2003-2011. Irish Wildlife Manuals, No. 60. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland.

Birds

Ballysheedy Quarry is known to support Peregrine Falcon (*Falco peregrinus*) and the nesting on the southern and western side of the quarry have been retained and undisturbed. The Peregrine Falcon nests in a scrape, normally on cliff edges. Cliff nests are generally located under an overhang, on ledges with vegetation, and south-facing sites are favoured. Peregrine Falcons are listed on Annex I species of the Birds Directive and are an amber listed species of moderate conservation concern. A pair of Peregrine Falcon were observed by TOBIN's ecologist on the day of the 2020 and 2022 surveys.

Other more common birds noted included;

- Robin
- Coal Tit
- Rook
- Wood Pigeon
- Linnet
- Sand Martin
- Chaffinch
- Wren
- Goldcrest
- Moorhen and great crested grebe (in pond)

All birds and their nesting places are protected under the Irish Wildlife Act (1976), and under the Irish Wildlife Amendment Act, (2000) (except for excluded species).

5.8.6 Ecological Evaluation

Key Ecological Receptors

Breeding Peregrine Falcons are the key ecological receptors which use the Substitute Consent application area. These are known by the quarry owner and left to breed in an undisturbed state both during quarry activities and since activity ceased.

The key ecological receptors noted within the overall quarry landholding, but outside the Substitute Consent application area of Ballysheedy Quarry are

- ash-hazel woodland (WN2)
- Scrub (WS1)

The previous quarrying activities did not significantly affect sites designated for conservation (including Natura 2000 sites), refer to NIS in Appendix 5.1.

Non Key Ecological Receptors

In general, the habitats present at Ballysheedy Quarry depend on current management activity and hence are disturbed habitats of negligible/ low ecological value.

5.9 Possible Impacts from Previous Works

5.9.2 Impact Assessment Criteria

The criteria used in the ecological impact assessment are outlined below. Mitigation measures (if required) are proposed to avoid, reduce or compensate for the impacts identified and any residual impacts are discussed.

Table 5.4 – Criteria used in Ecological Impact Assessment (EPA, 2002, IEEM 2018)

Positive or Negative: Is the impact likely to be positive or negative? International and national policy now pushes for projects to deliver positive outcomes for biodiversity.
Context (Magnitude and extent): A scheme may affect only a small part of a site but the area of habitat affected in that location (in hectares) should be given in the context of the total area of such habitat available (e.g., 1 ha of a woodland which measures 30ha in total.)
Character: The type of habitat (e.g., natural or highly modified woodland; mature or recently established, wet or dry) is important, as is the quality of the site (e.g., undamaged dormant blanket bog).
Significance: State whether a site has a designation, such as a SAC or NHA, or contains a listed (Annex I) habitat. The ecological value of a site can be assigned a rating using an evaluation scheme (e.g., undesignated areas of semi - natural broadleaved woodland are normally rated as high value, locally important).
Sensitivity: Indicate changes that would significantly alter the character of an aspect of the environment (e.g., changes in hydrology of a wetland due to construction of access road).
Duration: Indicate the time for which the impact is expected to last prior to recovery or reinstatement of impacted habitats and/or species. The duration of an activity may differ from the duration of the resulting impact caused by the activity (e.g., short-term construction activities may cause disturbance to birds during the breeding season, however, there may be longer – term impacts due to a failure to reproduce in the disturbed area during that season).
Reversibility: Identify whether an ecological impact is permanent (non-reversible) or temporary (reversible – with or without mitigation).
Timing and Frequency: Some changes may only cause an impact if they happened to coincide with critical life-stages or seasons (for example, the bird nesting season). This may be avoided by careful scheduling of the relevant activities.

Designated Conservation Areas

No direct or indirect impacts (alone) arose to any site designated for conservation purposes - also refer to the Natura Impact Statement in Appendix 5.1.

Key Ecological receptors (on site)

No impacts are likely to Peregrine that were potentially breeding in the Substitute Consent application area. The presence of Peregrine Falcons is as a consequence of previous quarrying i.e., the peregrine falcon occurs due to the presence of a steep quarry face within the site.

Based on the previous application, there was no loss of oak-ash-hazel woodland (source OSI mapviewer) in the Substitute Consent application area. The only identifiable impact to key ecological receptors is the loss of ash-hazel scrub/woodland (source OSI mapviewer) in the Substitute Consent application area. Some of this area has since re-vegetated. This is considered a permanent slight impact to a locally important (Higher value) habitat. One key ecological receptor created as a result of quarrying will be retained. This is the quarry faces used by peregrine falcons. In addition, a number of gravel islands on the quarry floor could be used as nesting sites.

The quarry allows retention of a number of locally important ecological features including ponds and woodland/scrub in particular in the area north of the site.

Key Ecological Receptor (off site) - Ground Water Quality

Based on the desk and field study findings it is determined that the flooded quarry floor pond/lagoon is effective at treating water at the site.

In summary the existing water quality management system is adequate for protection of waters (including groundwater) off site. No impacts are likely to have arisen from previous site activity. For more information refer to Chapter 7.

No significant adverse impacts are expected to non-key ecological receptors described.

5.10 Mitigation Measures

Mitigation measures implemented at this location were and are adequate for protection of water quality and key ecological receptors described herein. No additional mitigation is required.

It is obvious from the survey that the quarry activities are compatible with retaining water quality, Peregrine nest areas and locally important woodland and other habitats at the landholding.

The existing management of the site allows retention of key ecological receptors within the landholding and protects groundwater quality as evidenced from surveys implemented. As with all quarries, a suitable post operation landscape plan, which recognises developing habitats and

key ecological receptors detailed, has the potential to improve local biodiversity.

5.11 Conclusion

No significant adverse ecological impacts are evident from works to date within the Substitute Consent application area at Ballysheedy Quarry.

6 SOILS AND GEOLOGY

6.5 Introduction

This chapter aims to assesses the impact of the previous works within the area of Ballysheedy Quarry identified as the Substitute Consent application area and as described in Chapter 2. This Chapter includes an assessment of any impact to date on the geological environment (soils, subsoils, bedrock) at and surrounding Ballysheedy Quarry, as a result of quarrying activities at this location. As the geological, hydrological and hydrogeological environment is managed as a unit, it was deemed appropriate to assess the overall site as a unit with references to the Substitute Consent application areas within the land ownership.

Details of the existing wastewater management and surface water management plans at Ballysheedy Quarry are included in Chapter 2 and Chapter 7 of this remedial EIAR.

6.6 Study Methodology

The assessment of soils and geology consisted of:

- A desk study of soils, subsoils and bedrock;
- Review of existing monitoring data;
- Review of any Geological Heritage Sites in the area;
- Review of previous EIS;
- Site visits by TOBIN Consulting Engineers; and
- Interpretation of all data and reporting.

Guidelines used in the preparation of the report included the Environmental Protection Agency (EPA) document 'Guidelines on Information to be contained in Environmental Impact Statements' (2002) and the Institute of Geologists of Ireland (IGI) publication 'Geology in Environmental Impact Statements – A Guide'.

Information held by the Geological Survey of Ireland (GSI) and Environmental Protection Agency (EPA) was accessed to provide the geological setting of the site. Datasets used to provide the setting of the site included GSI bedrock geology data sets and the EPA/Teagasc soil mapping information.

Further to the description of the existing environment, the site and activities were assessed in conjunction with aerial photographs of the quarry to determine the areas where works have taken place outside of the 1994 and 2009 planning boundary and the scale of potential impact on the existing soil, subsoil and bedrock environments.

Any mitigation measures that have been implemented at this location have been assessed and, where required, measures to ensure that activities that have occurred at the site have not adversely impacted upon the geological environment outside of the site boundary.

6.7 Description of the Development

The Substitute Consent planning application is made for a combined activity area of 8.78 hectares (ha). This area was largely worked to 2012 and the required access area to the 2020 adjacent existing quarry planning expiry date and is primarily located to the west of Ballysheedy Quarry, as shown on Figure 1.2.

Extracted materials were either transported to the M18 by the dedicated site access or taken to other locations by HGV's via main entrance to the south of the site.

6.8 Existing Environment

6.8.2 Topography

The topography of the site varies from approximately 26mOD at the lowest point of the quarry (within the pond area) to the highest point of the quarry near the eastern boundary of the site (approximately 43mOD). The entrance of the quarry is at approximately 34mOD.

6.8.3 Geological Heritage

County Geological Sites are be included in County Development Plans and County Heritage Plans. Due regard should be given to sites of geological importance at all stages of planning, particularly in the development of quarries, wind farms and roads. The Geological Heritage data of the Geological Survey of Ireland (GSI) was reviewed. A number of active/inactive quarries are included in the Galway list of geological heritage sites however the Substitute Consent site was not included.

The nearest geological heritage site Coole-Garryland Complex is located 1.5 to the north and Beagh Sink - Pollduagh System is located 3km to the east. The Beagh-Pollduagh site has been classified as a County Geological Site and may be proposed for geological NHA designation under the IGH 8 Lower Carboniferous theme of the GSI's Irish Geological Heritage (IGH) Programme.

6.8.4 Soils

The soil classification for the area is shown in Figure 6.1. Reference to the GSI Soils Map for this area indicates that the dominant soil type within the planning boundary area is described as Shallow well drained mineral (Mainly basic).

There are also areas of Lacustrine deposits 0.5km to the west and north of the quarry and coincide with wetland/turlough areas. No evidence of wetlands/wet soils was identified from the historical mapping on the site.

Within the Substitute Consent application area of the site, the quarry has been worked for extraction purposes, access roads etc. and as a result, there is shallow soils (<0.5m) remaining within the application area including the unquarried area to the north of the site. Soils in the surrounding area are generally 0.5 to 1.5m deep.

6.8.5 Subsoil Geology

The subsoil classification for the area is shown in Figure 6.2. Subsoil types within an approximate 2km radius of Ballysheedy Quarry are described as karstified bedrock outcrop and subcrop (KaRck) and till derived from limestone parent material (TLs).

Similar to the Soils map, additional subsoil types within an approximate 2km radius of Ballysheedy Quarry are described as karstified bedrock outcrop and subcrop (KaRck) to the north, east and south west and till derived from limestone parent material (TLs) to the east and west.

6.8.6 Bedrock Geology

Reference to the relevant geological information, the 1:100,000 scale Sheet No. 17 – Geology (Geological Survey of Ireland (GSI), 1999) and the GSI bedrock data (www.GSI.ie), indicates that the Ballysheedy Quarry site is located within the Tubber Formation which comprises Crinoidal & cherty limestone & dolomite.

The Bedrock Geology for this area is included in Figure 6.3 below.

Quarrying activity is ongoing within the application boundary area of the quarry to 2020. Limestone was extracted for use in road construction, M18, house construction and other infrastructural projects.

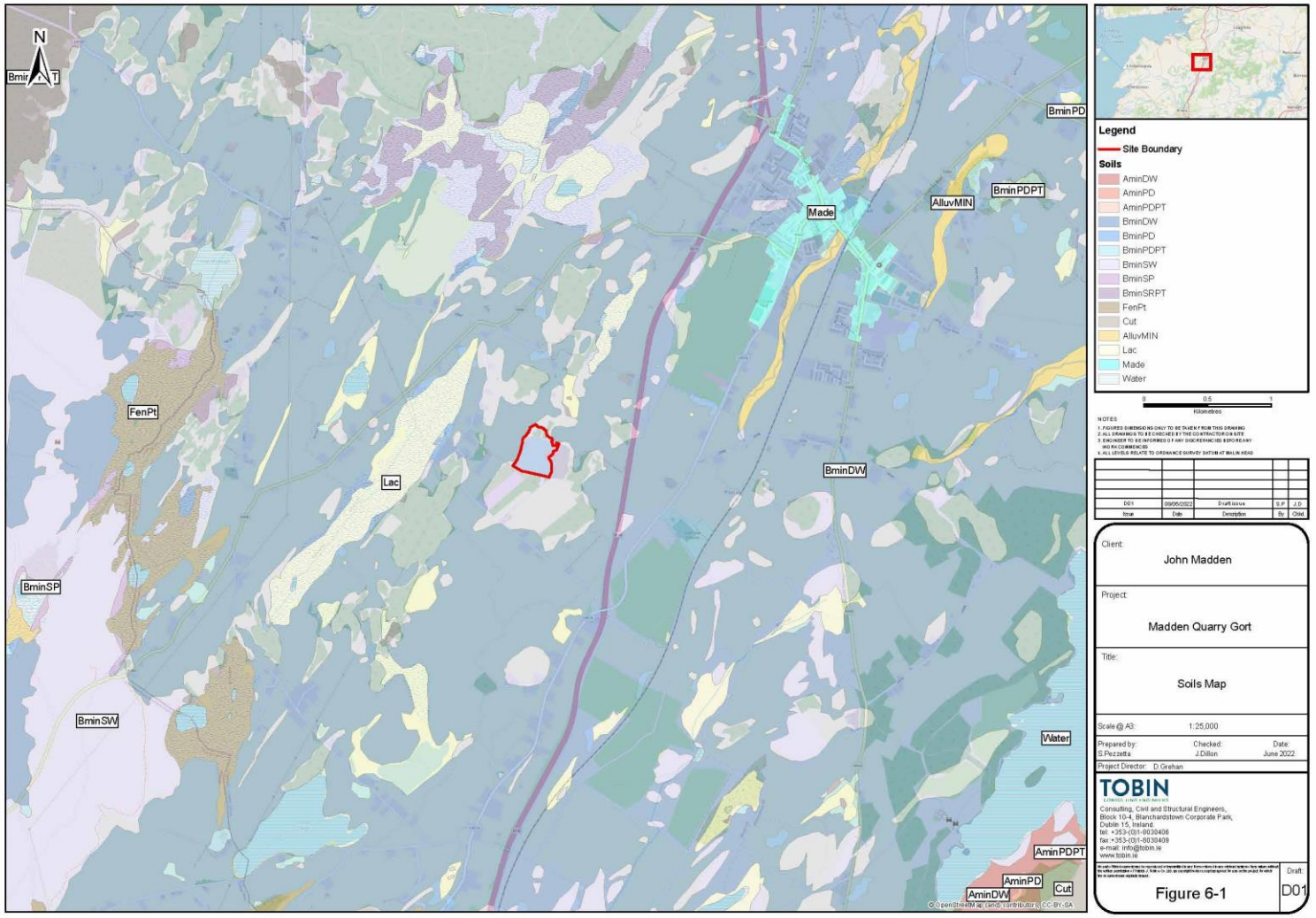


Figure 6-1 Soils Map

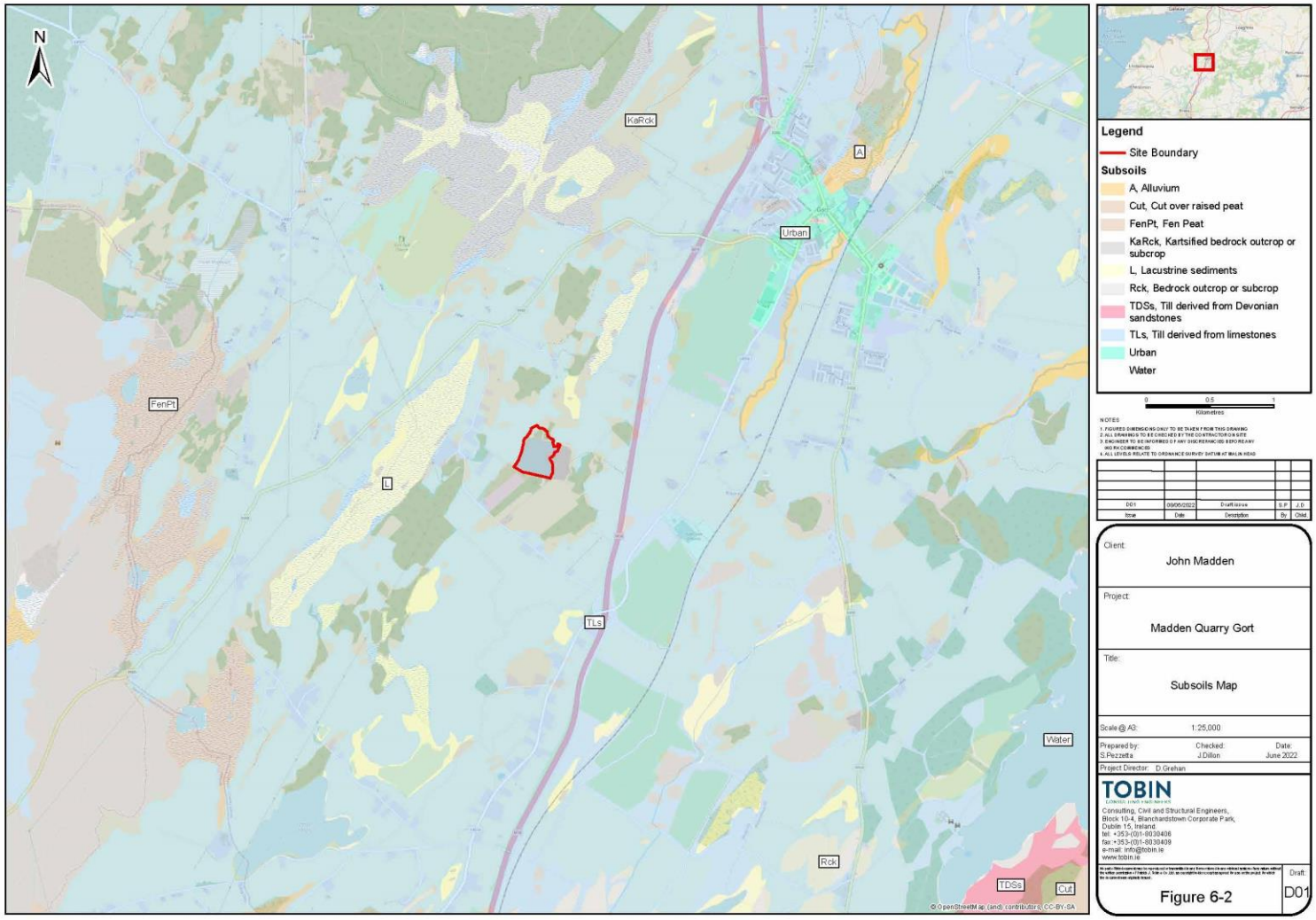


Figure 6-2 Subsoil Map

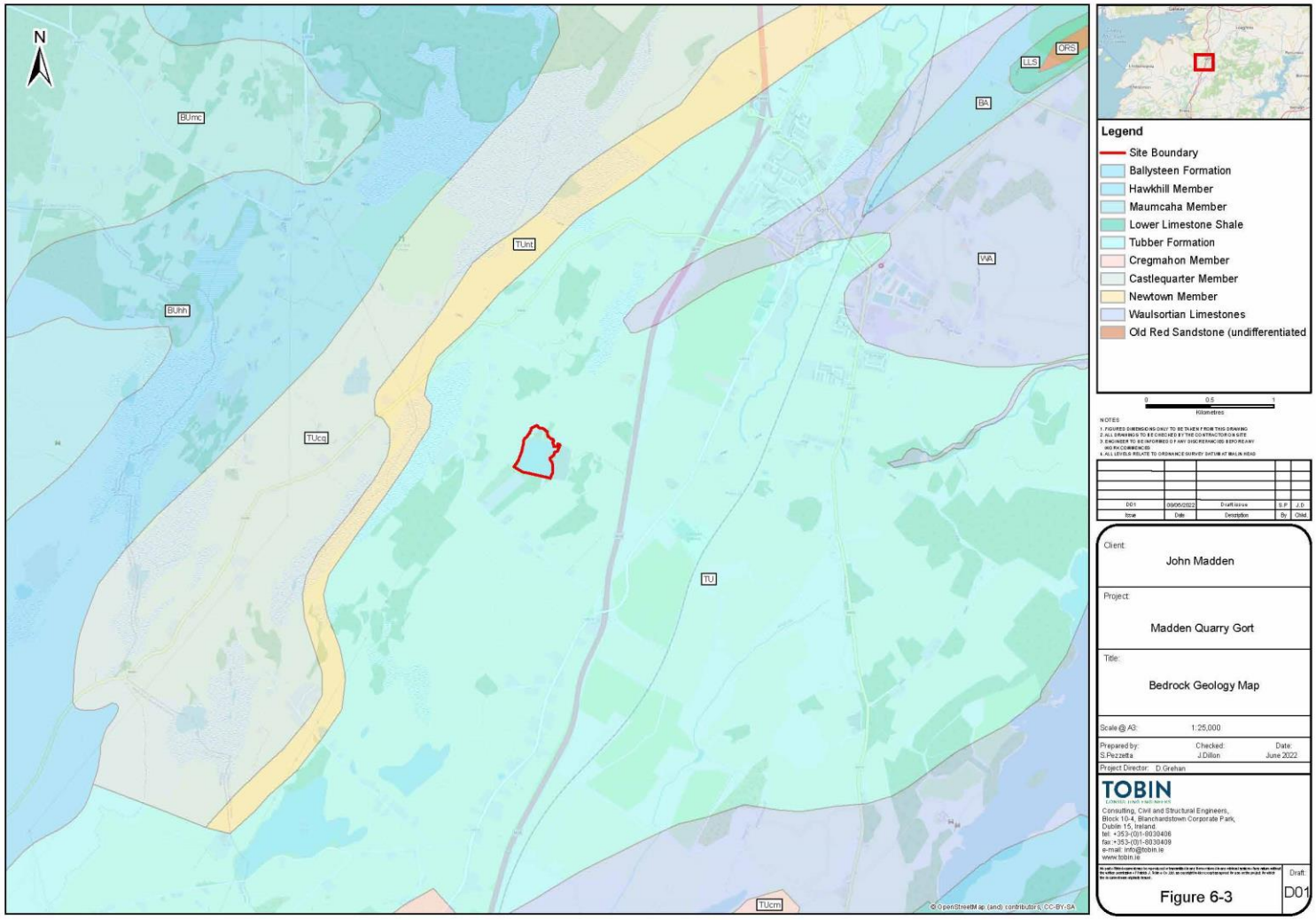


Figure 6-3 Bedrock Map

Figure 6-4 Karst Features Map

6.8.7 *Karst Features*

No significant karst features have been identified within Ballysheedy Quarry however a number of karst features have been recorded in the Karst Database of Ireland for this region as well as from site visits and aerial mapping, which is consistent with the GSI data in this area.

The Beagh Pollduagh sink is located 2km to the east of the site. The Beagh Pollduagh site comprises a sequence of linked karstic features along the course of the Beagh (Gort) River between its initial sink and its final resurgence from Pollduagh cave as the Gort River. A dry channel extends from the southern side of the sink into the large conical enclosed depression known as the Punchbowl. The Punchbowl was the original sink for the Beagh River but has since been modified by subsidence into the newer river cave beneath. A short distance to the west the river re-appears, flows in a gorge-like channel for a few hundred metres and then sinks again at Blackwater, to re-emerge 1 km further west from Pollduagh Cave. Between Blackwater and Pollduagh are two collapse dolines, each 13 m deep, into the river course: the Ladle, a choked collapse and the Churn, a vertical joint controlled shaft. The whole assemblage is a suite of landforms developed as an ancient underground river system and is destroyed by infilling with glacial deposits and by collapse from the surface.

Coole Garryland is a group of lakes and turloughs, 2km to the north of the site. Groundwater flow from Coole Lough to Doo Lough to Garryland to Caherglassaun Lough is via the epikarst, a shallow flow system with progressively greater transmissive capacities at higher levels. The Coole Lough and Doo Lough sinks are excellent and accessible examples of the entrances to such epikarst networks.

Figure 6.4 includes the various karst features identified within an approximate 3km radius of the quarry.

A number of the turloughs occur in the area surrounding the Ballysheedy Quarry site. These turloughs were previously investigated by the Gort Flood Studies Project (GFS) (Southern Water Global, 1997), which investigated the nature of the karstic environment and associated flow characteristics and pathways.

The GFS conceptual model for categorisation of karst and its associated flow characteristics has been used here to describe the karstic environment of turloughs within the area studied by the GFS, and also to describe the karstic environment of turloughs outside this area, where it is comparable.

The GFS categorisation is as follows:

Epikarst Flow Systems, comprising:

Shallow epikarst:

Groundwater flows in the upper 2-5 m, in karst characterised by fluted clints, grikes, small

deflation structures, solution opened joints and fissures and bedding plane karst.
Development often occurs over large areas and is as a result of direct recharge. No significant epikarst layer was noted on the quarry face or in areas exposed by quarrying.

Deep epikarst:
Normally generated in the top 10-15 m, groundwater flow is in large conduits, collapses at high level, areas of broken limestone, zones of solution opened fissures and joints and bedding plane karst. Development is over smaller areas than shallow epikarst and is often route specific. Very large flows are supported.
These systems are considered to be relatively modern, likely to be post glacial or younger (Johnston *et al*, 2007). No deep epikarst layer was noted on site.

Deep Karst Flow Systems, comprising:
Conduit Flow Systems:
Flow is in major conduit/cave systems at depths of up to 45 mbgl, often several meters in diameter, and representing linear flow routes. In the area around Gort, they developed in response to hydrological or base level conditions, which no longer exists and are remnants of an older, much larger regime which is masked by erosion and covered by glacial deposits. They can carry very large flows.

Fracture/Conduit (Conduit Type) Flow Systems:
Flow is at depth in smaller more distributed fractures and/or conduits, but which can be represented by the idea of a single conduit. These systems can carry minor to very large flows. They seem to be structurally/lithologically controlled. A large number of studies have looked at the groundwater flow direction in the surrounding areas. Approximately 1.5 to 3km km to the north of the Ballysheedy Quarry site, a large number of interconnected turloughs are present (Coole-Garryland).

Groundwater flow focuses on the Coole Lough/Caherglassaun Lough area, and from there water flows entirely underground in a north westerly direction, discharging to a group of large springs located in the intertidal zone at Kinvarra. There is no surface outlet to Galway Bay and the dimensions of the major conduits are fixed, therefore there is a limit to what the underground system can take and the lack of hydraulic head in the system (Drew, 2001; Drew and Daly, 1993). Thus, during periods of heavy rainfall, the water backs up and floods the lower lying areas. There is a large range in the water levels at Coole Lough and some degree of flooding each year. Groundwater levels vary between 2.7 and 14mOD.

6.8.8 Aquifer Classification
Reference to the National Aquifer Map prepared by the GSI (www.gsi.ie) indicates that the Bedrock Aquifer underlying and surrounding Ballysheedy Quarry is classified as a Regionally Important Aquifer Karstified (conduit).

6.9 Possible Impacts of Previous Works

Due to the nature of quarrying, the existing geological environment is impacted. Impacts

that may have occurred as a result of works within the Substitute Consent application area included in this assessment comprise of –

- Removal of overburden (soils and subsoils) which increases the risk of surface water runoff containing elevated suspended solids which may enter the local surface water network;
- The removal of the protective layer of soil and subsoil increases the vulnerability of groundwater beneath the site. There is a potential risk of contamination of groundwater, its discharge and any receiving waters;
- Material being carried off site by vehicles exiting the quarry; and
- Contamination of the underlying aquifer as a result of fuel spillages from plant and machinery operating within the worked areas.

Based on the continuous record of good water quality in the flooded quarry there is no potential for significant impacts on the groundwater. Furthermore, there is very limited connectivity with the regional groundwater quality due to the limited variation in water levels with the void.

6.10 Mitigation Measures

The operator endeavoured to ensure that there is no impact on the local or regional environment as a result of activities at Ballysheedy Quarry (2014-2020). There are no reported incidents during the previous operations at the site. There was no reported accidents or incidents during the operational period. Several mitigation measures were in place at this location to ensure that any impact on the soils and geology within the landholding did not impact on the environment within and/or underlying the overall site and the surrounding area. Mitigation measures which have been implemented at Ballysheedy Quarry include:

- A number of best-practice measures have been implemented to ensure that surface water and groundwater in the area does not become contaminated by pollutants;
- Fuel was stored in bunded diesel tanks and within designated buildings;
- No chemicals were stored on site;
- An Emergency Response Kit was kept on site to prevent any leaks of petroleum-based products from reaching the water table;
- There are no plans to restore the quarry to pre-extraction contours. The nature of quarrying results in exposure of geological faces. In additional consideration of biodiversity – specifically Peregrine Falcon which utilises the quarry face.

6.11 Conclusion

In summary, there have been no significant alterations to the local and regional environment as a result of works within the application area.

7 WATER

7.5 Introduction

This chapter aims to assess the impact of works within the area of Ballysheedy Quarry identified as the Substitute Consent application area and as described in Chapter 2. This Chapter includes an assessment of any impact to date on the water environment within and surrounding Ballysheedy Quarry. The water chapter provides a description of the surface water environment and the groundwater environment.

As the surface water and groundwater (hydrogeological) environment within the quarry is managed as a unit, it was deemed appropriate to assess the site as a unit with references to the specific Substitute Consent application area within the land ownership boundary.

7.6 Study Methodology

This report has been prepared using the recommendations set out in the EPA document 'Guidelines on Information to be contained in Environmental Impact Statements' (2002). The guidelines and recommendations of the Institute of Geologists of Ireland (IGI) publication 'Geology in Environmental Impact Statements – A Guide, 2013' was also taken into account in the preparation of this Chapter. The IGI guidance notes; 'Recommended Collection, Presentation & Interpretation of Geological & Hydrogeological Information for Quarry developments' of March 2022 were also consulted.

The assessment of the water environment consisted of:

- A desk study of available information;
- A review of site investigations, relating to surface water and groundwater, undertaken within or adjacent to the quarry;
- A site walk-over of the site and surrounding area;
- Review of all relevant surface water and groundwater quality monitoring; data
- Review of surface water quality monitoring data from the EPA;
- Review of the water quality sampling on site; and
- Interpretation of all relevant data.

Information retained by the Geological Survey of Ireland (GSI), the Office of Public Works (OPW) and Environmental Protection Agency (EPA) was accessed to provide the hydrological and hydrogeological setting of the site. Relevant documents and datasets used to provide the setting of the site included EPA Water Quality Data, topography maps, and GSI Hydrogeological Data.

Further to the description of the existing environment, the site and activities were assessed in conjunction with aerial photographs of the quarry to determine the areas where works have taken place outside of the 1994/2009 planning boundary and the scale of potential impact on

the water environment.
Any mitigation measures that have been implemented have been assessed and where required, measures are in place to ensure that activities that have occurred within the site do not adversely impact upon the water environment (inside or) outside of the site boundary.

7.7 Study Constraints

In terms of site investigations and data collection, TOBIN consider that sufficient information is available to characterise the water environment and to determine the impact, if any, of the development on the local and regional environment. No seasonal constraints were encountered, nor were there any constraints by lack of access to the site or its surrounds.

7.8 Surface Water Environment

The purpose of this section is to describe the hydrological setting of the site and in particular:

- Surface water features and regional drainage;
- Flooding;
- Assessment of hydrometric data;
- Surface water abstractions; and
- Surface water quality.

7.8.2 Surface Water Features and Regional Drainage

The natural surface water drainage patterns in the environs of Ballysheedy Quarry are shown in Figure 7.1.

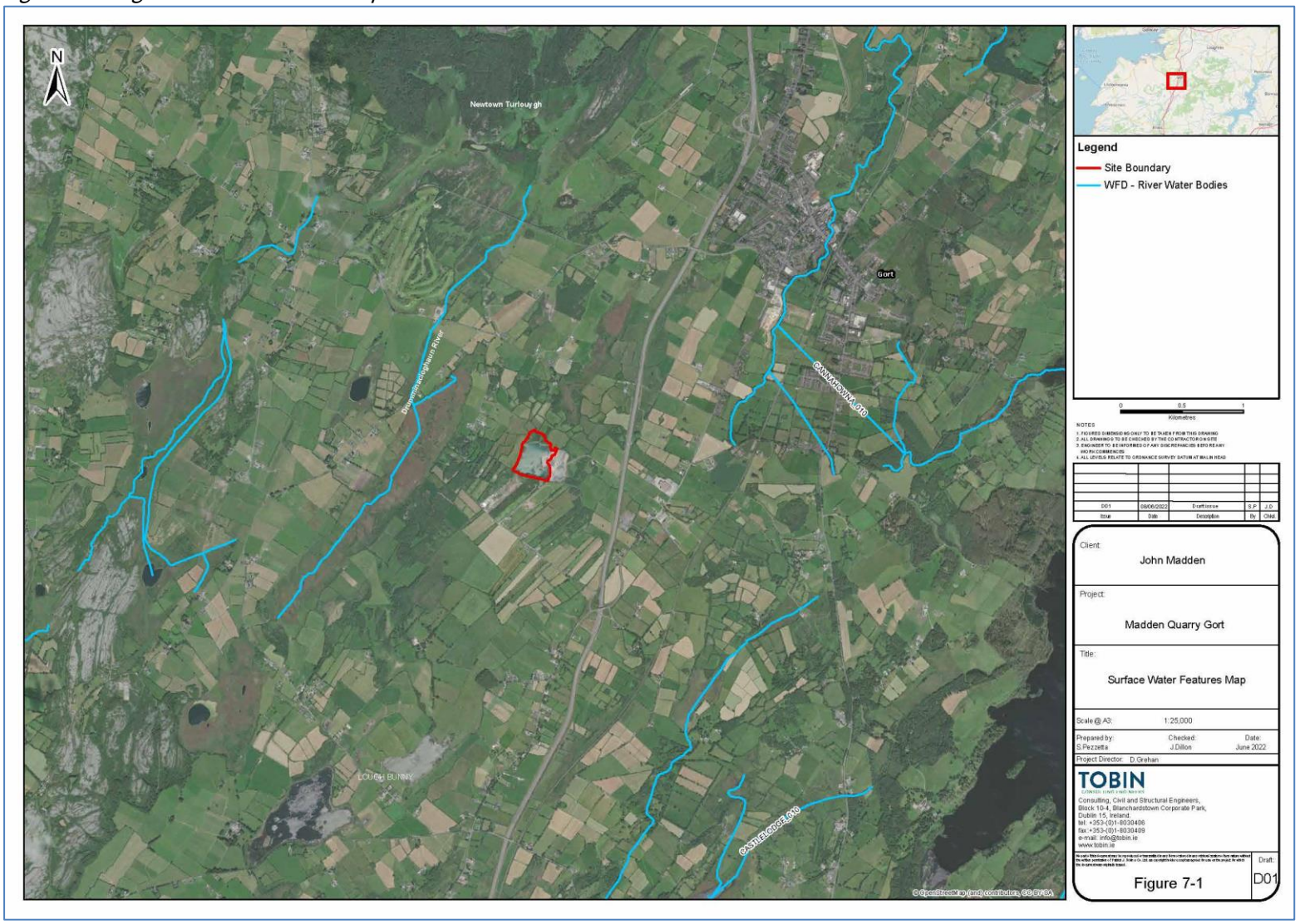
On a regional scale, Ballysheedy Quarry and its environs are located within the Galway Bay South East Catchment (Hydrometric Area 29). The nearest surface water features to the site include:

- Coole/Newtown Lough –>2km north of the site boundary
- Drumminacloghaun Stream – located approximately 1km west and northwest of the site boundary
- Termon Lough - located approximately 2km south of the site boundary
- The Gort/Beagh River - located approximately 1.5km east of the site boundary (and a tributary of Lough Coole).

Within the quarry, surface water features include a flooded area which occupies the floor of the quarry.

Due to the nature of quarrying, there is limited overburden remaining in the worked areas of the quarry, including the Substitute Consent application area. As a result, any rainfall that falls on the quarried site either recharges the bedrock aquifer or evaporates.

Figure 7-1 Regional Surface Water Map



7.8.3 Flooding

The majority of the former quarry area comprises a ponding on the flooded quarry floor with Summer and Winter water levels between approximately 29 and 30mOD. No significant variation occurs between summer and winter months in the flood pit. The lack of variation in water levels does not indicate that the quarry is connected to the regional karstic water table which typically varies between 10 and 20m. No flooding has occurred to the east of the substitute consent area.

Figure 7.2

Reference to available data indicates that there is no record of flooding in the area of Ballysheedy Quarry. Recurring flooding occurs at turloughs in a number of areas in the surrounding area. Significant flooding occurs in the vicinity of Newtown, Coole and Lisheen as well as in Gort town. Flood events took place in December 1999 and 2015 following a period of significant rainfall. The OPW report relating to this flood event (www.floodmaps.ie) states that the flood was as a result of increased groundwater levels after heavy rainfall over a long period. Details are shown in Figure 7.2 below.

7.8.4 Hydrometric Data

There was no available data from hydrometric stations (www.OPW.ie/hydro) in the immediate environs of the quarry. The closest Hydrometric Stations to Ballysheedy Quarry are approximately 3km north of the site (Station No: GSI-03) in Coole Park, and approximately 2km south of the site (Station No: GSI-08) at Ballycorey, near Gort.

All data obtained from the EPA Hydrometric Station Register is detailed in Table 7.1 below and appendix 7.1.

Table 7–1 Hydrometric Data for Stations nearest to Ballysheedy Quarry (EPA Hydrometric Register)

Station Name	Station Number	Status	River Basin District	Responsible Organisation	50 percentile (m^3/s)	DWF (m^3/s)	95 percentile (m^3/s)
Coole	GSI-03	Dormant	Galway Bay South East RBD	Office of Public Works	1.46	0.1	0.22
Coole	GSI-03	Dormant	Galway Bay South East RBD	Office of Public Works	1.46	0.1	0.22
Termon	GSI-08	Active	Shannon RBD	Galway County Council	7.61	0.15	0.75

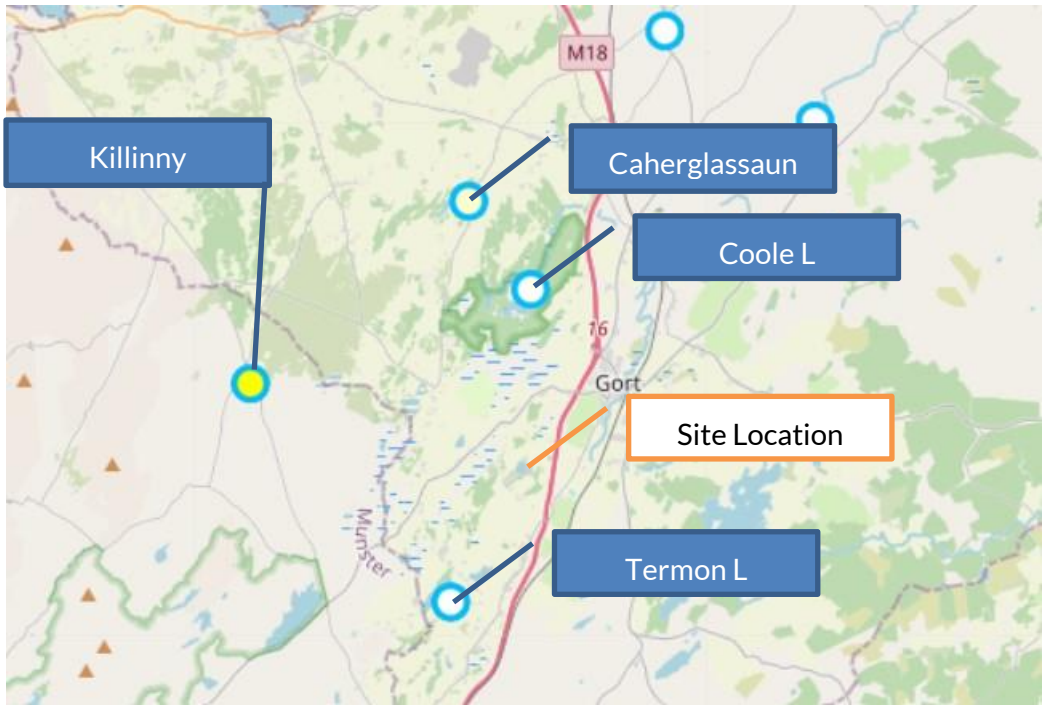


Figure 7-2 Groundwater monitoring - regional

7.8.5 Surface Water Abstractions

There are currently no known surface water abstractions from surface features either upstream or downstream of Ballysheedy Quarry, with the exception of water that is pumped from the "clean water lagoon" to the processing area. .

7.8.6 Surface Water Quality

The EPA monitors the quality of Ireland's surface waters and assesses the quality of watercourses in terms of 4(no.) quality classes; 'unpolluted' (Class A), 'slightly polluted' (Class B), 'moderately polluted' (Class C), and 'seriously polluted' (Class D). These water quality classes and the water quality monitoring programme are described in the EPA publication 'Water Quality in Ireland, 2003'.

The water quality assessments are largely based on biological surveys. Biological Quality Ratings or Biotic Indices (Q values) ranging from Q1 to Q5 are defined as part of the biological River quality classification system. The relationship of these indices to the water quality classes defined above, are set out in Table 7.2 below.

Table 7 –2 Relationship between Biotic Indices and Water Quality Classes

Biotic Index	Quality Status	Quality Class
Q5, 4-5, 4	Unpolluted	Class A
Q3-4	Slightly Polluted	Class B

Q3, 2-3	Moderately Polluted	Class C
Q2, 1-2, 1	Seriously Polluted	Class D

The EPA conducts an ongoing monitoring programme of water quality in the Galway Bay South East RBD. A number of monitoring locations have been identified in the region surrounding Ballysheedy Quarry. The 2 No. nearest monitoring stations are located approximately 2km north west of the quarry (Station No. RS29D020500, upstream of Coole/Newtown Lough) and 2km south-south-east of the quarry (Station No. RS29S010300, on the Shallee River). Additional monitoring locations are located approximately 3km to 3.5km to the south and east of Ballysheedy Quarry and are listed in Table 7.3 below and shown in Figure 7.3.

Sampling is conducted in summer months for a number of reasons. These include: (a) the macro-invertebrate fauna of Rivers is theoretically under the greatest ecological pressure from pollution, because of reduced flows and higher temperatures (McGarrigle et al. 2003); and (b) some macro-invertebrate larvae may not be recorded in freshwater systems during winter months[6].

Table 7 – 3 EPA Monitoring – Biotic Indices

Station No.	Code and Location	Approximate Distance from site	Status
Bridge in Gort Cannahowna_010	RS29C010100	2km west of quarry boundary	Q3-4, Moderate Status
Old Mill Br North of Gort Cannahowna_010	RS29C010200	1.4km south-south-east of quarry boundary	Q3-4, Moderate Status
Bridge u/s Lough Aslaun Castlelodge_010	RS27C010700	3.2km south east of quarry boundary	Q2-3, Q3 Poor Status

According to the EPA River Water Quality data, the quality of surface water closest to Ballysheedy Quarry is described as ranging from Moderate, with the water quality a further distance away ranging from moderate to poor. There are no Q values downgradient of the Gort River as it enters Lough Coole.

According to the EPA Water Framework Directive (www.watermaps.wfdireland.ie) data the surface water in the area around Ballysheedy Quarry has an overall risk rating of 1b – probably

[6] Macro-invertebrate life cycles often involve an over-wintering strategy

at risk of not achieving good status. This data source also describes the overall catchment water quality as poor. The objective for the catchment is to restore the River Drumminacloghaun catchment to good status by 2027.

Local Surface Water Quality

Surface water quality monitoring was conducted at Ballysheedy Quarry. No surface discharges occur at the site. Some water was pumped during the operational phase and discharged to ground to the north of the site.

Concentrations from the results of the pond sample analysis appear to be consistent with natural uncontaminated surface waters including very low levels of suspended solids.

Groundwater samples were collected on the 18th June 2020, from the main water features on site. A total of 1(no.) groundwater/surface sample were collected from the large waterbody to the west of the site.

The sampling was undertaken by TOBIN personnel using dedicated sampling pole. A pair of disposable latex gloves were used for each sample collected. The water sample was submitted to CLS Laboratories for analysis of a suite of parameters. The analytical results are discussed below and shown in Table 7-1 to 7-3.

Surface water samples were taken on the 18th June 2020 from the main flooded pond area to the west of the site. All concentrations are typical of natural uncontaminated surface water and groundwater.

Conductivity values measured on site were 302 µS/cm and a pH of 8.2. Turbidity was low <5 FNU. The water was clear and no evidence of any turbidity. Water visibility exceeded 1m depth.

Ammonium concentrations are low in all samples and below detection limits. There was no exceedance of the Threshold Value.
The concentration of nitrate is low with concentrations below 1 mg/l (as NO3).

Table 7-1 Water results 2014

	units	SW1
pH	pH Units	8.1
Conductivity	uS/cm	330
DO	%	90

Table 7-2 Water results 2020

	units	SW1
C.O.D.	mg/L	16

pH	pH Units	8.2
Ammonium	mg/l	0.071
Nitrate (as NO_3)	mg/L	<0.1
Conductivity	uS/cm	302
DO	%	92
Turbidity	FNU	<5

Table 7-3 Water results 2022

	units	**SW1**
pH	pH Units	8.1
Conductivity	uS/cm	289
DO	%	93
Turbidity	FNU	<3

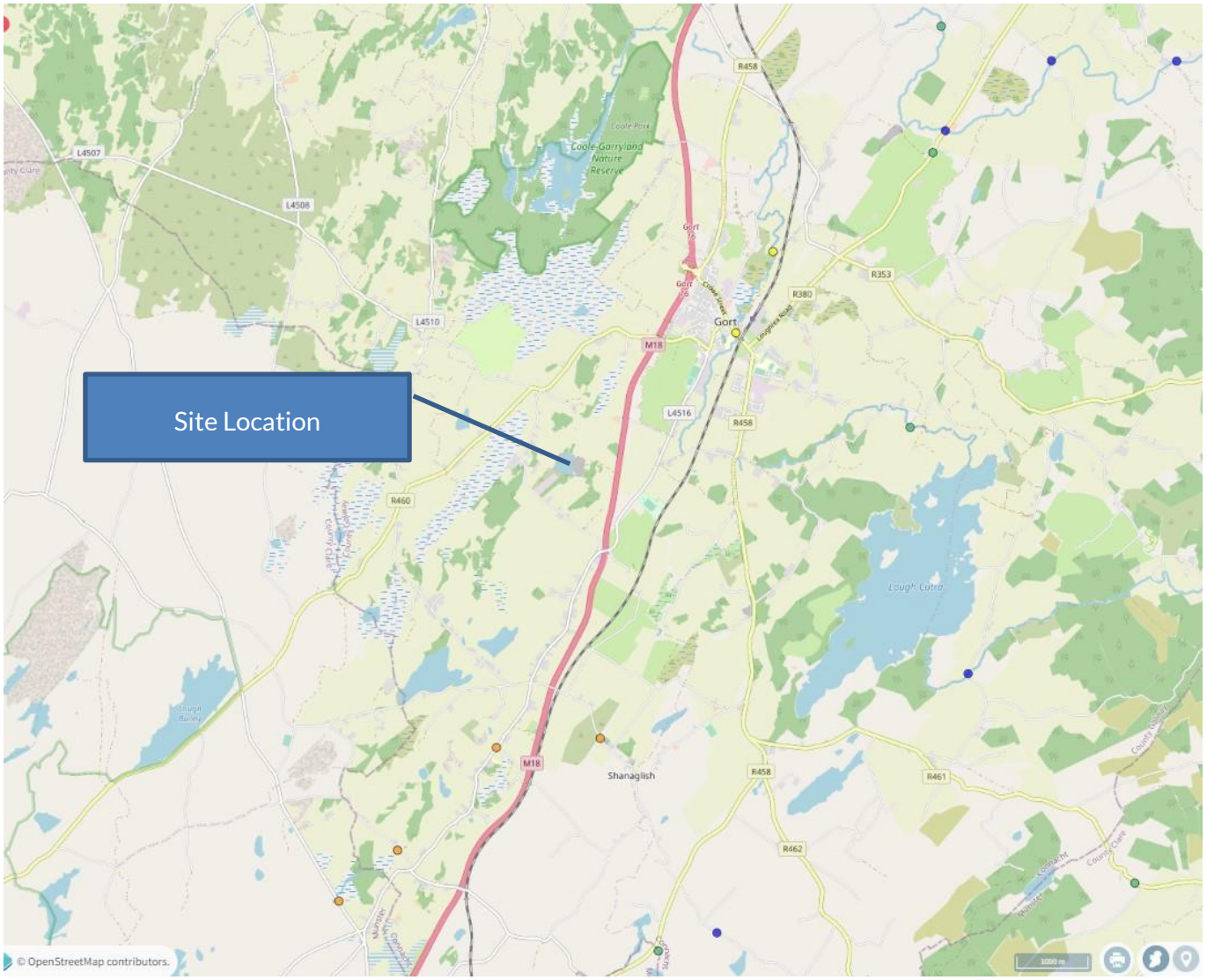


Figure 7-3 River Water Quality Station Locations

7.9 Groundwater Environment

The purpose of this section is to describe the hydrogeological setting of the site and in particular:

Groundwater Levels;

- Groundwater Quality;
- Aquifer Potential;
- Groundwater Vulnerability;
- Groundwater Usage; and
- Groundwater Flow.

The information provided below relates to the groundwater environment. It is provided to give context to the groundwater characteristics and flow patterns within and adjacent to Ballysheedy Quarry.

Owing to the development to date at Ballysheedy Quarry, it is important that the hydrogeological regime is clearly described so that potential impacts from development to date both within and adjacent to the site are expressed. Where implemented, design measures are detailed which reduce potential impacts. However, where residual impacts remain mitigation measures are proposed to ameliorate the impact on the groundwater environment.

7.9.2 Groundwater Monitoring (Levels and Quality)

The water level (29.5 to 30.1m) in the flooded quarry floor is stable and at a significant level above the regional groundwater level. Groundwater and surface water levels in the regional Gort lowlands area vary from 4 to 15mOD to the east and north of the site (based on M18 groundwater data and recent flood data) and 1.8 to 14m to the west (Killiny BH – EPA groundwater monitoring point), see Figure 5.

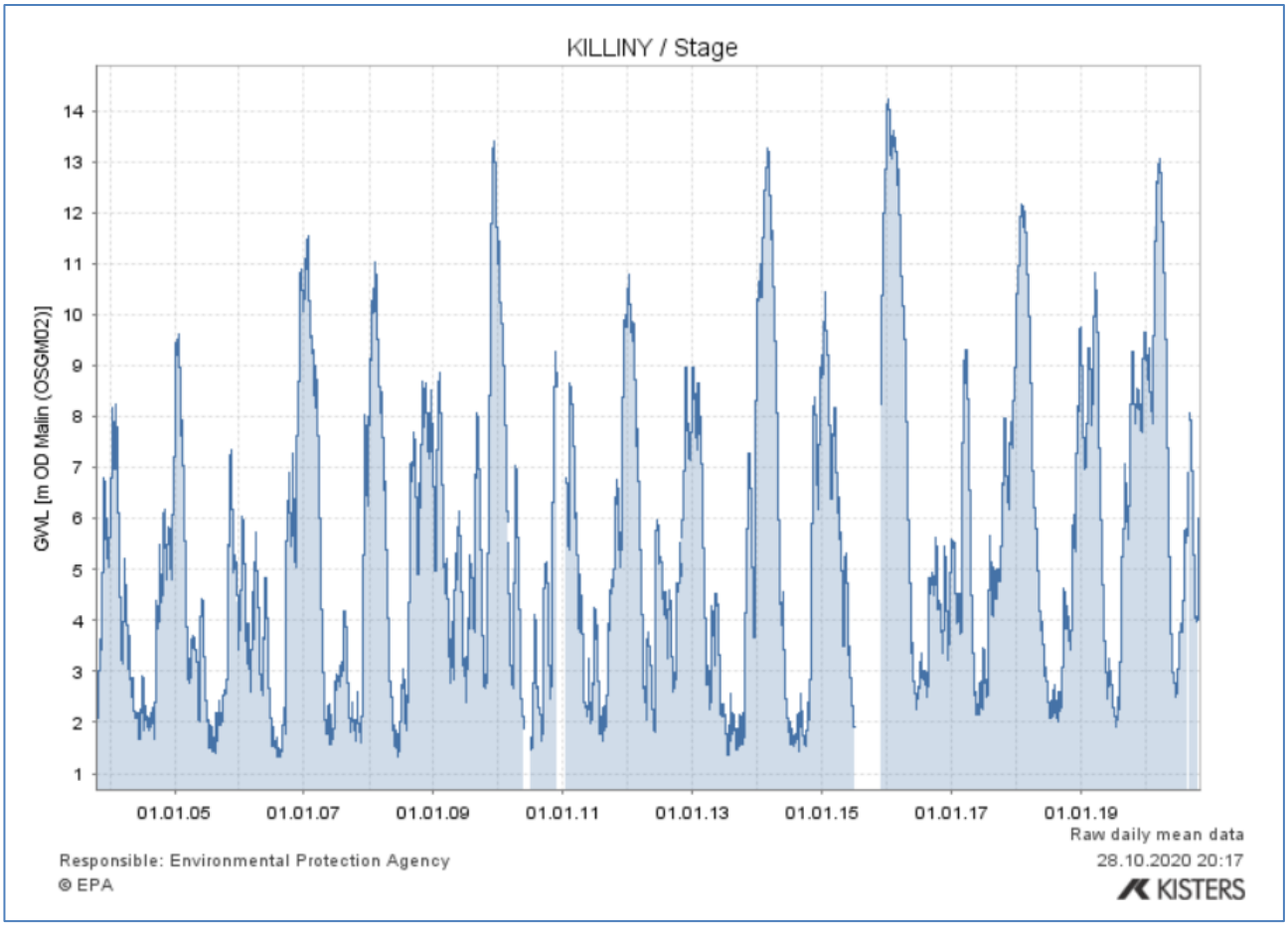


Figure 7-4 Killiny BH – 2km west of the site

There are 10 No. groundwater wells located within Ballysheedy Quarry, identified as PZ Boreholes 01-08 to PZ10-08 located within the Landowner Application area). All wells are shown on Figure 7.4.

Table 7-4 Groundwater levels

Summary Details of Groundwater Monitoring Piezometers					**Sept 2020 – June 2022**
Borehole	Collar Elevation (mAOD)	Base of Borehole (mAOD)	Average Water Level (Sep 08 - Feb 09)		
			(mbgl)	(mAOD)	
PZ 01-08	38	5	10.61	27.39	
PZ02-08	39	6	12.29	26.71	
PZ 02a-08	39.2	6.5	3.37	35.84	
PZ 03-08	38.5	7	Blocked at 0.5		
PZ 04-08	40	7	5.73	34.27	
PZ 05-08	42	9	7.61	34.39	
PZ 08-08	38.5	5	12.74	25.76	
PZ 09-08	31	-2	6.33	24.68	
PZ 10-08	35	2	12.27	22.73	
PZ QF-08	27.85	-5.15	0.67	27.19	

None of the piezometers encountered conduit flow; they were reported to be dry at the time of drilling. When checked the following week, groundwater levels were registered in 9 of the 10 piezometers, as specified in table 7-4. PZ03-08 was blocked at 0.5 mbgl and is therefore excluded from the assessment.

A groundwater level contour plan was prepared utilising the data presented in table 7-4. The contours are considered to be representative of groundwater moving through a diffuse network of small fissures. This interpretation is reinforced when looking at the 5 m difference in groundwater levels in the closely-spaced PZ 02-08 and PZ 02a-08. The difference has had to be averaged out in order to produce the contour plan.

Triangulating between the piezometers, it is inferred that the groundwater flow direction is towards the north, declining from 34-35 mOD on the southern boundary to 23-24 mOD (lowest level) on the northern margin. The groundwater level contours roughly mimic (albeit at a lower elevation) the pre-quarrying surface topography. Ground level declines towards the centre of the northern boundary, where the lowest topographic point is some 30-31 mOD, marking the head of a dry valley/elongated depression. From the low point on the northern boundary, the land drops away to the NNE, declining by some 5 m on to the floor of the valley/depression (based upon OSI mapping and M18 lidar data). Extrapolating across the Site, the .groundwater level contours indicate that the flow direction is from south (30 mOD) to north (25 mOD).

Figure 7-5 Groundwater levels - extract from 2009 EIS

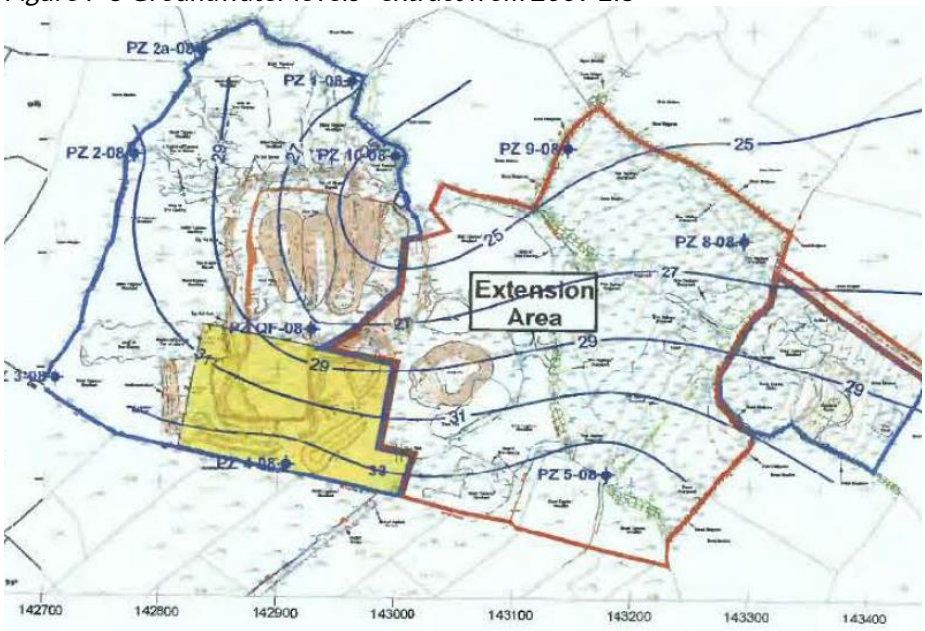


Plate 1: Boulders and rock on site at water edge with emergent vegetation.

Plate 2: Water edge with emergent vegetation.

On Site Groundwater Levels

The water table was determined using water levels from wells within the quarry (see Table 7.4). Groundwater levels are generally at their annual maximum in winter and display a decline into summer months, generally reaching an annual minimum in the autumn. Water level data for the groundwater locations was recorded in early April 2022.

Interpretation of water levels within the environs of the quarry indicates that groundwater flow is in a north westerly direction, towards a wet grassland/marsh area, the nearby fen and eventually to the Coole Garryland. Groundwater flow underlying the quarry is in a north north-easterly direction towards Coole Garryland. Due to the lack of water variation in the quarry, Given the average throughflow at the quarry is 0.002 m^3/second and the good water quality at the quarry, the potential for impact is negligible.

Observations from site visits and a review of historical photographs indicate that the majority of the quarry floor is flooded and stable with water runoff collecting at the topographical low, to and possible minor groundwater infiltration/seepage to the north

These observations indicate that the groundwater environment at this location has not been impacted significantly by the development and as there is no requirement for pumping of

water from the quarry floor and no indication of swallow holes or significant karst features on site.

Existing Water Quality
Water Quality monitoring has been conducted at Ballysheedy Quarry and results are available from samples taken from wells within the site in 2009, 2014 and 2022.

Parameter concentrations of the water sample taken appear to be consistent with natural uncontaminated groundwaters, showing no signs of mineral or nutrient contamination with the exception of elevated total suspended solids (TSS). Electrical Conductivity measured on site was recorded as 308uS which is within the statutory guidelines and observations on the day. Apart from TSS, all results were below the EPA Drinking Water Guideline Values (IGV's). Full monitoring details are contained within Appendix 7.2.

It should be noted that the groundwater status in this area is of a higher quality than the groundwater status of the overall region which is defined within the Water Framework Directive classification as "Poor". This is due to the lack of nutrient inputs at the site from the lack agricultural activity which is the main pressure in the Surface water and groundwater bodies.

7.9.3 Aquifer Potential and Characteristics

Reference to the National Aquifer Map prepared by the GSI (www.gsi.ie) indicates that the Bedrock Aquifer underlying and surrounding the Ballysheedy Quarry is classified as a Regionally Important Aquifer Karstified (conduit). Table 7.6 and Figure 7.6 give details of the aquifer characteristics of the underlying aquifer and surrounding aquifers.

Table 7-5 Aquifer Classification and Characteristics

Aquifer Classification	Permeability/Flow mechanism	Karst Features
Regionally Important Aquifer - Karstified (conduit)	Productive	Yes

7.9.4 Karst Features

No karst features have been identified within Ballysheedy Quarry however a number of karst features have been recorded in the Karst Database of Ireland for this region, which is consistent with the classification of the aquifer in this area. A swallow hole was recorded adjacent to the local road, approximately 500m to the south of Ballysheedy Quarry (as shown on Figure 6.4) and following a tracer test (completed with assistance from the GSI on May 17th, 2022) this swallow hole was found to be linked to a spring approximately 1km south east of the swallow hole, near the L8500 (shown on Figure 6.4). Figure 6.4 includes the various karst features identified within an approximate 3km radius of the quarry.

The literature makes reference to three distinct flow systems: a shallow epikarst system, a diffuse network of small fissures and a deep karst flow system.

The shallow epikarst system comprises large conduits with cave and collapse features at or near surface (upper 10-15 m).

The diffuse fissures intercepted by the Site piezometers are likely to show a relatively slow response to recharge events, only conveying a very small proportion of the groundwater moving through the aquifer, having a particularly minor role during medium to high flow conditions. To date, there has been negligible variation in the piezometer readings, which is consistent with the above assessment of diffuse fissure flow.

The majority of the groundwater flow, which feeds into the major turloughs and the rising watercourses/springs, is through direct-route, underground, solutionally enlarged conduits (often several metres in diameter), as typified by the deep karst flow system. The conduits linking Coole Lough to Kinvara Springs) are at an elevation of -10 mOD, with flow measured at >150 m/hr. Likewise, the U-tube conduit linking the Punchbowl and Pollduagh Cave (i.e. the underground stretch of the Gort River is at a similar elevation.

Groundwater/surface water flow into Lough Coole at Kiltartan, north of Gort (EPA River Flow estimation 29_677) is calculated at 0.852 m3/second at low flow (95%ile). Significant additional flow occurs at Caherglassaun turlough located downgradient of Lough Coole.

7.9.5 Groundwater Vulnerability

Groundwater vulnerability represents the intrinsic geological and hydrogeological characteristics that determine how easily groundwater may be contaminated by human activities. Vulnerability depends on the quantity of contaminants that can reach the groundwater, the time taken by water to infiltrate to the water table and the attenuating capacity of the geological deposits through which the water travels. These factors are controlled by the types of subsoils that overlie the groundwater, the way in which the contaminants recharge the geological deposits (whether point or diffuse) and the unsaturated thickness of geological deposits from the point of contaminant discharge.

The vulnerability within the quarry is primarily assigned a rating of extreme vulnerability, due to the exposure of bedrock at the surface (E (Rock near surface or karst) with an area of High vulnerability near the entrance to the quarry (H), within the S261A area.

7.9.6 EPA/GSI Source Protection Zones

As reported by the EPA and GSI, groundwater sources, particularly public, group scheme and industrial supplies, are of critical importance in many regions. Consequently, the objective of source protection zones is to provide protection by placing tighter controls on activities within all or part of the zone of contribution (ZOC) of the source.

There are two main elements to source protection land surface zoning:
Areas surrounding individual groundwater sources; these are termed source protection areas (SPAs)
Division of the SPAs on the basis of the vulnerability of the underlying groundwater to contamination.

These elements are integrated to give the source protection zones.

Two source protection areas are recommended for delineation:
Inner Protection Area (SI). This area is designed to protect against the effects of human activities that might have an immediate effect on the source and, in particular, against microbial pollution. The area is defined by a 100-dat time of travel (TOT) from any point below the water table to the source. In karst areas, it will not usually be feasible to delineate 100-day TOT boundaries, as there are large variations in permeability, high flow velocities and a low level of predictability. In these areas, the total catchment area of the source will frequently be classed as SI.;
Outer Protection Area (SO), encompassing the remainder of the groundwater source catchment area or ZOC. It is defined as the area needed to support an abstraction from long-term groundwater recharge i.e., the proportion of effective rainfall that infiltrates to the water table.

According to the GSI/EPA source protection zone map (www.epa.ie), Ballysheedy Quarry is not located within a Source Protection Zone.

7.9.7 Groundwater Flow

Based on water levels recorded in wells located close to the northern quarry boundary in 2022, the groundwater in this area is assumed to be flowing in a northerly direction. This finding is supported by similar water levels results reported in the Goode Quarry 2009 EIS.

On a regional scale, the groundwater flow direction is generally a subdued reflection of surface water drainage. There are no karst features on site with most groundwater/surface water with the site slow seeping back to groundwater. Therefore, on a regional scale and eliminating consideration of activities within the quarry, the regional groundwater flow is considered to be towards the Lough Coole and Caherglassaun.

Based on the landownership and limited inflows the inflows to the pond is based on the rainfall data – evapotranspiration (0.65m per annum) over the area (12.9ha) which is equivalent of 2l/s (0.002m3/s) on average. Evapotranspiration from open water bodies may be higher. Given the surface area of c5 hectares the permeability is (0.002m3/s/50,000 m2) is low at 4 x10-8 $m^3/m^2/s$. While variations will occur, the lack of significant water level fluctuation supports the site survey work which did not indicate a karstic groundwater flow at the site. Water quality at the quarry is good as detailed below.

7.9.8 Existing Pollution Sources

All domestic effluent, in the area of Ballysheedy Quarry is treated by on site wastewater treatment systems. The type of treatment system used to break down effluent is variable and is generally based on the age of the domestic dwellings.

A number of potential contaminant sources are associated with agricultural practices. These include land spreading of farmyard wastes and/or artificial fertilisers in an uncontrolled manner and instances where nutrient requirements for crops are exceeded may also pose a risk of contamination. This threat is compounded by the variable thickness of overburden and the presence of karst features within this region. These factors have the potential for excess nutrients to leach to the water table and contaminate the groundwater or become dissolved in the surface run-off and contaminate the surface water.

7.10 Possible Impacts from Previous Works

Impacts that may have occurred as a result of works within the **Substitute Consent** application area included in this assessment are described below.

An important factor in relation to water is the control and management of rainwater falling within the site. The movement of vehicles within the application area represents a potential impact, by means of leakages or spillages to ground.

The stripping and excavation process and processing of associated materials can result in fine particle sizes. Rainfall falling onto such materials and surfaces can result in the creation of sediment laden waters. Uncontrolled emissions of sediment laden waters can result in sedimentation of natural watercourses and can impact on fisheries potential.

Based on the water levels measured within the site and the ponding area in the site, it appears that works may have taken place beneath the water table in some areas of the quarry. As the water level was being kept to a lower level by the then operators, by pumping to the north northwest of the site). Quarry work was undertaken on a dry working floor. The groundwater levels have been recorded at between 29 and 30mOD and the lowest level in the Substitute Consent application area has estimated at 25mOD. However, the site does not appear to be located in an area of karst and surface water collects at the topographical low with minor groundwater infiltration/seepage. Water levels in the quarry are stable and do not show the large variation which is typical of the surrounding turloughs areas.

These observations indicate that the groundwater environment at this location has not been impacted significantly by the development and as there is no present or no future requirement for pumping of water from the quarry floor. There have been no significant inflows of groundwater to this site which would indicate that there has been an interception of the main underlying water table or any major conduits.

Based on observations and records to date at Ballysheedy Quarry and a review of the results of environmental monitoring and water clarity, there has been no significant impact on the local and/or regional water environment in this area as a result of works to date at this location.

7.11 Mitigation Measures

The operator endeavoured to ensure that there was no impact on the local or regional environment as a result of activities at Ballysheedy Quarry. Several mitigation measures were in place at this location to ensure that there was no impact on the surface water or groundwater environment within and/or underlying the overall site and the surrounding area. Mitigation measures which were implemented at Ballysheedy Quarry include:

- No potentially polluting materials were contained within the application area. There was a dedicated spill kits retained on site.
- Water was used for dust suppression within the site and sourced from the surface water pond.
- Owing to the surface water management system and also the topographic void created by the extraction in the application area it was not possible for water falling onto the application area to flow to any watercourse under gravity conditions. The lagoons act as low energy environments to allow sediment to fall out of suspension. This system provides additional storage and potentially reduces flood potential impacts downstream of the activity area and also ensures sufficient retention time is allowed for settlement of suspended material within the lagoons.
- Any impact on the groundwater table has been minimal and there has been no known adverse effect on groundwater levels in areas within or outside the property boundary of Ballysheedy Quarry. There was no karstic connection to the regional groundwater table. Following site visits to Ballysheedy Quarry and a review of historical aerial photographs, the majority of the quarry floor at this location comprises water runoff collecting in areas of topographical lows.

7.12 Conclusion

The mitigation measures have significantly ameliorated the risk to the water environment during the operations at Ballysheedy Quarry and as demonstrated, any impact on the local and regional water environment has been negligible.

8 CLIMATE

8.5 Introduction

This chapter assesses the impact on climate arising from Ballysheedy Quarry in Gort, Co. Galway.

8.5.2 Methodology

All meteorological data contained in this report has been received from Met Éireann. This information has been adjusted where necessary to take into account the quarry's location and elevation. All calculations detailed in the report are advised methods as described by Met Éireann.

8.5.3 Weather Observing Stations

Rainfall Stations

There are a number of rainfall measuring stations throughout the country. These stations measure the daily rainfall in millimetres (mm). A number of these stations also measure additional parameters such as soil moisture, temperature, humidity, etc.

Synoptic Stations

Synoptic stations are those, which observe and record all of the surface meteorological data. These observations include rainfall, temperature, wind speed and direction, relative humidity, solar radiation, clouds, atmospheric pressure, sunshine hours, evaporation and visibility. They report a mixture of snapshot hourly observations of the weather known as synoptic observations and daily summaries of the weather known as climate observations. There are currently 24 synoptic stations (manual and automatic stations) located throughout Ireland.

8.6 Description of the Site and Existing Environment

8.6.2 General Climate of Ireland

Over the summer months, the influence of anticyclonic weather conditions on the western and north western regions of Ireland results in dry continental air interspersed by the passage of Atlantic frontal systems. During much of the winter period the climate is characterised by the passage of Atlantic low pressure weather systems and associated frontal rain belts from the west. Occasionally the establishment of a high pressure area or anticyclone over Ireland results in calm conditions and during the winter months these are characterised by clear skies and the formation of low level temperature inversions with light wind conditions at night time. If anticyclonic conditions become established for a few days or more during the summer months, high temperatures during the day might be recorded, especially at inland locations. Long spells of dry weather are relatively rare but should continental air masses or anticyclones persist over Ireland a period of drought conditions may occur which could last up to two or three weeks.

8.6.3 Rainfall

In order to give reliable climatic data on a particular area a weather station should be located within 10km of the site and in operation for at least 30 years. A rainfall station is located at Gort approximately 3km northeast of the quarry site. This station opened in 1943 and is still operational. Shannon Airport and Athenry are the nearest suitable synoptic station and it is located approximately 26km south west of the quarry. This station has been operational from 1937. Specifics of these stations relative to the quarry site are outlined in Table 8.1.

Table 8-1 Designated Meteorological Stations for Ballysheedy Quarry

Location	Grid Reference	Elevation (m O.D.)
Shannon Airport	R379603	6
Athenry	M504269	29
Gort	M 430001	33

The elevation of the quarry site is approximately 29 to 42m O.D. The elevation of the rainfall gauge at Gort is approximately 29m O.D and the elevation of Shannon Airport Synoptic Station is approximately 6m O.D. According to Met Éireann, annual precipitation levels increase by 200 – 300mm per 100m elevations. The height difference between the rainfall gauge at Gort and the quarry site is approximately 3m. Therefore, the annual precipitation due to the elevation of the quarry site is not adjusted. Average monthly and annual precipitation levels are detailed in Table 8.2.

Table 8-2 Average Monthly & Annual Precipitation

Location	Gort (m)
Ht. m O.D.	29
January	116.7
February	87.8
March	94.7
April	72
May	75.3
June	79.6
July	86.5
August	107.8
September	100.3

Location	Gort (m)
October	128.9
November	120.3
December	123.2
Annual	1192.9

At the quarry site, approximately 58% of the total annual rainfall is recorded during the winter period (October – March). This amount of precipitation (including snow) will normally be associated with more prolonged Atlantic frontal weather depressions passing over the region compared to the summer.

8.6.4 Evapotranspiration and Effective Rainfall

Evapotranspiration is the return of water vapour to the atmosphere by evaporation from land and by the transpiration of plants, generally measured from a short-grass covered surface (such as a permanent pasture) adequately supplied with water. Evaporation is the return of water vapour to the atmosphere by evaporation from a free water surface such as a pan of water, known as a 'Class A Pan', fitted with a depth measuring gauge. The potential evapotranspiration figures for Shannon Airport synoptic station are detailed in Table 8.3 overleaf.

It can be noted that evapotranspiration is very low during winter months, when temperatures are lower than summer months, relative humidity is generally higher and plant growth is minimal. The vast majority of evapotranspiration during winter months is attributable to direct evaporation from ground surfaces. During summer months the rate of evapotranspiration increases and often exceeds the monthly rainfall. This is due to increased free evaporation from the surface and from transpiration from leaves and plants.

Effective rainfall is defined as precipitation minus actual evapotranspiration. Using the estimated rainfall data for the quarry and the potential evapotranspiration data for the nearest synoptic station i.e., Shannon Airport, the effective rainfall for the study area can be calculated. Refer to Table 8.3. Potential Evapotranspiration (PE) refers to the water flux under unlimited soil water conditions. Actual evapotranspiration is estimated as 95% of potential evapotranspiration to allow for seasonal soil moisture deficits.

Table 8-3 Effective Rainfall for Ballysheedy Quarry

Month	Rainfall (mm)	Potential Evapotranspiration (PE) (mm)	Effective Rainfall (mm)
January	116.7	7	109.7
February	87.8	19.6	68.2
March	94.7	37	57.7
April	72	60.9	11.1
May	75.3	85	-9.7
June	79.6	90.9	-11.3
July	86.5	86.9	-0.4
August	107.8	71.1	36.7
September	100.3	49	51.3
October	128.9	24.4	104.5
November	120.3	8.3	112
December	123.2	3.1	120.1
Total	1192.9	543.2	649.7

Any rain falling on the site infiltrates to ground or evaporates from the surface.

8.6.5 Wind

The closest synoptic station with the capability of measuring wind and that has been in operation for at least 30 years is Shannon Airport. This station is located approximately 6km south east of the quarry and is located at an elevation of approximately 6m O.D.

The wind rose for Shannon Airport shows that the prevailing winds are from the west. Refer to Appendix 8.1 'Shannon Airport Wind Rose Diagram' for further details. The mean wind speed at Shannon Airport is 9.3 knots (4.7m/s). The mean monthly wind speed from 1981-2010 (available 30 year average report) at Shannon Airport was 9.1 knots (4.6m/s), while the maximum gust reached 83 knots (42.6m/s). The mean number of days with gales during these years was 6.7 days. These wind speeds are likely to be indicative of those at the quarry site.

8.7 Climate Agreements

Ireland is party to both the United Nations Framework Convention on Climate Change

(UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global Greenhouse Gas (GHG) emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

In order to meet the commitments under the Paris Agreement, the EU enacted *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013* (the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

Following on from the recently published European Climate Law (EU, 2021), and as part of the EU's "*Fit for 55*" legislative package where the EU has recently committed to a domestic reduction of net greenhouse gas emissions by at least 55% compared to 1990 levels by 2020, the Effort Sharing Regulation is proposed to be strengthened with increased ambition by the year 2030. The proposal for Ireland is to increase the GHG emission reduction target from 30% to 42% relative to 2005 levels whilst the ETS market will also have more stringent reductions from the currently proposed reduction of 43% by 2030 compared to 2005 to a 61% reduction by 2030 based on annual reductions of 4.2% compared to the previous annual reduction level of 2.2% per year (EU, 2021).

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the Act). The purpose of the Act was to enable Ireland '*to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050*' (3.(1) of No. 46 of 2015). This is referred to in the Act as the '*national transition objective*'. The Act made provision for a national mitigation plan, and a national adaptation framework. In addition, the Act provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The *Climate Action Plan* (CAP) (Government of Ireland, 2021), published in November 2021, outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlines the various broadscale measures

required for each sector to achieve ambitious decarbonisation targets. The CAP also details the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The CAP has set a built environment sector reduction target of 40 - 45% relative to 2030 pre-NDP (National Development Plan) projections. There are no targets specific to the mining, quarrying or extractive industry.

Following on from Ireland declaring a climate and biodiversity emergency in May 2019 and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme for the *Climate Action (Amendment) Bill 2019* in December 2019 (Government of Ireland, 2019) followed by the publication of the *Climate Action and Low Carbon Development (Amendment) Act 2021* (S.I No. 32 of 2021) (hereafter referred to as the 2021 Climate Act) (Government of Ireland, 2021). The 2021 Climate Act was prepared for the purposes of giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act is to provide for the approval of plans '*for the purpose of pursuing the transition to a climate resilient and climate neutral economy by the end of the year 2050*'. The 2021 Climate Act will also '*provide for carbon budgets and a decarbonisation target range for certain sectors of the economy*'. The 2021 Climate Act defines the carbon budget as '*the total amount of greenhouse gas emissions that are permitted during the budget period*'.

The 2021 Climate Act removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2021, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request each local authority to make a 'local authority climate action plan' lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority.

8.8 Possible Impacts from Previous Works

On a local, regional and global scale, the climate has not been altered by the activities of the quarry. The quarrying industry is not a significant industrial generator of greenhouse gases. There has been no net contribution to greenhouse gas emissions. Therefore, this industry is not impacted by the limits of greenhouse emissions under the Kyoto protocol.

The quarry site has not created any temperature inversions, altered any current wind circulation patterns nor affected the sunshine or any other climatic factors in the area beyond the site boundaries of the quarry.

8.9 An Assessment of the Impact and the Mitigation Measures

As per the possible impacts detailed in Section 8.3 above, it is not likely that works at Ballysheedy Quarry to date have had any impact on the local or global climate.

However, mitigation measures have been implemented at the site to ensure that activities at this location do not adversely affect the local or regional climate. These measures include:

- Managing all staff and contractors to ensure that machinery used on site is properly maintained and is switched off when not in use to avoid unnecessary dust and exhaust emissions from construction traffic; and that
- The site and all plant and equipment on site are operated according to Best Available Technique (BAT) Guidelines.

9 AIR QUALITY

9.5 Introduction

All developments, including quarries, have the potential to adversely affect air quality within the surrounding area. Currently in Ireland there are no statutory limits for dust deposition from quarry developments. However, in recent years, the TA Luft/VDI 2119/Bergerhoff Method of dust emission monitoring has become the most commonly used method. This method involves using a direct collection pot to standardised dimensions of either glass or plastic. The system benefits from being a direct collection method i.e., less transferring of material and consequent reduction in sampling errors. This method is defined as an internationally recognised standard and has been adopted by the Environmental Protection Agency (EPA) as the method of choice for licensed facilities.

Department of Environment, Heritage and Local Government (DoEHLG) Guidelines for Planning Authorities on Quarries and Ancillary Activities, along with the EPA guidelines for Management in the Extractive Industry (Non- Scheduled Minerals), recommend that the TA Luft total dust deposition limit value (soluble and insoluble) of 350 milligram per square metre per day be adopted at site boundaries near quarry developments. The Irish Concrete Federation (ICF) has also suggested this threshold value for fugitive emissions arising from quarry developments. The thresholds have been widely applied by Planning Authorities in conditioning emissions from quarrying industries.

Conditions, as imposed by Galway County Council on the operation of Ballysheedy Quarry in Gort, Co. Galway under S.261 of the Planning and Development Act, 2000 (as amended) also specifies a dust deposition limit of 350 milligram per square metre per day.

This section of the Remedial EIAR will examine and discuss the dust monitoring results for dust samples taken at Ballysheedy Quarry, during 2014 and 2022.

9.5.2 Methodology

Total dust deposition is measured using the Bergerhoff gauges specified in the German Engineering Institute VDI 2119 document entitled "Measurement of Dustfall using the Bergerhoff Instrument (Standard Method)". Dust gauges are set up approximately 2m above the ground surface and placed in protective cages. The jars are left open for one month. The jars are then sealed and returned to the laboratory for analysis.

9.6 Existing Environment

The EU Air Framework Directive requires Member States to categorise geographic areas in terms of Zone and Agglomerations for Air Quality. The proposed scheme falls into the area classified as Zone D – Rural Ireland. A detailed description of the Air Quality Zones is given on the EPA website. http://www.epa.ie/air/quality/zones

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality "*Air Quality in Ireland 2019*" (EPA, 2020) details the range and scope of monitoring undertaken throughout Ireland.

As part of the implementation of the *Framework Directive on Air Quality* (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2020). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring, Sheeaun is categorised as Zone D.

NO_2

NO_2 monitoring was carried out at two rural Zone D locations in Emo and Kilkitt in recent years, and at an urban location, Castlebar (EPA, 2020b). The NO_2 annual average in 2019 was 4 µg/m^3 and 5 µg/m^3 for Emo and Kilkitt respectively while Castlebar had an annual average of 8 µg/m^3 (see Table 9-1). Long-term average concentrations measured at all locations were significantly lower than the annual average limit value of 40 µg/m^3. The maximum 1-hour limit value of 200 µg/m^3 (measured as a 99.8th percentile; i.e., 18 exceedances allowed per year) was not exceeded in any year for any of the Zone D locations. The average results at the Zone D locations over the last five years suggests an average of 8 µg/m^3 as a background concentration.

The M18 runs directly to the south of the site which is a source of air pollutants in the area. Based on the above information, a conservative estimate of the current background NO_2 concentration for the location of the Substitute Consent site is 12 µg/m^3.

In terms of short-term, 1-hour concentrations, a value of twice the annual mean concentration was added to the short-term process concentration.

Table 9-1 – Trends in Zone D air quality – Nitrogen Dioxide (NO_2)

Station	Averaging Period	Year				
		2015	2016	2017	2018	2019
Castlebar	Annual Mean NO_2 (µg/m^3)	8	9	7	8	8
	99.8th %ile 1-hr NO_2 (µg/m^3)	-	66	60	60	59
Kilkitt	Annual Mean NO_2 (µg/m^3)	2	3	2	3	5
	99.8th %ile 1-hr NO_2 (µg/m^3)	-	26	17	22	42
Emo	Annual Mean NO_2 (µg/m^3)	3	4	3	3	4
	99.8th %ile 1-hr NO_2 (µg/m^3)	-	36	28	42	28

NO_X

Monitoring for NO_X concentrations as carried out at a number of Zone D locations in recent years – Castlebar, Emo and Kilkitt. Over the period 2015 – 2019 concentrations ranged from 11 – 13 µg/m^3 for the urban site, Castlebar, while concentrations for the two rural sites,

Emo and Kilkitt ranged from 2 – 8 µg/m^3. Concentrations are below the annual limit value of 30 µg/m^3 set for the protection of ecosystems. Based on the EPA data a conservative estimate of the current background NO_X concentration in the region of the facility is 14 µg/m^3.

SO_2

Continuous SO_2 monitoring was carried out at a number of Zone D locations over the period 2015 – 2019. Annual mean concentrations ranged from 1 – 3 µg/m^3, with no exceedances of the daily limit value of 125 µg/m^3 for the protection of human health (see Table 9-2). Long term annual average results suggest an upper limit of 2 µg/m^3 as a background concentration. Based on this EPA data a conservative estimate of the annual mean background SO_2 concentration in the region of the facility is 3 µg/m^3.

SO_2 concentrations for the representative rural Zone D monitoring station at Kilkitt over the period 2015 - 2019 ranged from 1.5 – 5.7 µg/m^3 for the 99.2nd%ile of 24-hour means. The 1-hour limit value for SO_2 (measured as a 99.7th%ile) ranged from 1.6 – 6.9 µg/m^3, which is significantly below the 350 µg/m^3 limit value. A 24-hour background concentration of 6 µg/m^3 and a 1-hour background concentration of 7 µg/m^3 have been used in the assessment. In relation to the annual averages, the ambient background concentration is added directly to the process concentration. However, in relation to the short-term peak concentration, concentrations due to emissions from elevated sources cannot be combined in the same way. Guidance from the UK DEFRA (2016) and the EPA (2020a) advises that for SO_2 an estimate of the maximum combined pollutant concentration can be obtained as shown below:

SO_2 - The 99.7th%ile of total 1-hour mean SO_2 is equal to the maximum of either A or B below:

a) 99.7th%ile of hourly mean background SO_2 + (2 x annual mean process concentration SO_2);

b) 99.7th%ile of hourly mean process contribution SO_2 + (2 x annual mean background concentration SO_2).

SO_2 - The 99.2th%ile of total 24-hour mean SO_2 is equal to the maximum of either A or B below:

a) 99.2th%ile of 24-hour mean background SO_2 + (2 x annual mean process concentration SO_2)

b) 99.2th%ile of 24-hour mean process contribution SO_2 + (2 x annual mean background concentration SO_2)

Table 9-2 – Trends in Zone D air quality – Sulphur Dioxide (SO_2)

Station	Averaging Period	Year				
		2015	2016	2017	2018	2019
Kilkitt	Annual Mean	2	2	2	3	1
Shannon Estuary	Annual Mean	2	2	2	-	-
Askeaton	Annual Mean	-	-	-	-	2

2. Total Depositional Dust

The results of dust monitoring undertaken at Ballysheedy Quarry are presented in Table 9.3 below.

Table 9-3 Dust Results at Ballysheedy Quarry

Monitoring Period	Total Dust Deposition ($mg/m^2/day$)		
	D1	D2	D3
	Southern boundary	Western boundary	Eastern boundary
			4
June 2014	46	35	26
November 2020		55	151.2
January 2022	43	34	

These existing dust monitoring locations are illustrated on Figure 9-1.

Figure 9-1 Dust Monitoring Locations

It can be seen from Table 9-3 above that dust result levels recorded at Ballysheedy Quarry over the past were predominantly below the compliance threshold limit of 350mg/m^2/day as recommended by the TA Luft/VDI 2119/Bergerhoff Method. It should be noted that the D1 and D2 monitoring locations are on the landownership boundary near the quarry and the quarry stockpiles respectively and are not located close to sensitive receptors i.e. The distance to the nearest sensitive receptors are as 560m to the north, 800m east, 420m to the south and 330m southeast and 400m west

9.7 Possible Impacts from Previous Works

The nature and particle size of the materials being handled at the site have a fundamental influence on their tendency to be broken down and to generate fugitive dust emissions. It is also dependent on material density and to some extent particle shape. Experience of quarry workings indicates that mechanical activity is the most significant factor in material erosion and dust generation. However, the effect of wind and high ambient temperatures are also important factors in dust generation and migration. Problems may arise at quarry workings when all these factors arise simultaneously. Potential sources of dust from the quarry can be categorised under the following headings. These are:

Point Source – where dust is generated by activities such as loading, dozers, earth-moving plant, processing screens, crushers and conveyor transfer points.

Line Source – where dust is generated by activities identified above along well-defined haul roads and open conveyors.

Dispersed Source – where dust is generated by activities such as topsoil stripping, uncontrolled placement of these soils and general activity on the quarry floor. Stockpiles are also considered to be a dispersed dust source.

The amount of dust capable of being dispersed to a particular location during windy conditions is related to several factors including the distance from source to receptor, prevailing weather conditions and intervening topography between source and receptor. As dust travels downwind from the source it initially disperses outwards and upwards and then progressively falls to the ground surface. Larger particles fall first and therefore do not migrate as far as the smaller particles. The concentration of dust therefore reduces very quickly from the emission source. Most emitted dust is in fact deposited close to its source, generally within a distance of a few tens of metres.

9.7.2 Dust Emissions at Ballysheedy Quarry

Dust result levels recorded at Ballysheedy Quarry over the past six years were predominantly below the compliance threshold limit of 350mg/m^2/day as recommended by the TA Luft/VDI 2119/Bergerhoff Method (refer to Table 9-3).

In the last eight years John Madden & Sons Ltd. has received no complaints regarding dust from Ballysheedy Quarry. Only one complaint regarding dust from Ballysheedy Quarry has ever been received and this was in 2007 during the S261 process. Subsequent to which it is understood that dust suppression by damping down was increased.

Mitigation measures were in place to ensure dust emissions from the quarry operations have no negative environmental effects and remain low, as discussed below.

9.8 Mitigation Measures

Dust emissions were kept to a minimum at all locations and have taken all reasonable steps as far as is practical to minimise dust emissions. Several mitigation measures were put in place to limit dust emissions on site and in the surrounding area.

The operator cleaned, when necessary, any dirt and debris from any road surfaces soiled as a result of spillage due to haulage to and from the site, in order to minimise public nuisance.
A mobile water bowser system is used to ensure that all internal hauls roads and access routes are sprayed with water in periods of dry weather to help suppress dust emissions.
All stockpiles are conditioned with water to minimise dust.
The provision of on-site speed limits prevents unnecessary generation of fugitive dust emissions.
A complaints register was maintained on-site and any complaints relating to dust emissions are immediately dealt with.
All crusher are kept covered to reduce dust emissions from processing activities.
Dust monitoring has been carried out on a monthly basis at the quarry and the records

retained as part of the EMS system in place at the site.

The above mitigation measures have significantly reduced the potential for dust emissions. It is considered that any residual dust emissions did not cause a nuisance or have a perceptible impact on the local or regional environment. This was be verified by measurement using the TA Luft/VDI 2119/Bergerhoff Method at dust monitoring locations at Ballysheedy Quarry. No significant dust will be generated from within the substitute consent area due to the development of groundcover and the large water body.

A number of mitigation measures were implemented as part of the M18 which also applied to the site in question.

Dust suppression measures were implemented in accordance with the British Research Establishment's (BRE) recommendations contained in the "Control of Dust from on Construction and Demolition Activities". Specific measure would include but not be limited to:

- restraint on dust generation operations (such as earthworks) during inappropriate weather conditions such as high winds;
- frequent sweeping of local roads where construction plant and delivery vehicles would be allowed access;
- sweeping of site hardstanding during non-windy periods;
- sheeting of all vehicles transporting potentially dust generating materials to and from the site;
- watering of potential dust sources such as haul routes and site roads and storage hardstanding's at the onset of and during windy weather ; and
- siting of materials storage areas to minimise exposure to winds or appropriate screening of such areas.
- imposition of site speed restrictions to limit the potential for generating dust;
- introduction of wheel wash facilities at exit points from the site working areas onto public roads;
- temporary cessation of operations and implementation of corrective action should dust generation cause nuisance beyond the site boundaries;
- vehicles using site roads have their speeds restricted to 20 kph;
- material handling systems and site stockpiling of materials designed and laid out to minimise exposure to wind;
- water misting or sprays used as required if particularly dusty activities are necessary during dry and/or windy periods;
- during the movement of materials
trucks were covered; and
- a liaison officer appointed to provide a point of contact with local residents and to deal with any concerns raised regarding dust emissions.

10 Archaeology/Cultural Heritage

10.5 Introduction

This chapter reports the findings of a retrospective assessment on the likely significant effects on archaeology as a result of extraction activities at the site, a previously excavated, now disused, quarry (outlined in red), at Ballysheedy townland, near Gort in County Galway (Figures 1 and 2). The adjacent lands outlined in blue are also in the applicant's ownership and consist of a partially extracted quarry development site.

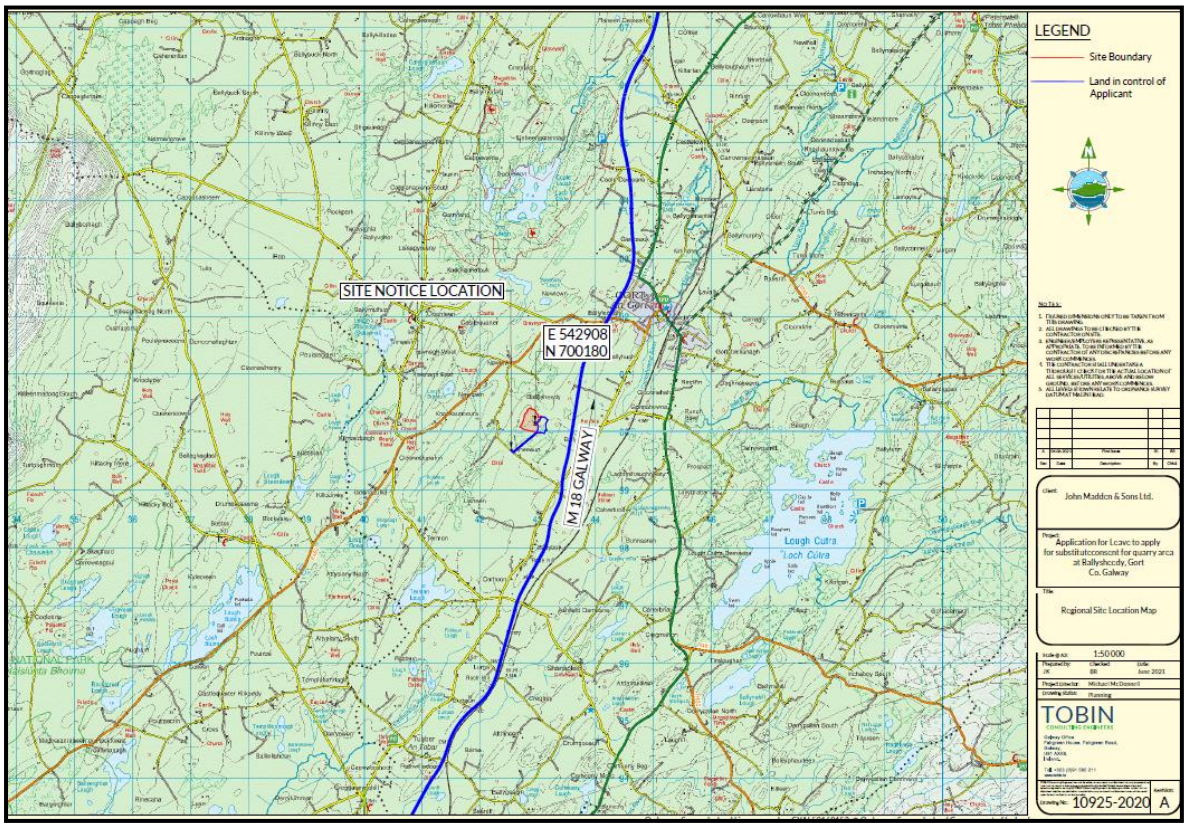


Figure 1 Site Location Map.

The primary issue with regards to archaeology concerns a recorded monument, a cashel (RMP No. GA128-021), which was located within the site area but which is no longer extant.

Chapter 6 (Project Description) provides a full description of the Substitute Consent site and describes the extractions activities that took place until 2020 and provides a description of the site.

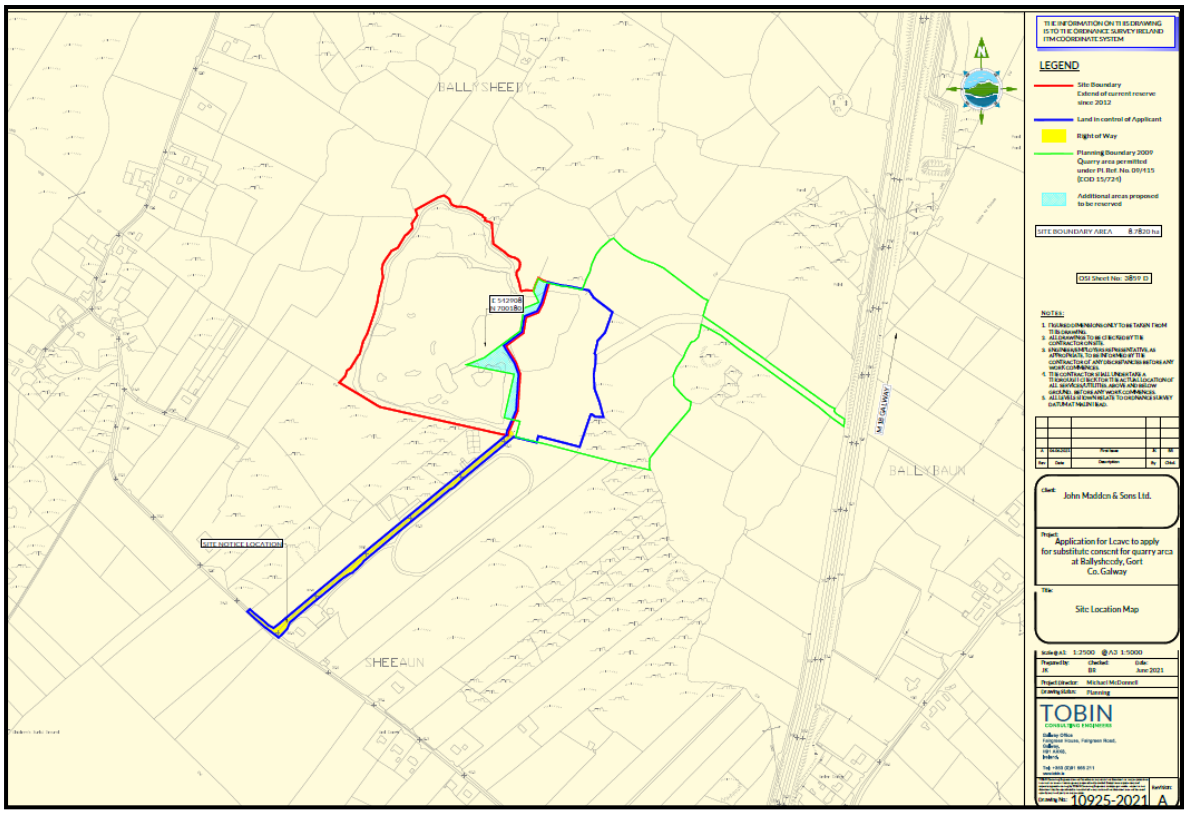


Figure 2 Site Location Map

3. Statement of Authority

Richard Crumlish is a Licensed Archaeologist and a current Member of Institute of Archaeologists of Ireland (M.I.A.I.). He has directed over 350 excavations since 1992 and compiled numerous Impact Assessments. He was a founding director of Archaeological Services Unit Ltd. which operated between 1997 and 2002. Since 2002 he has run a successful business as a consultant archaeologist. He has worked in 21 counties during his career and clients have included many of the local authorities in the west of Ireland, including Galway County Council, architects, engineers, developers, community groups and sporting organisations. Richard has published several articles in national, county and local historical/archaeological journals. He has also given talks at various locations in Donegal, Mayo and Galway at heritage events over the years.

10.6 Assessment Methodology

4. Background

The study was undertaken in two parts; the first involved the research of a number of cartographic and literary sources, followed by field walking of the Substitute Consent site which took place on 14 July and 4 September 2020.

10.2.2 Relevant Legislation

- Recorded Monuments in Ireland and specifically within County Galway are protected under the National Monuments Acts 1930 to 2014 and the Galway County Development Plan 2015-2021.

- The National Monuments (Amendment) Act 1994 gave legal protection to recorded monuments through the establishment of the Record of Monuments and Places (RMP), which incorporated the Sites and Monuments Record (SMR) for each county into law.
- Under Policy ARC3 of the Archaeological Heritage Policies of the Galway County Development Plan 2015-2021, it is a policy of the Council to 'Consult with the National Monuments Service of the Department of Arts, Heritage and the Gaeltacht in relation to proposed developments adjoining archaeological sites.
- Under Objective ARC2 of the Archaeological Heritage Objectives of the Galway County Development Plan 2015-2021, it is an objective of the Council that 'All planning applications for new development, redevelopment, any ground works, refurbishment, and restoration, etc. within areas of archaeological potential or within close proximity to Recorded Monuments or within the historic towns of County Galway (Ardrahan, Athenry, Dunmore, Eyrecourt, Loughrea and Tuam) will take account of the archaeological heritage of the area and the need for archaeological mitigation.
- Under Objective ARC7 of the Archaeological Heritage Objectives of the Galway County Development Plan 2015-2021, it is an objective of the Council to 'Ensure that any development in the immediate vicinity of a Recorded Monument is sensitively designed and sited and does not detract from the monument or its visual amenity.

10.7 Receiving Environment

10.7.2 Desk Review

10.3.1.a Recorded Monuments

There are fifteen (15) recorded monuments within 1km of the site area (Table 10-1 and Figures 3 and 4). One recorded monument (RMP No. GA128-021, a cashel) is located within the site (Figure 4).

Table 10-1 RMP

RMP No.	Classification	Townland	Distance away
GA122-020	Ringfort-cashel	Ballysheedy	*c.* 380m
GA122-021	Ringfort-cashel	Ballysheedy	*c.* 575m
GA122-021001	Souterrain	Ballysheedy	*c.* 575m
GA122-021002	House-indeterminate date	Ballysheedy	*c.* 575m
GA122-079	Bi-vallate Ringfort-rath	Drumminacloghaun	*c.* 720m
GA122-079001	Souterrain	Drumminacloghaun	*c.* 720m
GA122-121	Holy Well	Newtown (Glynn)	*c.* 1km
GA122-122	Ringfort	Newtown (Regun)	*c.* 900m
GA122-140	Fulacht Fia	Newtown (Glynn)	*c.* 1km
GA128-014	Ringfort-cashel	Ballybaun	*c.* 260m
GA128-014001	Souterrain	Ballybaun	*c.* 260m
GA128-015	Ringfort-rath	Laghtyshaughnessy	*c.* 900m

		and Ballybaun	
GA128-021	Ringfort-cashel	Ballysheedy	Within site
GA128-072	Ringfort-cashel	Sheeaun	*c.* 250m
GA128-072001	Souterrain	Sheeaun	*c.* 250m
GA128-073	Ringfort-cashel	Sheeaun	*c.* 370m
GA128-074	Ringfort-cashel	Sheeaun	*c.* 520m
GA128-074001	Souterrain	Sheeaun	*c.* 520m
GA128-075	Cairn-unclassified	Sheeaun	*c.* 520m
GA128-076	Children's Burial Ground	Sheeaun	*c.* 830m
GA128-078	Ringfort-rath	Sheeaun	*c.* 680m

The four closest recorded monuments (RMP Nos. GA128-014, GA128-021, GA128-072 and GA128-073) are described below.

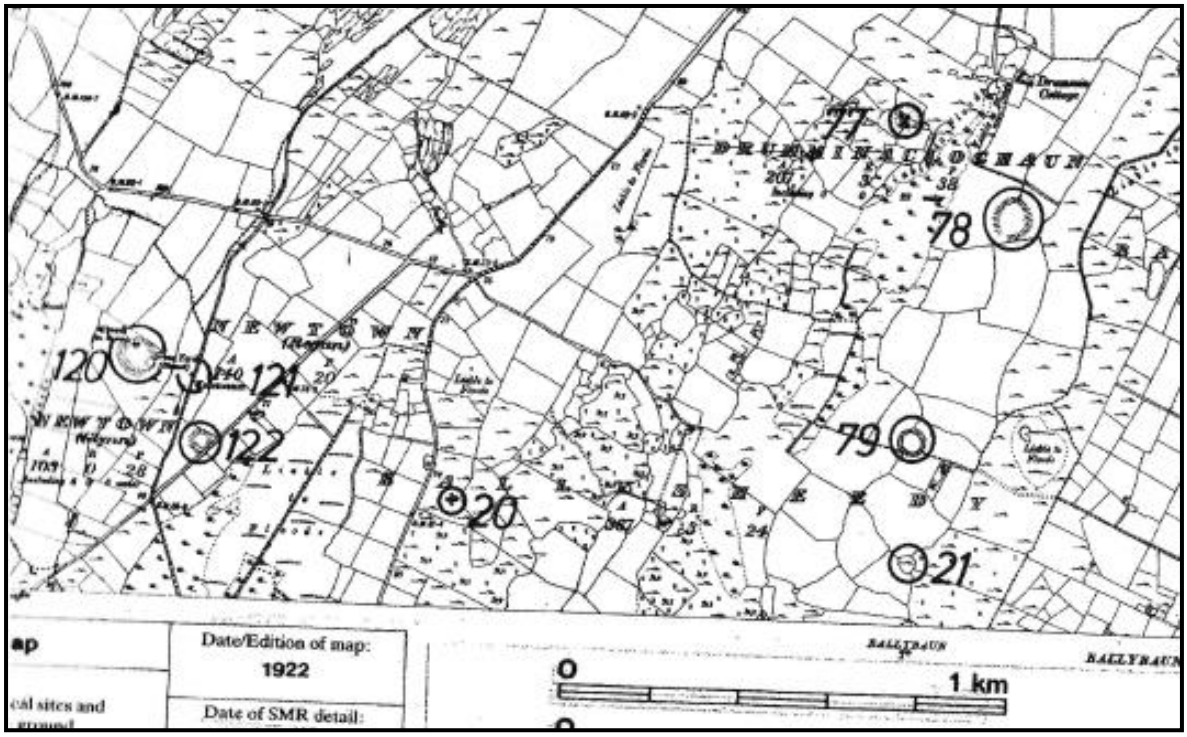


Figure 3 Site Location Map (Extract from Galway RMP, Sheet No. 122).

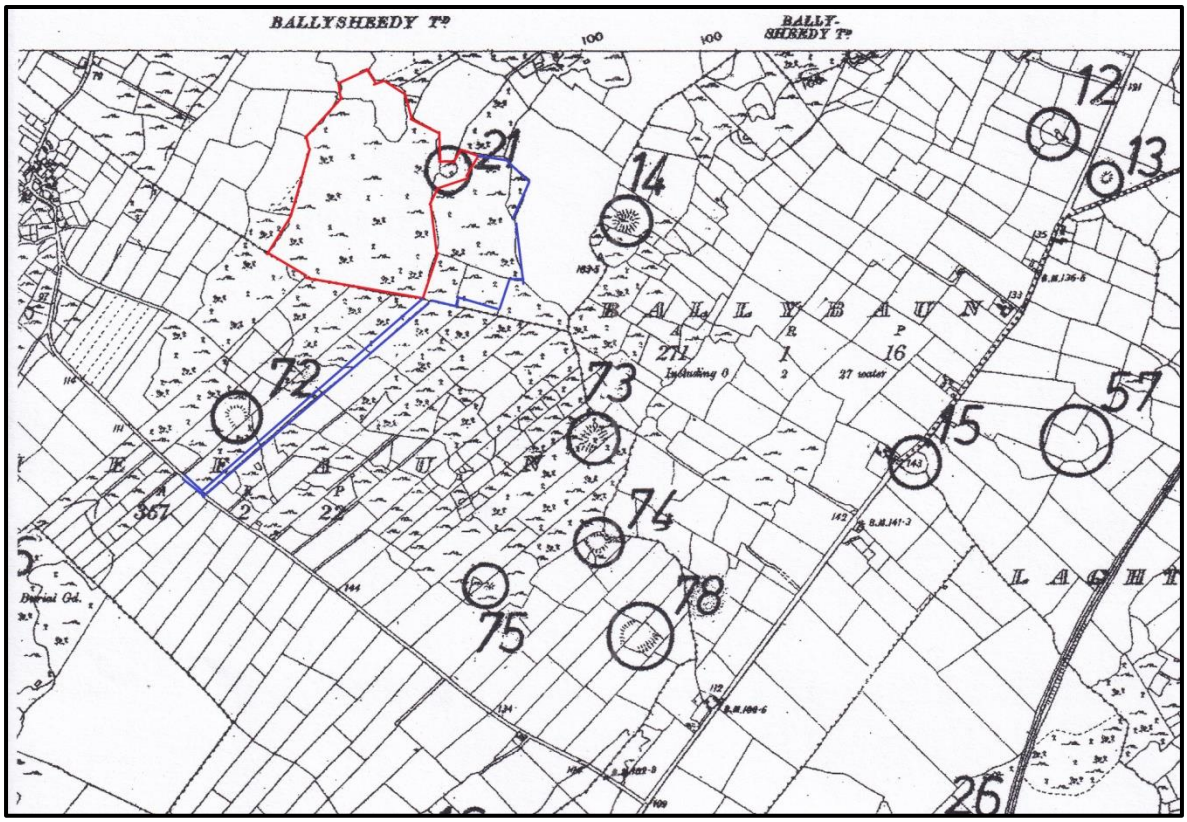


Figure 4 Site Location Map (Extract from Galway RMP, Sheet No. 128).

RMP No. GA128-014

Description: 'On an E facing slope in grassland. Poorly preserved roughly circular cashel (diam. 23m) defined by a drystone wall overlain by a field wall at N and SW. Though much collapsed, double wall-facing is evident intermittently. A gap at ESE may be original. A possible souterrain (GA128-014001) is associated.' Fahey (1893) refers to the site as 'Cahir Mugachane'.

'Within the interior of a cashel (GA128-014), according to Fahey (1893, 5) based on "local traditions, as well as structural indications", it is likely that there is a "cave" (possible souterrain) in the "fort". No visible surface trace of it survives.' (Description courtesy of www.archaeology.ie).

The cashel is located *c.*260m outside the E site boundary. The perimeter of the monument is overgrown with hazel and hawthorn. A concrete surface has been laid across the enclosing element and into the interior of the monument with a livestock feeder located within (Plate No. 1).

Plate No. 1 Looking ESE towards cashel (RMP No. GA128-014).

RMP No. GA128-021

Description: 'On a low ridge in an area of grassland and rock outcrop. Marked on the 1838 edition of the OS 6-inch map as a hachured subcircular enclosure (c. 34m N-S; c. 26m E-W) and on the 1915 edition as a subcircular field. On inspection in August 1982 a curving field boundary in the W and N sectors with slight traces at S may have mirrored the outline of the enclosing element; otherwise, no visible surface trace of the enclosure survived. Many of the field boundaries shown on the 1915 map had also been cleared away. Aerial imagery indicates that a large quarry now occupies this area and no visible surface trace of the enclosure is visible. A trackway leading into the site may overlie the W half of it. The cartographic evidence and siting in an area of outcropping rock suggest that this may be a cashel' (Description courtesy of www.archaeology.ie).

A description of the monument by Martin Fitzpatrick in 2005 states 'Immediately NE of the existing quarry there is the remains of a semi-circular bank of stone which represents the remains of an enclosure site (GA128-021). It is located on a low flat ridge which runs NE-SW and is currently a modern field boundary which once formed a sub-circular arc. The monument survives only in the E and N sections with a small section also in the S. The area of the monument is overgrown with scrub and a large pile of quarried stone borders the site in the W.'

There is no visible surface trace of this monument with most of the site location having been quarried away. A 5-6m wide area to the N of the quarried area and adjoining a roughly semi-circular field of pasture to the N has no identifiable features with rock outcrop in places (Plate No. 2).

The current quarry operators stayed the 5-6m indicated the field boundary that may have represented what remained of the monument.

Plate No. 2 Looking W across site of monument (RMP No. GA128-021).

RMP No. GA128-072

Description: 'In scrubland. This very poorly preserved oval cashel (c. 35m NW-SE; c. 25m NE-SW) is defined by a much-collapsed drystone wall that is overlain by a later field wall from N to E. Some facing-stones are evident from S to W. A NE-SW running field wall clips the monument from SE to SSW. There is a souterrain (RMP No. GA128-072001) in the NW quadrant of the interior. This souterrain has collapsed and is marked by a linear stone-filled depression (L >6.2m; Wth 1.2m) running NE-SW. Traces of the side-walls survive at its NE end. It curves slightly to the S at the SW end where it is blocked by stones and a tree.'
(Description courtesy of www.archaeology.ie)
Martin Fitzpatrick (2005) describes the monument as being 'completely destroyed' and believes the feature within the interior 'unlikely to be a souterrain' and 'more likely that the feature is in fact an Icehouse'.
The site location is currently completely overgrown in scrub.

RMP No. GA128-073

Description: 'In scrubland. This poorly preserved roughly circular cashel (diam. 32.2m) is defined by a much collapsed and completely overgrown drystone wall. A field wall cuts though the monument from SE to S' (Description courtesy of www.archaeology.ie).
Martin Fitzpatrick (2005) described the monument as being in 'poor condition in places, but though overgrown, features on the cashel wall can be identified (diameter north/south 29m)...A souterrain is located in the west north-west sector of the cashel.'

10.3.1.b National Museum of Ireland Finds Database

There are no entries in the finds database of the National Museum of Ireland for Ballysheedy townland in County Galway.

10.3.1.c Excavations

There are two entries for Ballysheedy townland on www.excavations.ie, which records summaries of all excavations undertaken on the island of Ireland between 1969 and 2019. Both are associated with the construction of the M18 motorway, located over 300m E of the site.

- Excavation Licence No. 07E0457. This excavation licence covered pre-development testing in Ballysheedy, as well as a number of other townlands, along the line of the N18 Gort to Crusheen road scheme, by Ed Lyne in 2007. Nothing of archaeological significance was found in Ballysheedy townland.

- Excavation Licence No. 07E0489. This excavation licence covered pre-development testing in Ballysheedy, as well as a number of other townlands, along the line of the N18 Gort to Crusheen road scheme, by James Kyle in 2007. Nothing of archaeological significance was found in Ballysheedy townland.

10.3.1.d Cartographic Sources

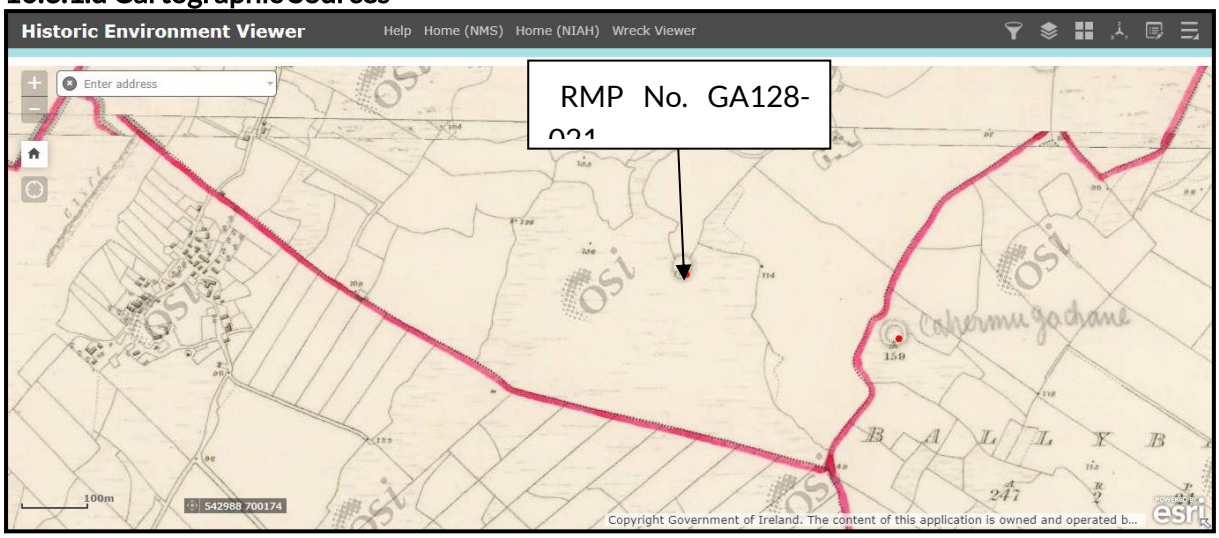


Figure 5 Site Location Map (Extract from 1st edition of OS six-inch sheet, Galway No. 128).

The site is depicted as part of a larger featureless field, with the exception of the cashel (RMP No. GA128-021) shown along the northern boundary, on the 1st edition of the OS six inch map of 1838 (Figure 5).

On the subsequent OS 25-inch map of the late 19th/early 20th century, the site is shown as a field of rock outcrop which is covered in scrub (Figure 6). The cashel (RMP No. GA128-021) is again depicted, located along the NE of the site

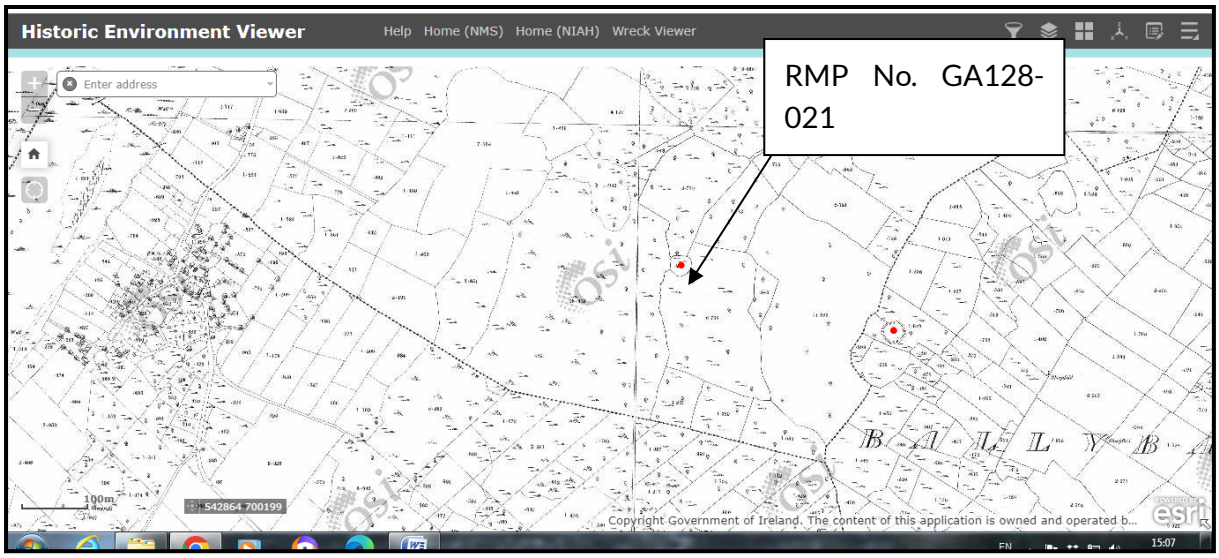


Figure 6 Site Location Map (Extract from OS 25-inch sheet).

The site is depicted in much the same way on the 1921 edition of the OS six-inch sheet (Figure 7). The cashel (RMP No. GA128-021) is also shown.

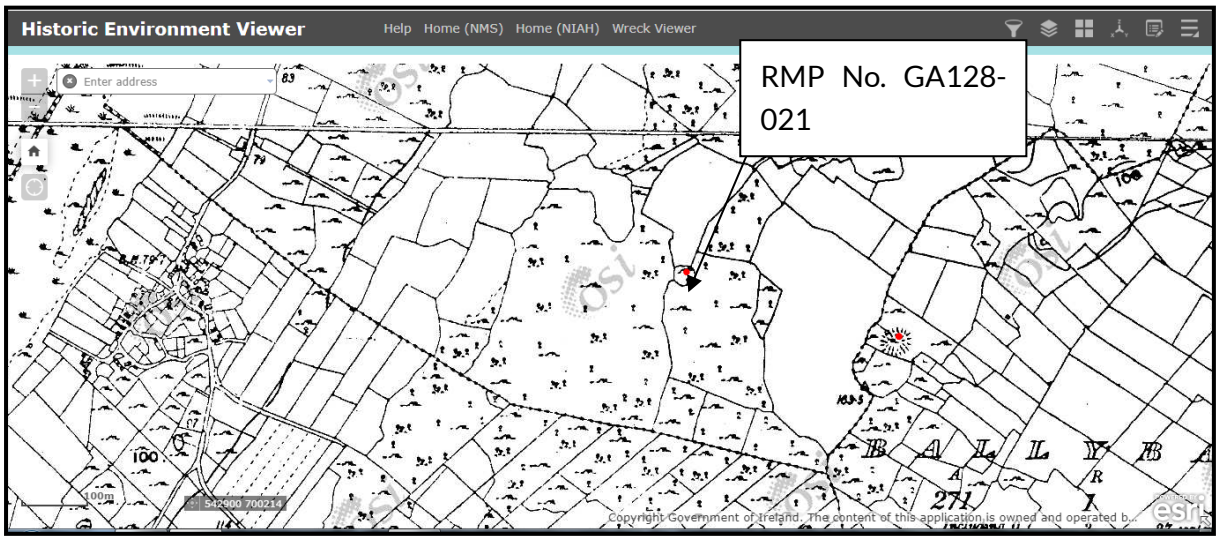


Figure 7 Site Location Map (Extract from OS six-inch sheet, Galway No. 128, 1921 edition).

Field Survey

The site is a disused quarry, first opened in 1994 and which limited operation since 2012 (outlined in red on Figures 2 and 8). The area to the E is a substitute consent quarry which is currently inactive (outlined in blue on Figures 2 and 8).

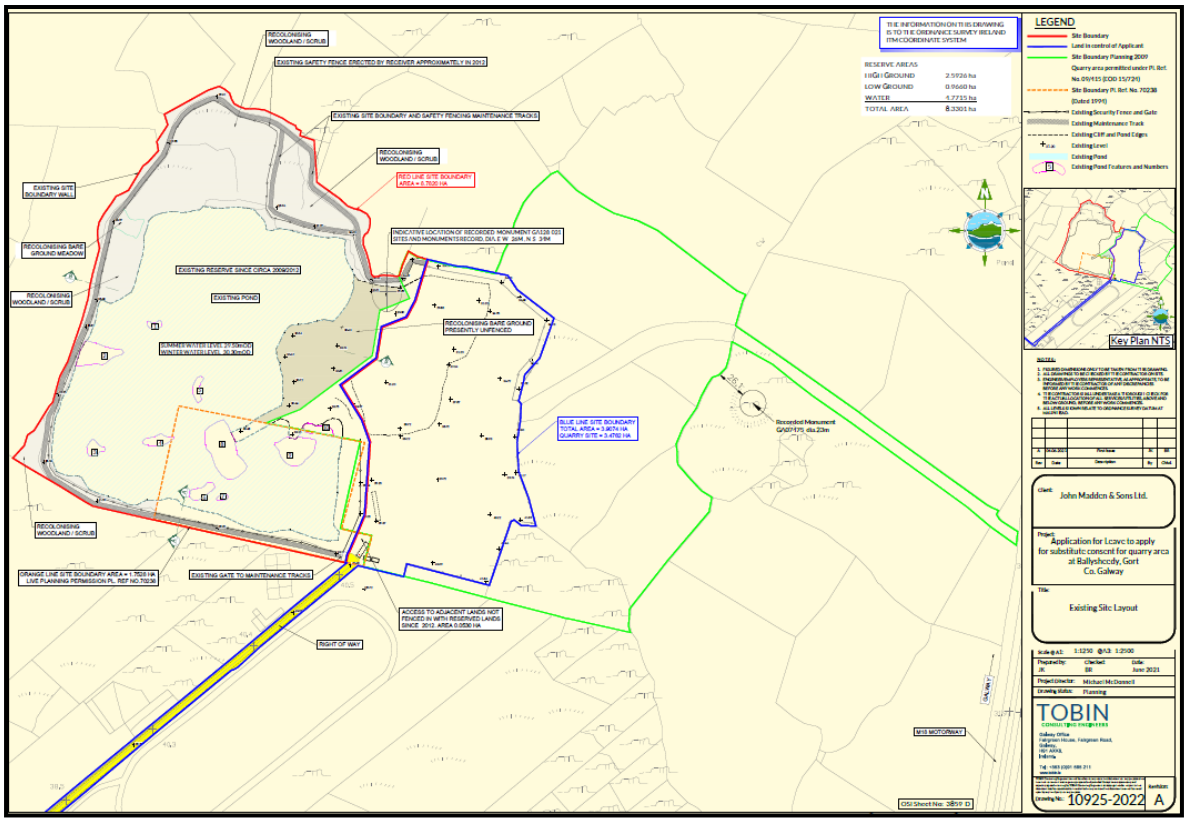


Figure 8 Existing site layout.

The majority of the site area is under water with the disused quarry flooded (Plate Nos. 3-6). There are vertical sides to the N, W and S with a stoned maintenance track and high security fence around the perimeter (Plate Nos. 3-6).

Plate No. 3 Looking SW across S half of the site.

Plate No. 4 Looking SSW across the site.

Plate No. 5 Looking S across the E half of the site.

Plate No. 6 Looking N across N half of site.

The area to the E (outlined in blue on Figures 2 and 8) ceased to be used as a quarry in 2020? Stockpiles of stone, a wheel-wash, temporary buildings and a weigh-bridge are found in the S half of this area, while recent quarrying has taken place in the N half of the area (Plate No. 7).

Plate No. 7 Looking S across the E side of the site.

The site is accessed via a tarred access road which runs SW for *c.* 550m from the SE corner of the site (Plate No. 8).

Plate No. 8 Looking SW along the access road from its NE end.

No features of archaeological significance were in evidence within or in the immediate vicinity of the Substitute Consent site during the field walking.

10.8 Remedial Impact Assessment

5. Cumulative and Indirect Impacts

One known recorded monument, a cashel (RMP No. GA128-021), was located within the Substitute Consent site, of which no surface trace survives. Martin Fitzpatrick's description from 2005 shows that only a portion of the monument survived at that time. That portion, of the monument, was removed subsequently.

The fourteen recorded monuments located within 1km of the site, the closest of which (RMP No. GA128-072, Cashel) is *c.* 250m away, have not been impacted upon by the historic quarrying there. The field walking of the Substitute Consent site revealed no further features of archaeological significance.

The substitute consent should not impact on the recorded monuments in the vicinity due to the distances involved (Table 10-1). Although only minor landscaping works are proposed with no reduction in levels involved, any works could have an adverse impact on any remains of the former cashel (RMP No. GA128-021) which may still exist.

10.9 Mitigation and Monitoring Measures

6. Cumulative and Indirect

Based on the evidence above (10.4.1) no works should take place in the vicinity of the location of the former cashel (RMP No. GA128-021), near the NE corner of the site.

10.10 References

- Fahey, J. (1893) *The History and Antiquities of the Diocese of Kilmacduagh*. Dublin.
- Fitzpatrick, M. (2005) *Archaeological Assessment of a Quarry Site at Ballysheedy, Gort, Co. Galway.* Unpublished Report.
- Ordnance Survey 1:10560 (6-inch) map of County Galway, Sheet No. 128, 1st Edition of 1838.
- Ordnance Survey 1:10560 (6-inch) map of County Galway, Sheet No. 128, Edition of 1921.
- Ordnance Survey 1:2500 (25-inch) map of County Galway, Late 19th/early 20th century edition.
- Record of Monuments and Places, County Galway, Dúchas, the Heritage Service, Department of Arts, Heritage, Gaeltacht and the Islands, 1997.
- www.archaeology.ie (web-site of the National Monuments Service).
- www.excavations.ie (summary accounts of all excavations in Ireland 1969-2020).
- www.heritage maps.ie (includes the finds database of the National Museum of Ireland).

11 Noise & Vibration

11.5 Introduction

This noise study was undertaken so as to characterise the historical noise climate and possible impact that activities at Ballysheedy Quarry have had on the local and regional environment.

The main purpose of the noise study undertaken was to:

- Collate and review the historical noise levels in the environs of the Substitute Consent application area at Ballysheedy Quarry; and
- Assess the noise levels generated by the development to date.

11.5.2 Acoustic Terminology

Sound is simply the pressure oscillations that reach our ears. These are characterised by their amplitude, measured in decibels (dB) and their frequency, measured in Hertz (Hz). Noise is unwanted or undesirable sound; it does not accumulate in the environment and is normally localised. The criteria for environmental noise control are of annoyance or nuisance rather than damage. In general, a noise level is liable to provoke a complaint

whenever levels exceed by a certain margin the pre-existing noise level or when it attains an absolute level.

Units of Measurement

The units of measurement of noise must reflect our overall response to it. The basic difficulty in measuring noise is the huge range in the sensitivity of the ear. Audible sound pressures range between the threshold of hearing (0.00002N/m²) and the threshold of feeling (20N/m²), which corresponds to a ratio of 1:1,000,000. In order to cover this wide range, a logarithmic unit, the decibel (dB) is used. The dB scale ranges from 0 to 120/140 dB. While the size of the pressure fluctuations is measured in dB, the rate of pressure fluctuations is measured in cycles per seconds or Hertz (Hz).

The human ear has a limited frequency range from about 20 Hz to 20 kHz, the upper end depending on the age of the person and previous exposure to high levels of noise. Within that range the ear can tolerate low frequencies more than middle to high frequencies and one must ensure that any measurement device elicits a numerical value, which matches the ear's response. This is achieved by introducing an electronic filter (called an 'A' weighted filter) into the measuring system. This weighting characteristic provides good correlation with the noise annoyance, and, since its maximum lies in the frequency region where the ear is most sensitive, it takes into account the hearing damage potential of the noise. For this reason, environmental noise levels are generally measured in terms of 'A' weighted decibels, dB(A). A noise level in excess of 85 dB(A) gives a significant risk of hearing damage. A noise level increase of 3 dB(A) is barely perceptible, while an increase in noise level of 10 dB(A) is perceived as a twofold increase in 'loudness'.

Where noise levels vary in time, statistical analysis of the variation can be carried out. The results are usually stated in the form LN (L for level), where N is the percentage of time a level is equalled or exceeded. Hence if L90 = 40 dB(A), the noise level exceeds 40 dB(A) for 90% of the time measured period (i.e., background noise level is 40 dB(A). Consequently, background noise level could be described as the lowest 10% of noise level over a given period.

In addition to the statistical units, the equivalent continuous level is also measured. The equivalent continuous level, Leq, is measured in dB(A) and is a notional steady level that has the same sound energy as the real fluctuating sound over the same measurement period. It is measured using an integrating sound level meter (SLM). Leq is often described as the total noise level for a specified period.

11.6 Existing Environment

The subject site was an active quarry at which rock is extracted by blasting and excavation, transferred to a mobile crushing unit by excavator or front end loader, and further processed by mobile screening units which grades the aggregates which are then

subsequently stockpiled on site and loaded onto trucks for export off site.

The quarrying resulted in a lowering of the existing ground level at the site which progressively offer increased attenuation of impacts associated with the development on local air quality due to the natural attenuation that the quarry faces provided.

11.6.2 Noise Monitoring

Noise monitoring has been conducted at Ballysheedy Quarry. Noise surveys have been carried out at 3 No. locations. Results are currently available from 2007, 2014 2020-2022, at locations identified as N1 to N3.

The measurements taken were representative of 60-minute[7] daytime LAeq readings and 15-minute night time LAeq readings and were carried out in accordance with ISO1996, Part 1 (Description and Measurement of Environmental Noise - Part 1:Basic Quantities and Procedures)' and are presented in Table 11.1 and 11.2 and Figure 11.1 below.

At each noise measurement point a Cirrus 831A Type 1 Sound Level Meter (SLM) was mounted on a tripod so that the microphone was maintained at 1.5 metres above ground level and at least 3.5 metres from any potential noise reflecting surfaces. The monitoring equipment was manned throughout the sampling intervals and comments were recorded in order to aid the interpretation of the results.

At each of the monitoring locations the following data was recorded:

L(A)eq: Equivalent Continuous A-weighted Sound Level. The continuous steady noise level, which would have the same total A-weighted acoustic energy as the real fluctuating noise measured over the same period of time.

L(A)10: The noise level that is equalled or exceeded for 10% of the measurement period; and

L(A)90: The noise level that is equalled or exceeded for 90% of the measurement period.

Table 10.1: Noise Monitoring Day-Time (60 mins)

	LAeq	LA90	LA10	LAeq	LAeq	LA90	LA10	LAeq	LA90	LA10
Location	07/11/07			10/04/14	18/05/20			30/05/22		
	60min			30min	60min			60min		

[7] The April 2014 day-time survey consisted of 30-minute levels at each location.

1	House 420m south of site at site access	53	43	54	52	54	55.7	43	49	42	53
2	House 430m west of site	46	35	44	47	53	55	43	52	44	44
3	Site boundary - 280m east of SC site				55	56	58	47	49.4	40	50.5
3a	House 650m to the east, pre M18	47	38	50							

Day Time Results

- 2008, LAeq levels at all the noise monitoring locations are below the day time limit of 55dB. At location 1 and 2, the main noise source was passing road traffic.
- 2014, LAeq levels at all the noise monitoring locations are below the day time limit of 55dB. At all locations, the main noise source was passing road traffic. The M18 added to the background noise levels
- 2020, LAeq levels at all the noise monitoring locations are below the day time limit of 55dB except for locations 3. At these locations, the main noise source was passing road traffic (M18).
- 2022, LAeq levels at all the noise monitoring locations are below the day time limit of 55dB.

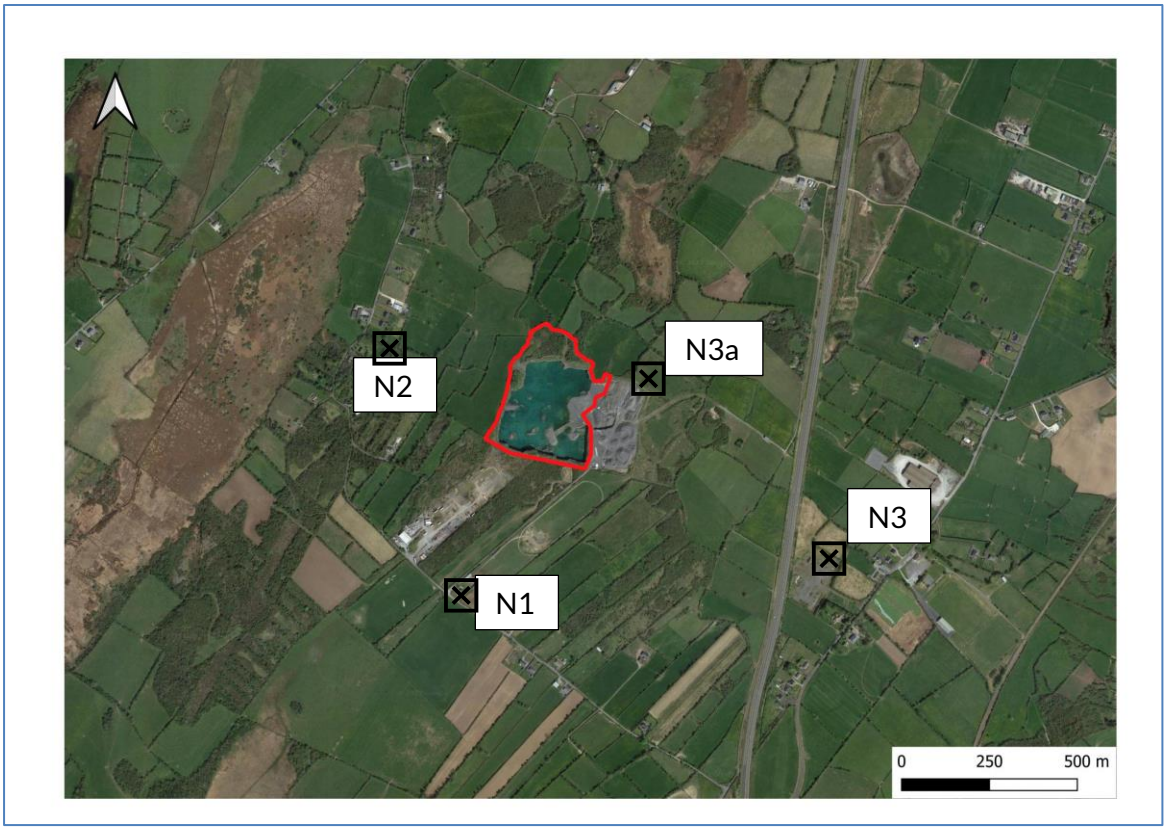


Figure 11-1 Noise Monitoring Locations

11.6.3 Blast Monitoring

Details of previous blasting is included in the 2009 EIS and included in Appendix 11.1. Rock was extracted from benches less than approximately 15m in height using medium diameter boreholes drilled from the top to the foot of the bench. These holes were drilled in rows and positioned at a distance from the face of the bench, in relation to the blast design. When drilling is completed, the Blasting Engineer then calculate the explosive charge.

This operation occurred approximately twice to four times a month during the 2009/2010 peak and advance notification of blasts given to local residents. The effects which may be observed as a result of the blasts will be vibration and noise associated with air overpressure impacts. Vibration levels and air overpressure levels were restricted to levels recommended above. No adverse nuisance effects was predicted for either human beings or for farm animals as a result of the quarry site activities. The quarry operator managed blasts in accordance with Best Practice in this field and the specialist services of blasting contractors employed at the site to ensure that any potential impacts associated with the activity were thus minimised.

Blasting occurred approximately 2-4 times a month on average during the peak extraction in 2010, and the blasts lasting for just 1-2 seconds; the noise from the blast is dissipated on a similar time-frame. As the noise level will be reduced with distance, typically by 6dB(A) for

every doubling in distance from the quarry site; consequently, the further away from the site, the lower the perceived noise level and reduced impacts are observed.

Experience shows that animals become used to the noise associated with blasting very quickly to the extent that they do not even react to the blast after a few events. The further away the animals are, the less likelihood of even the first blast causing a response from the animals.

Ground Vibration

Ground vibration is caused by the imperfect utilisation of the explosive energy released during blasting operations. The energy that is unused in the fragmentation of rock propagates as an elastic disturbance away from the shot area as seismic waves. These waves, which radiate in a complex manner, diminish in strength with distance from the source. The theory relative to this motion is based on an idealised (sinusoidal) vibratory motion. When these waves come into contact with a free face, physical motion results as the energy induces oscillation in the ground surface. Blasting vibration is a surface wave type, which incorporates components of both body and surface motion.

Ground vibration itself is inaudible, however air vibrations both audible and sub-audible usually accompany it. The resulting impacts of blasting vibration are often characterised as being impulsive and of short duration, usually less than 3 seconds. It is difficult for the average lay person to differentiate between the various types of vibrations (ground and air), humans commonly associate the level of vibration with the 'loudness' of a blast.

Ground Vibration Control

The level of ground vibration is related to the maximum charge weight per delay and numerous studies have shown that peak particle velocity is closely related to the maximum charge weight per delay.

In terms of predicting ground vibration each location is 'site specific'. However, ground vibration is recorded simultaneously for each blast at locations relevant to the location of the blast. A vibration limit of 12mm/second peak particle velocity (ppv) when measured in any one of three mutually orthogonal planes at any residence is used at Ballysheedy Quarry.

This vibration limit is recommended in DoEHLG, EPA and ICF Environmental Guidelines.
Existing levels of vibration were assessed by reviewing blast monitoring records were reviewed. The records of blasts carried out were considered as indicative of blasting practices carried out at the quarry. The results from nearest sensitive receptors are included in Appendix 11.1.

All Air Over Pressure results recorded at nearest sensitive receptors outside the landownership boundary were below the limit of 125 dB(L) and all values for the three orthogonal planes (Transverse, Vertical and Longitudinal) were well below the limit of

12mm/second peak particle velocity, values were below 8mm/second ppv.

Air Blast (Air-Overpressure)

An explosion causes a diverging shock-wave front that quickly reduces to the speed of sound, and an air blast is then propagated through the atmosphere as sound waves. Air blast or air overpressure is the term used to describe the low frequency; high energy air vibrations generated by blasting detonation. Air blasts are characterised by containing a larger proportion of its energy in the sub-audible spectrum, below 20 Hz. Because the waves associated with air blasts are essentially outside the audible spectrum (below 20 Hz), a separate unit of measure, pressure is reported.

The pressure is recorded using an air-blast transducer and the linear device must measure accurately in the structurally critical range, 2 to 20 Hz. Air blast (sound waves) can be reported in two distinct units of measurements, pressure (psi) or decibels (dB).

Sound waves in the form of the sub-audible sound waves (air overpressure/air blast waves), and noise (the audible waves) are sometimes linked inextricable. It is difficult sometimes for humans to differentiate between the characteristics of air blasts and noise.

In general, the sub-audible waves are of greatest concern. The sub-audible sound waves, if high enough can excite structures to produce audible rattle inside structures and may, in the extreme, break glass and crack wall coverings. There are no known cases of foundation cracks from air blasts at values anywhere near the glass breakage threshold of 140 dB[4]. The cracking of glass (the weakest component of a structure) is likely to be probabilistic in nature. In other words, not all windows will crack at above 140 dB.

Air blast/ Air overpressure waves are attenuated over distance in much the same way as sound waves. However, there are some differences due to the lower frequency of the sub-audible air blast waves. There is no known evidence of structural damage to structures from excessive air overpressure levels from quarry blasting.

As air overpressure is transmitted through the atmosphere, meteorological conditions such as wind speed and direction, temperature, cloud cover and humidity will all affect the intensity of the air overpressure experienced at a distance from the blast site. As outlined above, a predetermined date and time for each blast is arranged between Quarry Management, Gardai and the explosive supplier. It is difficult to arrange a date and time when favourable atmospheric conditions are present and as such blasting activities may often be carried out during times of prevailing meteorological conditions (i.e., low cloud, high wind, etc.). Therefore, air overpressure monitoring results are regularly influenced by the unpredictable and uncontrollable effects of prevalent weather conditions and as such

[4] Siskind, D. E., Crum, S. V., and Plis, N. M. (1993). '*Blast Vibrations and Other Potential Causes of Damage in Homes Near a Large Surface Coal Mine in Indiana'*, USBM, RI 9455

recommended thresholds values may occasionally be breached. However, to date, the air overpressure results recorded at the nearest sensitive receptors (not including the office locations which are within the quarry and not considered sensitive locations) to Ballysheedy Quarry have been below the 125dB limit, as shown in Appendix 10.1.

11.7 Possible Impacts from Previous Works

11.7.2 Noise

Impacts that may have occurred as a result of works within the Substitute Consent application area included in this assessment comprise of –

- Noise as a result of overburden stripping;
- Noise as a result of quarrying activity at the working face including blasting and stockpiling of materials; and
- Transport of materials to the processing area and off site.

The results of noise monitoring at Ballysheedy Quarry show that all results are within the 55dB (A) Daytime time limits.

11.7.3 Blasting and Vibration

Blasting was undertaken during the quarrying phase of the Substitute Consent application activities. The blasting process by its nature results in ground vibrations and air overpressure impacts. Ground vibration at sensitive receptors was measured as peak particle velocity (PPV) in mm/sec while the air overpressure was measured in dB (Lin).

The level of ground vibration associated with a blast is dependent on the quantity of explosive detonated at any instant in time. Normal practice in the design of blasting sequences is to arrange the charges so that they are detonated in sequence with millisecond delays between the individual explosions, and the complete blast lasting 1 to 2 seconds.

International Standards defining vibration limits for blasting activities are established to ensure that cosmetic or structural damage is not caused to buildings and that adverse impacts on residential amenity are not experienced as a result of blasting. The US Bureau of Mines has established that cosmetic damage to structures will not occur at peak particle velocities below 12.7mm/second while the threshold for structural damage is 50mm/sec (BS7385, Evaluation and measurement for vibration in buildings; Part 2: Guide to damage levels from Groundborne vibration). The limit of 12mm/second ppv is thus well within international guidelines for protection of amenity and prevention of damage to structures.

The acceptable air overpressure limits at sensitive receptors in Ireland is 125 dB(Lin)max peak with a 95% confidence limit - Air Overpressure (AOP) as defined in the EPA Guidance Note for Noise in respect of Scheduled Activities.

The blasts at Ballysheedy Quarry in the past occurred at an average rate of two to four times

per month during full production (2009-2010). Due to the distance to sensitive receptors, while the blasts would be clearly audible, there was no known difficulty in meeting the DoEHLG, EPA and ICF Environmental Guidelines requirements in respect of vibration and air overpressure limits at sensitive receptors in the vicinity of the development. This minimised the potential impact of the blast on residential properties in the vicinity of the site.

In addition, potential impacts from blasting within the Substitute Consent application area have been limited to date as a result of the extended stand-off distances between the limit of the Substitute Consent application area and the nearest receptors to the site, the presence of screening bunds around the perimeter of the quarry and the implementation of best practice blasting procedures at Ballysheedy Quarry.

Traffic movements associated with the quarry development are limited to their movement of trucks transporting aggregates from the site, and subsequently returning to the site. During the main phase of quarrying, the previous operator supplied aggregate products via a dedicated access to the M18 Gort to Crusheen Road Scheme. Vehicle movement associated with this specific project utilised internal haul roads between the quarry and the M18 construction site and therefore did not exit and access the existing quarry site entrance and therefore, there would be no additional HGV movements on the existing local county road network.

HGV movements travelling between the M18 construction site and the quarry extension increase ambient noise levels at receptors located in the vicinity of the proposed M18 road scheme and this section addresses the predicted noise impacts of this relatively short term project. Traffic movement on the Local road were minimal and typical less than 2 per hour.

The combined HGV movements of up to 105 per hour associated with the construction of the M18 Scheme. In order to demonstrate a worst case scenario at the closest receptors (N3) located to the east of the quarry and in proximity to the proposed M18 construction site, a figure of 105 truck movements per hour has been used in the calculations to offer a conservative impact assessment.

The predicted noise levels at the nearest noise sensitive receptor (N3) as a result of HGV movements on the site associated with the M18 Scheme were calculated using a standard international acoustical formula as described below.

Laeq, T= SEL + 101og1o(N)- 10log1o(T) + 20log10(1/r2) dB

where LAeq, T is the equivalent continuous sound level over time period (T) (1hr);
SEL is the A weighted Sound Exposure Level of the noise event (77dB);
N is the number of events over the time period T (105);

r1 is the distance at which SEL is assessed (5m)
r2 is the closest distance to the receptor from the haul road (50m)

The calculations assumed a worst case scenario of 105 truck movements per hour, a maximum Sound Exposure Level of 77 dB(A) for the trucks and the minimum distance between the construction road passing by the closest receptor (N3).

The maximum predicted LAeq, 1hr values as a result of the traffic movements associated with hauling aggregates from the Substitute Consent site to the east of the site to the proposed M18 construction site at the nearest noise sensitive receptors are predicted to be 41dB(A), LAeq, 1hr .

This low predicted value resulting from HGV movements from the quarry extension were calculated not to result in an unacceptable increase in the existing noise at the closest receptors to the M18 Scheme.

Noise levels associated with quarry activities and all associated site activities have been assessed and are presented below. The combined noise level experienced at the closest noise sensitive locations as a result of all site operations have been calculated.

The predicted noise levels in the following table are likely to overestimate the actual noise generated by site activities since the maximum noise levels associated with each item of plant were used, and simultaneous operation of all plant items were assumed.

Table 11-1 Values

	Site Activities	Traffic	Combined	Limits
Location	LAeq, 1hr	LAeq, 1hr	LAeq, 1hr	**LAeq, 1hr**
N1 530m East of site	51	44	52	**55**
N2 430m West of site	53	44	54	**55**
N3 580m East of site	**50**	**41**	**51**	**55**

The maximum predicted noise levels associated with the operation of the quarry without the influence of non-site related noise sources such as private vehicle, traffic noise, agricultural noise, domestic noise and meteorological noise as shown to be 53dB(A) LAeq at the nearest noise sensitive receptor which does not exceed the EPA, ICF and DOHLG recommended daytime noise limit value of 55dB(A) LAeq,1hr; therefore no adverse impacts on the noise environment in the vicinity of the site are predicted to arise.

11.8 Mitigation Measures

11.8.2 Noise

A comprehensive quantitative assessment of the potential noise on nearby residences as a result of the operation of the quarry has shown that no adverse noise nuisance impacts occur. It is reported that there have been no reported complaints relating to the operation of the quarry in 2009.

As the quarry operation progresses, noise generated by site activities were increasingly attenuated as a result of the screening offered by the quarry face. Screening of site activities in conjunction with distance between source and receptor results in significant noise attenuation and subsequently minimise impacts at local receptors.

The presence of between stand-off areas between the limit of quarry extraction and the quarry site boundaries and local residences further minimises the noise impact on local residences.

Working hours during the operational phase of the quarry are 07:00-18:00, Monday to Friday and between 07:00-14:00 on Saturdays. It was not proposed to extract or process material on Sundays or Public Holidays. Potential impacts on the noise climate in the vicinity of the site are therefore limited to the daytime period, which reduce the impacts on local residents.

Noise control measures were enforced at the site during the period 07:00 - 08:00 hours and included the limiting of drilling and crushing activities during this period. In addition, items of plant such as crushing, screening and drilling plant were not be started until after 08:00hrs.

The following mitigation measures were implemented:

- Regular maintenance of items of plant to ensure that they are operation efficiently;
- Turn off items of machinery when not in use;
- Reduce tum-over time for deliveries to and export of materials from site;
- Maintenance of trucks and site vehicles so that they are not excessively noisy.
- Internal haul roads designed so as to have as low a gradient as possible so as to minimise excessive revving of vehicle engines on-site.
- Conveyor belts and crushing / screening plant included acoustic: enclosures so as to minimise noise generated by the operation of these items of plant.

The operator endeavoured to ensure that noise levels as a result of activities at Ballysheedy Quarry have been kept to a minimum and have taken all reasonable steps as far as is practical to minimise nuisance from noise. Several mitigation measures have been put in place to limit noise levels on site and in the surrounding area.

- Screening of quarrying activities occurring below ground level together with sound attenuation due to distance between source and receptor and the presence of

screening banks where appropriate at site boundaries have resulted in significant noise attenuation;
- Regular maintenance of items of plant to ensure that they are operating efficiently;
- Stockpiles/vegetated berms have provided noise attenuation;
- Turn off items of machinery when not in use;
- The turn-over time for deliveries to and export of materials from site has been managed in order to keep this time to a minimum;
- Maintenance of trucks and site vehicles so that they are not excessively noisy;
- Items of plant and equipment used at the site have needed to comply with the standards outlined in 'European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations, 1996;
- Internal haul roads have been designed so as to have as low a gradient so as to minimise excessive revving of vehicle engines travelling on-site;

11.8.3 Blasting and Vibration

The following controls have been/are in place at Ballysheedy Quarry to ensure that ground vibration and air overpressure noise is minimised and kept within the limits specified:

- Laser profiling is used to establish an accurate geometry of the quarry face, thereby enabling the optimum burden and spacing to be applied for the blast;
- Ensure that the optimum blast ratio is maintained and ensure that the maximum amount of explosive on any one delay, the maximum instantaneous charge, is optimised so that the ground vibration levels are kept below those specified;
- The adequate confinement of all charges by means of accurate face survey and the subsequent judicious placement of explosives;
- No blasting is carried out at weekends or public holidays;
- All blasts are measured with respect to PPV and AOP to ensure compliance with the aforementioned limits;
- All monitoring equipment is calibrated regularly to ensure that peak particle velocity and air overpressure generated from each blast is accurately measured;
- All blasting at Ballysheedy Quarry is carried out by professionally trained blast engineers; and
- Drilling contractors complete a log for every borehole drilled.

11.9 Conclusion

An assessment of the potential historical noise and blasting impacts associated with Ballysheedy Quarry has been completed. As the results of the historical noise and blast monitoring events at the nearest sensitive receptors outside the landownership boundary reported no exceedance of the thresholds associated with operational activities at Ballysheedy Quarry, no further mitigation measures are proposed in relation to noise and blasting impact at this location and the mitigation measures implemented to date at this location have been successful at Ballysheedy Quarry.

It was concluded from the assessment that the intervening distance between the nearest residences and the proposed quarry blasting operations is adequate to allow them to be carried out successfully while at the same time keeping the environment emissions within guidance levels. It is concluded that if the recommendations outlined in the assessment with respect to blast design parameters are implemented, the levels of ground vibration produced were unlikely to cause even minimal cosmetic damage to the adjacent properties, and the risk of fly rock was negligible.

12 Landscape and Visual

12.5 Introduction

This report examines the landscape and visual impact of the existing quarry at Ballysheedy, Gort, County Galway. The assessment also includes a description of the surrounding landscape character and describes measures to reduce the visual impact of the development.

Ballysheedy Quarry is located in the south County Galway, approximately 2.8km southwest of Gort. This report assesses the landscape and visual effects of Substitute Consent Application Area within the existing quarry. The application area for the purposes of this report is approximately 8.78ha.

The site was visited by the author on 28th May 2022, and the weather conditions were generally bright with sunny spells. Visibility was good over short, medium and long distances. This chapter reports on the results of assessment of any significant effects on Landscape as a result of extraction activities at Ballysheedy. Although closely linked, landscape and visual impacts are assessed separately.

Landscape assessment relates to changes in the physical environment, brought about by a Substitute Consent site, which may alter its character. This requires a detailed analysis of the individual elements and characteristics of a landscape that go together to make up the overall character of that area. By understanding the aspects that contribute to this character it is possible to make judgements in relation to its quality (integrity) and to identify key sensitivities. This, in turn, provides a measure of how the landscape in question accommodated the type and scale of change associated with the project and to consider whether the project caused unacceptable adverse changes to its character.

Visual Impact Assessment relates to changes in the composition of views as a result of changes to the landscape, how these are perceived and the effects on visual amenity. Such impacts are population-based, rather than resource-based, as is the case of landscape impacts.

A description of the mitigation measures envisaged and/or or used to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and where appropriate, of any monitoring arrangements, are then discussed. Due to the retrospective nature of the assessment, this chapter will focus on existing or pre-existing measures used in order to mitigate the likely significant effects of historic extraction. Any residual effects are also assessed.

A full description of the project is provided in Chapter 4 (Project Description).

12.5.2 Basis for the Landscape Impact Assessment

This report uses the 'Guidelines on the Information to be contained in Environmental Impact

Statements' prepared in March 2002 on behalf of the Environmental Protection Agency (EPA) as the basis for the landscape and visual impact assessment.

12.5.3 Purpose and Structure

The guidelines describe the central purpose of an EIAR as "to identify potentially significant adverse impacts at the pre-consent stage and to propose measures to mitigate or ameliorate such impacts." This, however, is a remedial EIAR (rEIAR) and therefore it contains:

- a statement of the significant landscape and visual effects of the existing quarry,
- a description of the landscape and visual effects that arose as extraction was occurring,
- a description of the landscape and visual effects that can be reasonably expected to occur because of the existing areas subject to this application, and
- restoration proposals for mitigation measures to remedy any identified landscape and visual effects, including a timescale for implementation

12.5.4 Landscape in the Description of the Existing Environment

The guidelines describe the term 'Landscape' as covering a range of environmental topics including Landscape Character, Landscape Context, Views & Prospects, Historical Landscapes and Man-made Landscapes.

Landscape impact assessment is a combination of two separate but closely related aspects:

The first is **Landscape Impact** -.This aspect defines the impact on the landscape character as a result of physical changes to the fabric of the landscape resulting from assessed development.

The second is **Visual Impact** – This aspect is closely related to landscape impacts but concern changes in views. Visual assessment concerns people's perception and response to visual amenity. Impacts may result from new elements located in the landscape that cause visual intrusion (i.e., interference with or interruption of the view).

The Guidelines recommend systematic, accurate and comprehensive descriptions of the following to be included in any assessment:

- **Context** - Describes areas from which the existing site is visible (with particular attention given to views from roads, residences and designated tourism routes and viewpoints). Areas from where the site can be seen beyond the boundary are noted. Principal landscape features and areas of distinctive character are mapped.
- **Character** – Describes the landscape character differentiates between subjective assessments and objective description. A description of the character of the site that is perceived both from within the site and from the wider landscape is important, as is a description of the intensity and character of land use.
- **Significance** - Description of the quality, value or designation assigned to landscape aspects. It investigates the level of visual intrusion upon designated views, designated landscape and designated landscape amenity areas.

- **Sensitivities or Vulnerability** – These aspects describe changes that altered the character of the landscape significantly. The magnitude of change experienced in the existing landscape or view is described as follows:
  - **High** – The existing development has significantly altered the perceived character of the landscape.
  - **Medium** – The existing development has altered moderately the perceived character of the landscape.
  - **Low** - The existing development has not notably altered the perceived character of the landscape.

12.5.5 Description of Impacts on the Landscape

The report presents an assessment of the significant impacts of the part of the pit subject to this remedial EIAR.

- **Significance of Impacts**
  As described in this section, this means either the sensitivity to change of the environment that is affected (often reflects its importance), or the importance of the outcome of the impact (the consequences of the change). It is determined by a combination of objective and subjective concerns.
  Description of Impacts
  The report describes key aspects of impacts, namely *character, magnitude, duration and consequence.*

12.5.6 Mitigating Impacts on the Landscape

Relevant strategies for impact mitigation as described in the guidelines include:

- **Reduction** – Where the significance of adverse impacts is lessened. Seeks to limit the exposure of the receptor. Reduce the visual intrusiveness of the design and reduce the visibility of the project (e.g., by installing barriers between the location(s) of likely receptors and the source of the impact).
- **Remedy** – Remedy serves to improve adverse conditions by carrying out further works which seek to restore the environment e.g., increased planting of trees/shrubs to offset unavoidable loss of vegetation.

If it is not possible or practical to mitigate an impact (e.g., felling mature trees) this is described as a Residual Impact.

12.5.7 Definition of Visual Impacts

Terminology used in the assessment of impacts is defined as follows:

- **Visual Intrusion** – This occurs where a development impinges on an existing view without obscuring the view.
- **Visual Obstruction** – This occurs where a development obscures an existing view.

The quality of the impact may be described as:

- **Neutral** – A neutral impact neither enhances nor detracts from the landscape character or viewpoint.
- **Positive** – A positive impact improves or enhances the landscape character or viewpoint.
- **Negative** – A negative impact reduces or has an adverse effect on the existing landscape character or viewpoint.

The Duration of impacts is defined as follows:

- **Temporary** Impacts lasting one year or less
- **Short Term** Impacts lasting one to seven years
- **Medium Term** Impacts lasting seven to fifteen years
- **Long Term** Impacts lasting fifteen to sixty years
- **Permanent** Impacts lasting over sixty years

also

- **Occasional**
- **Intermittent**
- **Continuous**

The Significance of impacts may be described as follows:

- **None** – There is no change to an existing view. Arises where existing landform, vegetation or the built environment adequately screens the proposal.
- **Imperceptible** – An impact capable of measurement but without noticeable consequences.
- **Slight** – An impact, which causes noticeable changes in the character of the environment without affecting its sensitivities.
- **Moderate** – An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends.
- **Significant** – An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
- **Profound** – An impact which obliterates sensitive characteristics.

12.5.8 Summary

In summary, this report employs recognised guidelines – 'Guidelines on the Information to be contained in Environmental Impact Statements' prepared in March 2002 on behalf of the Environmental Protection Agency (EPA) – as the basis for remedial landscape and visual assessment and recognises the assessment process as being a combination of assessment of impacts on views from key receptors, and of responses towards the combined effects of the development on landscape character.

Landscape Context and Character are addressed; also, Significance in relation to planning designations and the inherent Vulnerability of the landscape in question. To ensure clarity, it is deemed important to use stated terminology to define impacts arising from the development.

The significance of impacts on the perceived environment depends partly on the number of people affected but also on value judgements about how much the changes matter.

12.6 THE RECEIVING ENVIRONMENT

12.6.2 Landscape Context

The entrance to Ballysheedy Quarry is located on the L8500, approximately 2.8km southwest of Gort. The town of Gort is surrounded by areas of special landscape protection ("Proposed Natural Heritage Areas", "Natura 2000 Sites" according to National Parks and Wildlife Service and "Heritage Landscape" as per Galway County Development Plan 2015-2021) and is located within 6km of the eastern part of the Burren National Park. Ballysheedy Quarry is situated closer to Gort, in an area with scattered houses.

12.6.3 Landscape Character

The study area for this remedial landscape and visual impact assessment consists of an area of 5km radius around the application site. Ballysheedy Quarry is located in a low drumlin farmland landscape. The quarry sits within an area of transitional woodland/scrub and is surrounded by grasslands with occasional scrub and transitional woodland.

The Substitute Consent (SC) Application Area spreads over elevated area between 26 and 43mOD. The surrounding landscape undulates gently with land elevations between 15 and 45mOD. There are low drumlins in the south, east and north of the study area and higher drumlins in the east, which is generally more elevated area. Approximately 8km west and east of the site, the land rises to 150mOD.

The site is located approximately 3km east of the county boundary with Clare. The wider region has a rich archaeological and landscape heritage with many sites of interest including Churches, Holy wells, Castles and the boundary of the Burren Notional Pork approx. 4.5km to the south west.

Views of the application site are generally restricted to close and medium distance views from areas within 2.5km located to the east, north and south of the site. Potential views from public roads located to the southwest, west and northeast are generally blocked by existing vegetation and topography due to the extraction area layout.

The previous EIS did not identify any areas that would experience long distance views of the site. In views from this distance the site was not recognisable.

According to the *Landscape Character Assessment of County Galway*, the site itself is situated within Southwest Galway - *Gort to Clarinbridge Lowland* Landscape Character Type (see Figure 12.2) Landscape Character Area (see Figure 12.3).

The main characteristics of Landscape Character Type according to Landscape Character Assessment of County Galway 2003 are listed below:

- Low drumlin fields are spread across the area
- Improved grassland is the dominant land use
- Settlement is more frequent than in high drumlin areas
- Areas of low drumlin farmland have a higher percentage of native woodland cover, hedgerows and hedgerow trees than high drumlin farmland

Some of main characteristics of Landscape Character Area according to *Landscape Character Assessment of County Galway* are listed below:

- Settlement of Gort is the focal point of the area where both historical and modern development is apparent.
- Gort situated within drumlin farmland, drumlins oriented northeast to southwest punctuated by small loughs.
- Area can be disorientating due to many small winding roads and limited views.

Galway County Development Plan 2011 – 2017 developed a new approach that proposes County Galway as a series of ***'Living Landscapes'*** – where different parts of the County are regarded as having different potential in terms of how communities can pursue their ambitions and aspirations. The County Development Plan therefore proposes that future planning policies for rural areas in County Galway be integrated by considering the County to comprise three types of landscapes, as follows:

i. ***Settled landscapes*** – areas where people live and work
ii. ***Working Landscapes*** – intensively settled and developed areas within Settled Landscapes or areas with a unique natural resource
iii. ***Heritage Landscapes*** – areas where natural and cultural heritage are given priority and where development is not precluded but happens more slowly and carefully.

The Ballysheedy Quarry is located in the area categorised as "Working Landscape", in particular – "The Western Corridor – Gort to limerick Working Landscape" within Galway County Development Plan 2011 – 2017, defined as:
"Working Landscapes are those areas within Settled Landscapes that contain pockets of concentrated development or a unique natural resource."

"Western Corridor Working Landscape - This part of the County contains the highest concentrations of population and jobs and the strongest transport links and connectivity. It includes the linked Gateway of Shannon and the County Town/Hub Town of Gort. It is the economic driver of the County and an important component of the West Region."

The landscape of the study area contains strong evidence of human impact such as roads, electricity poles, industry and buildings. There are a number of existing or former quarries in the study area. Due to the intensively settled character, along with the evidence of existing quarry and industrial activity, the landscape within the study area is considered to be of medium sensitivity to the described development.

12.6.4 Site Description and Access

The Substitute Consent Application Area is of irregular shape located north of the L8500. The main part of the Substitute Consent Application Area is a quarried area with an exposed quarry face and stockpiles of aggregates. While most of the existing site boundaries (western, southern and western) consist of hedgerows and trees the northern boundary providing screening of the site in views from immediate locations along local roads and beyond. The Ballysheedy Quarry is accessed directly from a local road and the entrance, located to the south of the quarry.

12.6.5 Site Visibility – General

Visibility of the site is primarily determined by local topography and intervening existing vegetation.

Figure 12.1 shows the location of the Substitute Consent Application Area and indicates the areas along public roads in the vicinity of the site from where the existing excavated area would be openly or partly visible. Due to local vegetation and topography, the site may not be visible from all residences and locations along these parts of the roads.

Given the sites topography, following desk study assessment, it was expected that there may be views of the application site from positions to the east. The openness and significance of these potential views cannot be confirmed in a desk study, detailed site investigation is required to establish actual Zone of Visual Influence (ZVI).

A ZVI was calculated and generated using topographical data , this is generally not an accurate representation of the actual visual catchment on the ground, it is therefore considered as a theoretical ZVI. It is essential that a topographically generated ZVI is refined through site survey and analysis to become a more realistic representation.

The desk study revealed that the site is located in an area which has a low population concentration. Population is concentrated in the town of Gort to the north east and elsewhere as sporadic ribbon settlements primarily located along the surrounding minor roads.

Designations, protected areas and viewpoints:

The site does not lie within an area of mineral constraint or Area of Outstanding Natural Beauty (AONB). Galway County Council Development Plan contained a landscape character assessment survey and divided the county into 'Landscape Character Areas' (LCA); details and extracts are included below; the area is described as 'Southeast Galway (Clarinbridge to Gort). There are no protected viewpoints or scenic routes within the study area .

Field Study

Site visits were undertaken in August 2008 and May 2022 to confirm the location and significance of visual receptors; and to establish the general landscape character and its

importance within the region.

During these field studies the eye-level visual envelope of the Substitute Consent site was refined [Figure 12.1) along with an assessment of the predicted impacts on both landscape character and visual amenity.

The key visual receptors within the ZVI where identified as:

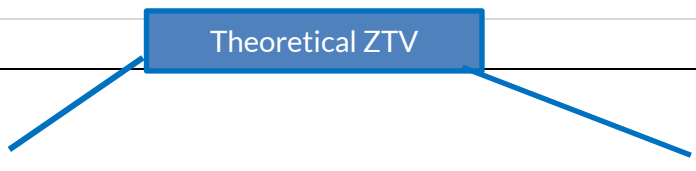
- Individual Residential Properties;
- M18, R460, Third Class Roads;
- Junctions and Crossroads;
- Sites of Cultural/Historic/Visitor significance

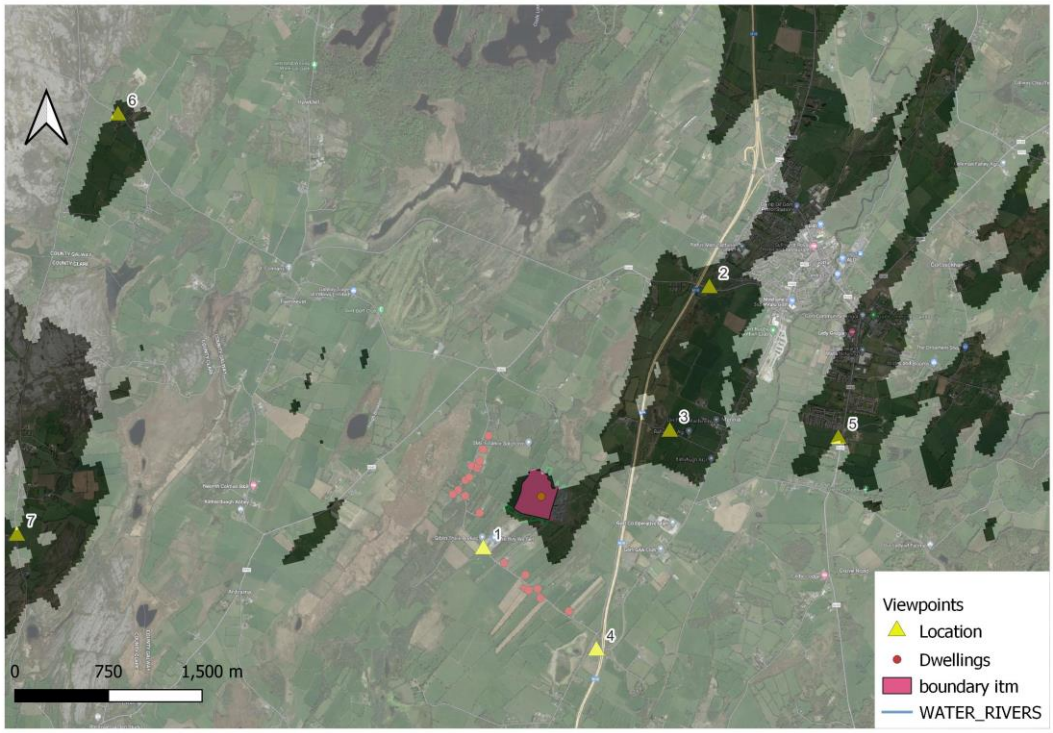
An intervisibility study was carried out from within the application site and assists with the preparation of a more realistic representation of the Zone of Visual Influence (ZVI);

A number of key viewpoints were selected from within the ZVI to be representative of the main visual receptors in the study area; Figure 12.1 show the key visual receptors selected. Assessment below provides a description and evaluation of landscape and visual impacts from each viewpoint.

Due to the intervening vegetation, undulating topography within the study area and the topography of the site itself, the exposed quarry face can only be seen from some locations within 2.5km to the north of the site. Visibility at distances beyond 2.5km would depend highly on weather conditions. Intervening vegetation and topography screen views from any other direction.

Figure 12-1 Theoretical ZTV for quarry





The main groups which experience visual impact arising from the activity in Substitute Consent Application Area are residents of private properties located within the vicinity of the site, and road users. Open or partial visibility of the application site from accessible public roads is indicated on Figure 12.1 – Location 2.

Roads

Figure 12.1 indicates open and glimpsed views of the Substitute Consent Application Area from public roads within the study area.

Viewpoint 1 – south of site	Eastings Northings
{Within site)	E 143015
Grid Reference Image Direction	N 200144
M 43015 00144	
	North
Viewpoint2	
Grid Reference	E 144139
M 44139 01967	N 201967
Image Direction	South west
Viewpoint3	

Grid Reference	E 144070
M 44070 00657	N 200657
Image Direction	South west
Vlewpoint4	
Grid Reference	E 143181
	N 198856
	R 43181 98856
Image Direction	North
Viewpoint 5	
Grid Reference Image Direction	E 145295
M 45295 00763	N 200763
Image Direction	West
Viewpoint 6	
Grid Reference	E 144808
M 44808 02951	**N** 202951
Image Direction	South west
Viewpoint 7	
Grid Reference	E 14400
M 44808 02951	**N** 202800
Image Direction	East

Most of the potential views are concentrated in the area in close vicinity to the site, within a 2.5km radius. These views are mostly experienced from a section of the R460, to the north of the site and from other local roads located within 2.5km to the north, east and south of the site. Topography and the screening effects of the existing vegetation around the perimeter of the site (excluding the northern boundary along the L8500) have blocked the views from southwest, west and northwest.

12.6.6 Vulnerability / Sensitivity of Existing Views

Existing views are on the whole important, representing a stable and relatively unchanging local, predominantly rural/agricultural environment albeit with existing quarry activity and infrastructure.

The views described in 12.2.1 above could in general be deemed to be of **moderate sensitivity** to the workings within an existing quarry.

The nature of impact on views arising from the activity carried out in the Substitute Consent Application Area depends on the existing screening and ongoing revegetation.

12.6.7 Significance / Planning Context

The word significance as used in this report relates to the level of intrusion of a development upon designated views, designated landscapes and designated amenity areas.

The Galway County Development Plan is the statutory plan detailing the development objectives of the Authority. The Galway Landscape Character Assessment, which constitutes part of this Plan, was also considered in this report. The following is a list of existing designations within the study area and wider landscape, which are of importance:

Special Areas of Conservation

East Burren Complex SAC – Site code 001926

The *East Burren Complex SAC,* at its closest point, is located approximately 0.6km west of the most western Substitute Consent Application Area boundary. There are no known views of the development mainly due to intervening vegetation.

Newtown Garryland SAC – Site code 001926

The *Newtown Garryland SAC*, at its closest point, is located approximately 1.6km to the north of the most northern Substitute Consent Application Area boundary. There are no potential partial views of the development resulting in neutral visual effects.

Termon Lough SAC – Site code 001321

The *Termon Lough SAC*, at its closest point, is located approximately 1km to the south of the most southern area within Substitute Consent Application Area. There are no potential partial views of the development resulting in neutral visual effects.

Special Protection Areas (SPA)

Coole Garryland Lough SPA

The *Coole Garryland SAC*, at its closest point, is located approximately 1.6km to the north of the most northern Substitute Consent Application Area boundary. There are no potential partial views of the development resulting in neutral visual effects.

Galway County Development Plan 2015-2021- Landscape Designations

The Ballysheedy Quarry is located in an area described as *Central Galway Complex Landscape*. The boundary of this landscape type has been defined by the following criterion:

Galway County Council has prepared a Landscape Character Assessment (LCA) for the county. Landscape Character Assessment is a process that describes, maps and classifies landscapes objectively. Defining landscape character enables an understanding to be formed of the inherent value and importance of individual landscape elements and the processes that may alter landscape character into the future. The LCA will assist in the identification of the most appropriate locations for development. This LCA has subdivided the county Galway into three landscape regions and the coast. These are the foundations of the county's landscape character, that are determined by the underlying geology and glacial drifts that have determined topography, soil, vegetation and patterns of human settlement from prehistory to today.

These three regions and the coast are as follows:

- The West Galway Region is a zone that is mostly underlain by older harder geology that gives rise to large-scale rugged, complex landscapes of mountains, lakes, bogs, islands and coastal inlets in the western parts of the county;
- The Eastern Plains Region is underlain by younger, softer rocks. This gets most of its character from the covering blanket of glacial soils that give rise to extensive, level plains of grasslands, with many areas of bog in the north;
- The South Galway Region where the Slieve Aughty Mountain's older, harder rock meet the younger, yielding geology of the Burren in the west and the Shannon basin in the east. The result is a collection of small landscapes which vary considerably as one travels from west to east;
- The Coast is a separate region that derives differences in its character areas principally from its proximity and interactions with terrestrial areas.

The development plan identifies important views and prospects that are characterised by great natural beauty. These are valued and protected for their amenity, tourism, economic and cultural roles.

Chapter 13 deals with 'Development Management Standards and Guidelines'. Development management (DM) standard 37: extractive development part six deals with mitigation i.e., methods to reduce environmental impact. Impacts upon Visual amenity is included amongst these. Part 8 deals requires details of the phased rehabilitation and after-care of the site

including finished landforms and landscape treatments. Part 11 requires details of existing trees and other screening to be retained or removed alongside any new landscaping and screening proposed.

DM standard 41: field patterns, stonewalls, trees and hedgerows. Existing field patterns, stone walls, trees and hedgerows should be retained and incorporated into development wherever possible. Planting of native trees and hedgerows along all boundaries is encouraged.

Walking routes
The current Galway County Development Plan does not identify specific existing walking routes within the study area. However, relevant existing walking routes have been laid out in OSi Discovery Series (4th Edition) as well as on the following websites:

- Irish trails; http://www.irishtrails.ie/
- Discover Ireland, http://www.discoverireland.ie

The most relevant and clearly mapped routes within the study area have been included in Figure 11.1 and are listed below:

The Burren Way

The Burren Way is a 123km walking route in the Burren area. Terrain consists mainly of quiet tarmac roads, old green roads, ancient cattle droving roads, paths and forestry tracks, but there are also some stretches on busy roads.

At its nearest it is located approximately 5km southwest of the western site boundary. There are no known visual effects on this walking route.

12.7 POSSIBLE IMPACTS FROM PREVIOUS WORKS AND MITIGATION MEASURES

12.7.2 The Application

This report assesses the impact of work carried out to date within the Substitute Consent

Application Area at Ballysheedy Quarry. This comprises of approximately 8.78ha within the 12.9 ha ownership.

12.7.3 Scope of the Impact

The quarrying activity has had an impact on the visual and landscape character of the surrounding area. These impacts have arisen from factors including the following:

- Visibility of the extraction area;
- Visibility of operating plant;
- Removal of vegetation;
- Final state of the quarry.

The degree of visual impact will vary depending on topography, the extent and quality rewilding /regeneration for the site.

12.7.4 Impact on Landscape Character

The impact on the landscape character is dependent on both the vulnerability and sensitivity of the affected landscape, and by its ability to accommodate change.

The existing quarry is fully or partially concealed in views from northwest, west and southwest and the impact on the landscape character is significant but quite localised.

Extent of the theoretical visibility is indicated on Figure 12.1. The Substitute Consent Application Area will remain concealed from many viewpoints due to the nature of the topography and existing vegetation in the area. This area, however, has had localised moderate impact on landscape character. The regeneration of the quarry (including habitat regeneration and scrub growth on the quarry edges will ameliorate this impact in the medium term.

Sensitivity is the extent to which the existing landscape (or view) is capable of being changed in such a way as would not alter the perceived character. It is considered that the landscape surrounding the application site is of moderate sensitivity to workings within an existing quarry. There is a level of change which when reached can destroy the landscape character of an area. In this case, the visibility of the site, plant, dust and traffic has directly related to the impact on landscape character. Screening measures and sensitive grading are therefore important in relation to reducing the impact on the landscape character. The

The greatest impact on landscape character is the exposed face of the excavation area and stockpiles of aggregates visible from close and medium distances to the north, northeast and east of the site. At present this impact is slightly mitigated by landform and rows of trees and hedgerows existing in the fields between the quarry and the observer. The site is insufficiently screened at its most vulnerable boundary (northern boundary), resulting in high landscape and significant visual effects.

Further impact reduction will be achieved with regeneration of grass, scrub and native woodland growth within the site.

Overall, it is felt that the current impact on landscape character arising from the development is generally long-term and slight in nature. The scrub regeneration reduces the permanent negative impact on landscape character.

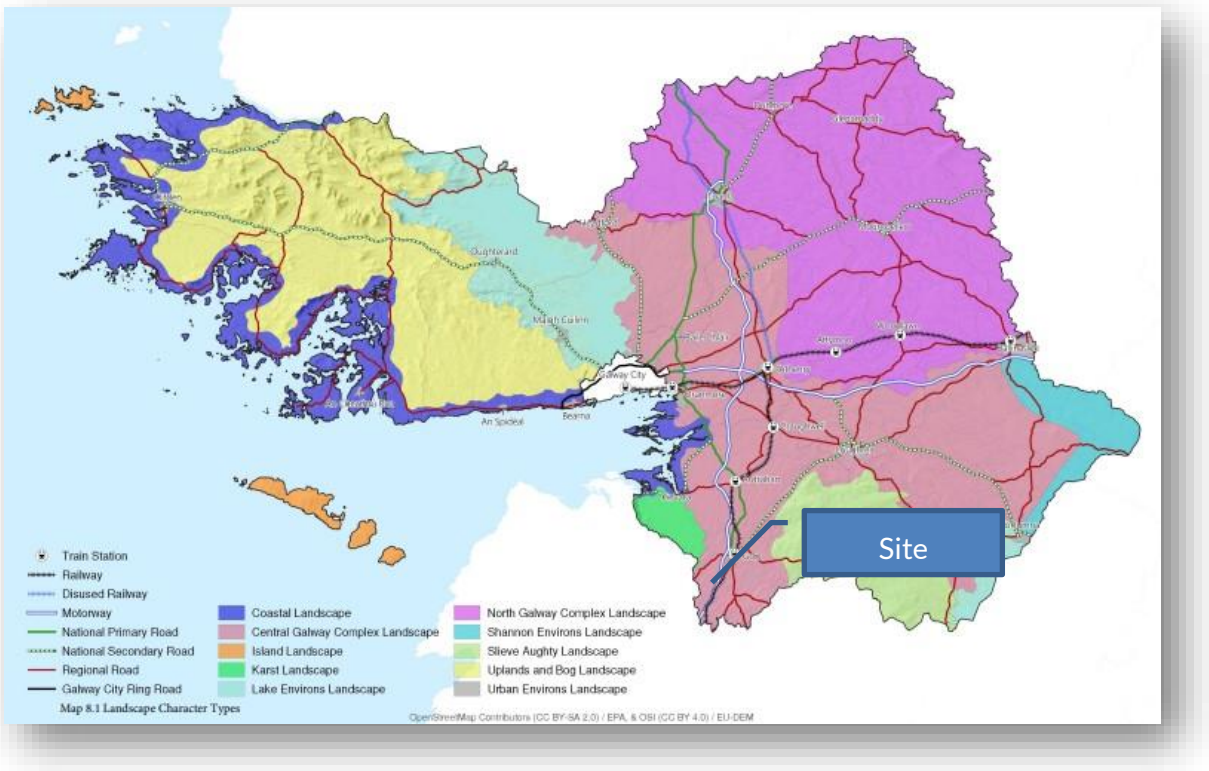


Figure 12-2 Landscape Character Areas

12.7.5 Impact of the Development on Historical / Man-Made Landscape

This section outlines briefly how history has shaped the receiving environment and how it influences the wider landscape surrounding the development.

Ballysheedy Quarry is located within a generally rural landscape but with strong human influence represented by scattered residences, industry and farms. The landscape becomes more rural the further one travels from Gort and settlement is dispersed but it concentrates along the busy main roads that radiate from the county town.

A diversity of soil types is found within this area, reflecting the mixed glacial deposits. Although Gort amounts for a significant amount of land cover with urban settlement, the surrounding areas remain grassland. Transitional woodland and scrub are also evident in small areas, though this is likely to be recent planting of commercial forestry.

The L8500 is the main vehicular route through the area and most development is located along this or along the roads and lanes which lead off from the main road.

The existing Ballysheedy Quarry represents a strong human influence on a landscape that has experienced much human impact including road and house building, quarrying, electricity infrastructure etc. The development has significant impacts on a number of views from locations to the immediate north (L8500, adjacent to northern boundary), east and northeast of the excavated area.

12.7.6 Visual Impacts and Mitigation Measures

(Refer to Figure 12.1 and to the definitions of visual impacts as described in section 12.1.6 of this report.)

The greatest existing visual impact occurs in views from section of M18 flyover, 2km to the north. Open views and glimpsed views are experienced from an approximately 100m long section of this road. The impact is considered slight.

Intervening topography and vegetation generally prevent any views of the existing quarry from the south, west, northwest, southeast and southwest therefore the visual effects of the development are deemed to be localised.

The visual character of the site lands has been altered as a result of the excavation works.

Impacts on views from roads

There are no views of the Substitute Consent Application Area, along the section of the L8500 immediately adjacent to the entrance. Glimpsed views occur 2km to the north of the quarry along the R460 flyover of the M18. These partial and intermittent views continue for approximately 0.1km on the R460.

These are classified as close to middle distance views, experienced from the R460. At further distances on the R460 and L8500, views of the exposed quarry face and site itself are not possible due to topography and intervening vegetation.

Visual impact (without mitigation measures)

Quality of impact: negative
Duration of impact: long-term
Significance of impact: slight for views experienced from the R460 (2km north)

Predicted visual impact (mitigation measures in place)

Quality of impact: neutral
Duration of impact: long-term
Significance of impact: slight

There are intermittent views of the Substitute Consent Application area and the exposed quarry face from short sections of local roads 2km from the site.

Visual impact (without mitigation measures)
Quality of impact: negative
Duration of impact: long-term
Significance of impact: moderate to slight

Predicted visual impact
Quality of impact: neutral
Duration of impact: long-term
Significance of impact: slight

There are no views of the Substitute Consent Application Area from a local and regional roads located approximately 1.5km west of the site.

Predicted visual impact
Quality of impact: neutral
Duration of impact: long-term
Significance of impact: neutral

Impact of the Development on Historical/Man-Made Landscape

Section 12.3 outlines briefly how history has shaped the receiving environment and how it influences the wider landscape surrounding the development.

Impacts on the historical and man-made landscape arising as part of the previous works within Ballysheedy Quarry include the change of land use from natural grassland to extractive industry, and the resulting change in landscape character. The impact on the man-made landscape is moderate to significant, negative and long term.

Summary of Impacts

In conclusion, the greatest levels of visual impact arising from the Substitute Consent Application area, are confined to visual effects experienced on a restricted number of views from locations 2.m to the north of the site. The impact on these views is considered to be long-term and slight if no mitigation measures were put into place. This impact reduces considerably with natural regeneration and existing screening on site.

Mitigation Measures

The following section describes the mitigation measures and landscape objectives considered as part of the quarry development.

Mitigation measures reduced the visual effects. These measures include:

- Retention of existing vegetation;
- Introduction of screening including mixed woodland planting to northern boundary;
- Regeneration of mixed woodland and areas of scrub; and
- Establishment of wildlife amenity and biodiversity lake.

Residual Impacts (After Mitigation)

The Ballysheedy Quarry is screened from most directions. Removal of all unvegetated aggregate stockpiles will minimise residual landscape and visual impact.

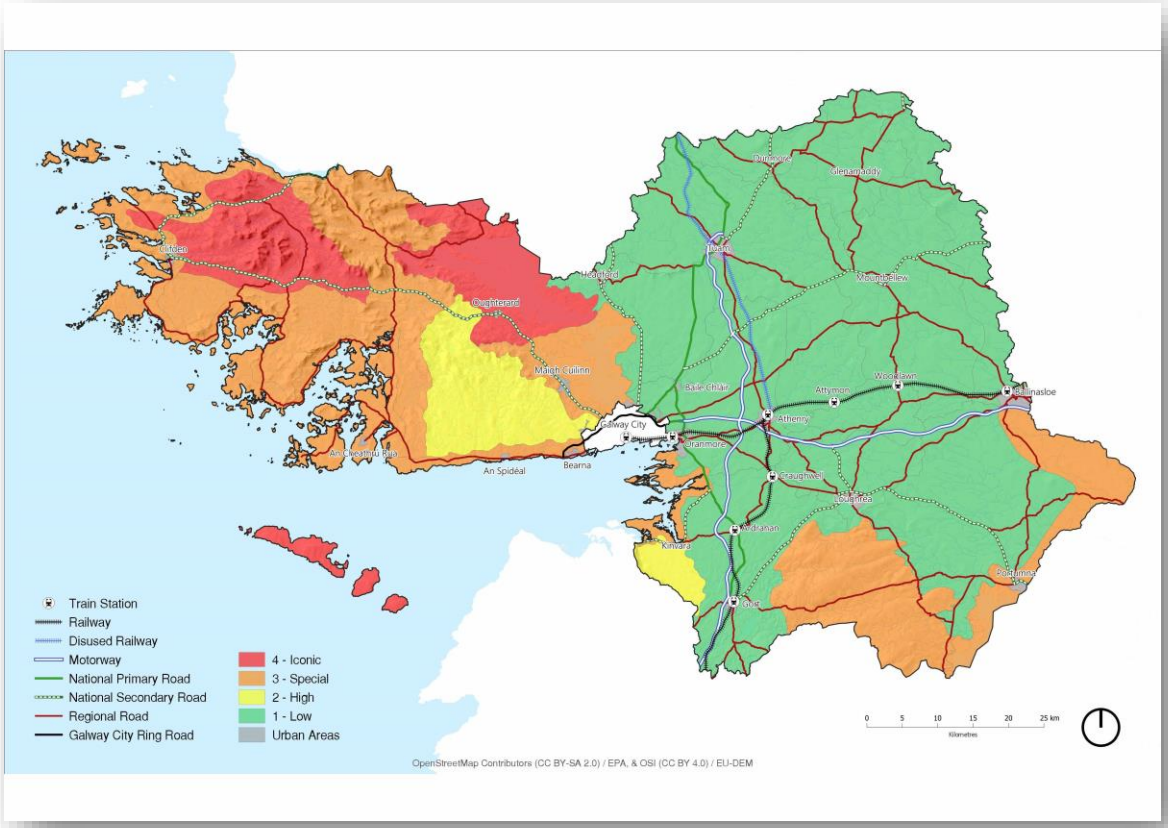


Figure 12-3 Landscape Designations: Sensitivity ratings

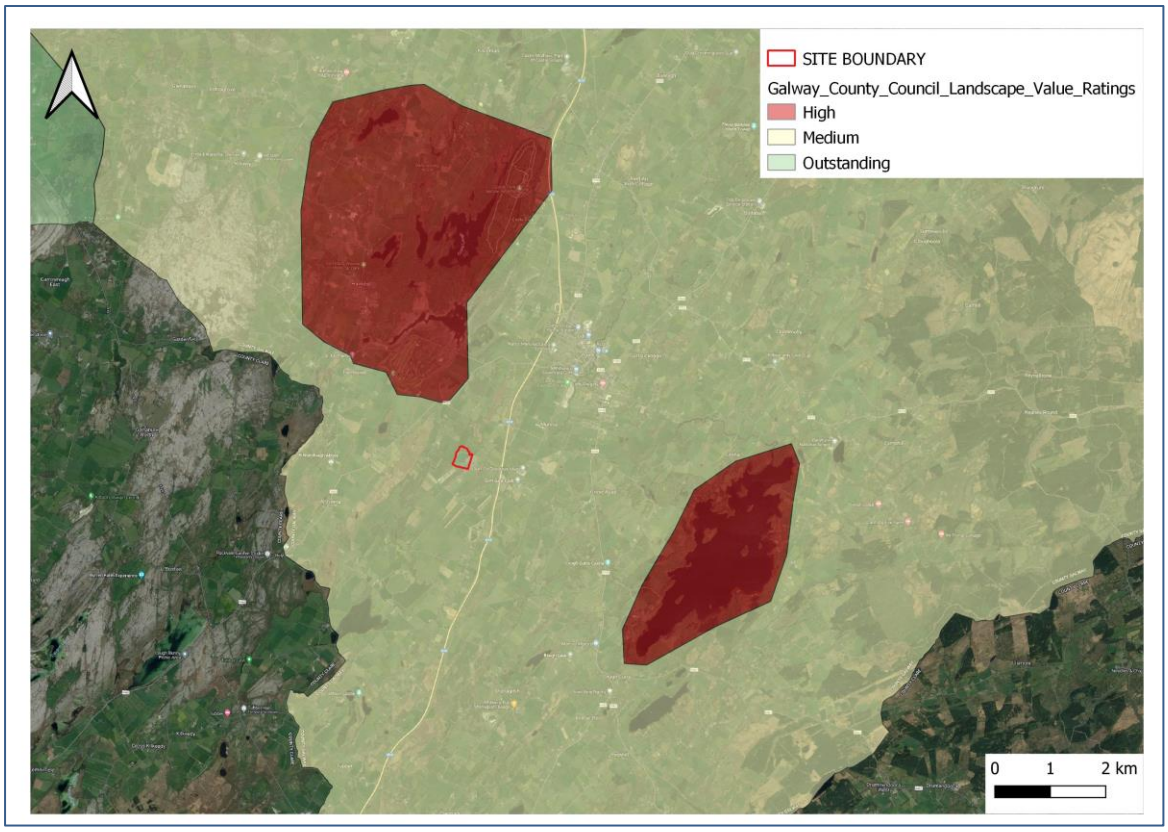


Figure 12-4 Landscape Value Ratings

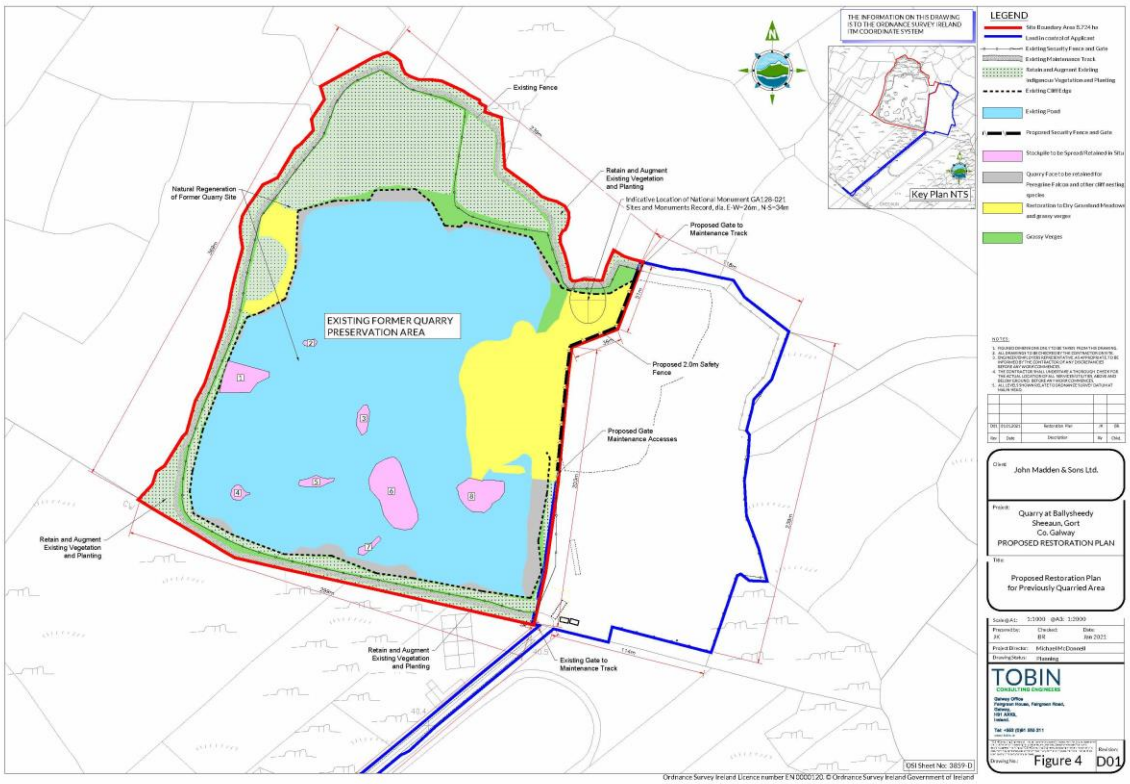


Figure 12-5 Rewilding/Regeneration Plan

13 TRAFFIC

13.5 Introduction

This chapter presents a traffic assessment of the existing Ballysheedy Quarry development and should be read in conjunction with the site layout plans and project description section (Chapters 1 and 2) of this Remedial Environmental Impact Assessment Report (EIAR). The approach to this assessment is conservative as it assesses the traffic generated as a result of activities within the overall landholding of Ballysheedy Quarry and has not been restricted to traffic associated with the substitute consent application area only.

In preparing this report, TOBIN has made reference to the following:

- The National Roads Authority 'Traffic and Transport Assessment Guidelines 2007';
- The National Roads Authority Design Manual for Roads and Bridges (NRA DMRB);
- An Foras Forbartha - RT180 Geometric Design Guidelines; and
- Galway County Development Plan 2015-2021.
- Draft Galway County development Plan 2022-2028

13.6 Existing Environment

Ballysheedy Quarry is located in the rural hinterland of Gort, approximately 2.8km northwest of the nearest suburb in the townlands of Ballysheedy.

The existing access to the quarry is from a local road to the south of the site. The speed limit along this regional road is 80km/hr. The local road has an average carriageway width that varies from between 4.0 and 5.2m, with no hard shoulder, no verge on the southern side and a variable verge on the northern side.

Access into the quarry is via a large, recessed access that can accommodate heavy vehicles leaving and entering the quarry simultaneously. Visibility at the entrance is in excess of the recommended 80m visibility from a setback of 2.4m set out in the NRA DMRB for roads within an 80km/hr speed zone. Figure 12.1 shows the sightlines at the entrance.

13.7 Possible Impacts from Previous Works

An estimate of the volume of HGV traffic generated by the quarry has been generated using the volumes of materials that left the Ballysheedy Quarry. This information is included in Table 13.1 below:

Table 13-1- Average HGV Departures from Ballysheedy Quarry 1994-2008

Average HGV Departures from Ballysheedy Quarry				
Materials Departing	Volume Departing (tonnes per annum)	Departures per year[1]	Departures per week[2]	Departures per hour[3]
Raw Materials	40,000	2,062	41.2	0.625
Total	560,000	24,037		

Notes

(1) Assumed that 70% of trucks carrying raw materials had a payload of 20 tonnes and remaining 30% had 18 tonne payload.

(2) 50 working weeks assumed

(3) 66 hour working week assumed based on operations occurring between 07:00 and 20:00 on weekdays and between 08:00 and 14:00 on Saturdays

Table 13-2- Average HGV Departures from Ballysheedy Quarry 2009-2010 – access road

Average HGV Departures from Ballysheedy Quarry				
Materials Departing	Volume Departing (tonnes per annum)	Departures per year[1]	Departures per week[2]	Departures per hour[3]
Raw Materials	1 million	51,200	4,200	105
Total	2.25 million	24,037		

Notes

(1) Assumed that 70% of trucks carrying raw materials had a payload of 20 tonnes and remaining 30% had 18 tonne payload.

(2) 50 working weeks assumed

(3) Based on presented figures in 2009 EIS

Table 13-3- Average HGV Departures from Ballysheedy Quarry 2009-2010 – local road access

Average HGV Departures from Ballysheedy Quarry				
Materials Departing	Volume Departing (tonnes per annum)	Departures per year[1]	Departures per week[2]	Departures per hour[3]
Raw Materials	40,000	2,062	41.2	0.625
Total	80,000	4,124		

Notes

(1) Assumed that 70% of trucks carrying raw materials had a payload of 20 tonnes and remaining 30% had 18 tonne payload.

(2) 50 working weeks assumed
(3) 66 hour working week assumed based on operations occurring between 08:00 and 20:00 on weekdays and between 08:00 and 14:00 on Saturdays

Table 13-4- Average HGV Departures from Ballysheedy Quarry 2014-2020 – local road access

Average HGV Departures from Ballysheedy Quarry				
Materials Departing	Volume Departing (tonnes per annum)	Departures per year[1]	Departures per week[2]	Departures per hour[3]
Raw Materials	20,000	2,062	41.2	0.625
Total	40,000	4,124		

Notes
(1) Assumed that 70% of trucks carrying raw materials had a payload of 20 tonnes and remaining 30% had 18 tonne payload.
(2) 50 working weeks assumed
(3) 66 hour working week assumed based on operations occurring between 08:00 and 20:00 on weekdays and between 08:00 and 14:00 on Saturdays
Limited extraction in 2019 to 2021

As can be seen from the table above, the average number of HGV departures per hour was <1. Departures of a HGV from site would have resulted in a corresponding arrival of an empty vehicle. The total number of hourly HGV movements at the quarry was, therefore, an average of 2 movements.

In addition to the Heavy Vehicles there was some generation of light vehicles at the quarry due to staff and visitors. It is estimated that there would have been on average 4 light vehicles arriving on site per day with a corresponding 4 departures (i.e., 8 movements).

The majority of the material leaving the quarry would not have used local road network and instead utilised the direct access to the M18. It has been estimated that this would consist of 75% of the traffic generated by the quarry over its lifespan. The quarry is located approximately 2.5km by road from the R458 which is a national road that links Gort to the west. Due to the proximity of this and the M18 national route, a proportion of quarry traffic would have travelled to and from the quarry using the R458 to access the L8500. The remaining 25% would exit the quarry and travel east to the L4516 and the regional roads.

The capacity of the L8500 has been assessed using the An Foras Forbartha - RT180 Geometric Design Guidelines. For the purposes of this assessment, an average width of 4m has been assumed, obstructions on both sides and lateral clearance of 0.0m and visibility of

0% greater than 460m. This indicates that the two way capacity of the L8500 in the vicinity of the quarry entrance is approximately 475 passenger car units (pcu) per hour at a Level of service C and 858 pcu per hour at a Level of service D. Passenger car units is a unit of measurement used for road capacity calculations that involves converting vehicles into an equivalent number of cars. This takes into account the fact that a large vehicle would have a bigger impact on capacity than a car.

As described above, the Ballysheedy Quarry was on average generating 2 truck movements per hour corresponding to 4.5pcu per hour. For the purposes of this assessment, it is assumed that all light vehicles arrive during one hour in the morning and depart during one hour in the evening. This results in a flow of 8pcu during the peak hourly flow during an average year. The quarry was therefore using approximately 1% of the capacity of the L8500 during an average year compared to the capacity of the road at Level of Service C.

A threshold of development traffic exceeding 10% of the adjoining roads traffic flow is provided by the National Roads Authority Traffic and Transport Assessment Guidelines as an indication of when a junction capacity assessment is required. As the development generated approximately 1% of the capacity of the road, it was therefore considered unnecessary to carry out a junction capacity assessment of the entrance to the quarry. Given the rural nature of the quarry's location and the low volumes of traffic generated, it is likely that quarry was causing a minor to negligible impact on traffic flows on the L8500.

Traffic generated by the quarry have had some adverse impact on the pavements on the surrounding network, particularly on that of the local road to the south. It is possible that weak sections of the existing pavement are present which traffic emanating from Ballysheedy Quarry would have contributed to. It can be reasonably concluded that there may have been slight impact on the pavement condition associated with traffic from the quarry.

In addition, the entrance was realigned and resurfaced sections of the L8500 over the lifetime of operations at this location (at the operator's expense).

Collision data collated by the Road Safety Authority and made available at www.rsa.ie has been reviewed. No recorded incidents have occurred at the entrance to the quarry indicating that the quarry entrance has been operating safely.

13.8 Mitigation

The majority of material excavated at the site did not utilise the existing entrance and therefore limited the potential for impact on the local road. Most material was utilised using a dedicated access track to the M18 construction. Road maintenance works resulting from this contribution would have mitigated against damage caused by traffic generated by the quarry. In addition, the entrance was realigned and resurfaced sections of the entrance at the L8500 over the lifetime of operations at this location.

The operator cleaned, when necessary, any dirt and debris from any road surfaces soiled as a result of spillage due to haulage to and from the site, in order to minimise public nuisance.

Parking is provided within the site to ensure vehicles associated with the site are not parking on the public road, causing hazardous obstructions.

13.9 Conclusion

The quarrying of materials from the Ballysheedy Quarry resulted in an average increase of approximately 2 heavy vehicles per hour on the public road network on average. This would have resulted in a minor to negligible impact on traffic capacity on the surrounding road network and a slight impact on the pavement conditions of roads used to transport materials from the quarry. A contribution was made in relation to road maintenance, as well as realignment and resurfacing works on the L8500, that would have mitigated the impacts that heavy vehicles generated by the quarry may have caused.

Based on a review of accident history at the entrance to the quarry, it has been determined that the entrance has been and continues to operate safely and without incident.

14 Interaction of the Foregoing

This Remedial Environmental Impact Assessment Report (rEIAR) has been prepared by TOBIN on behalf of John Madden & Sons Ltd. and accompanies a Substitute Consent planning application to An Bord Pleanála for an existing quarry in the townlands of Ballysheedy and Ballysheedy , Gort, Co. Galway.

The potential environmental impacts of previous works at this location, including an assessment of the impact of historical works on the past, current and future environment have been outlined in this report. This section discusses the potential for interaction between impacts of the different environmental aspects.

14.5 Discussion of Interactions

Human Beings/Socio Economic/Dust/Noise

Human Beings interact with other environmental aspects given the nature of the extractive industry.

Adverse impacts that may have been associated with noise and vehicular disturbance during quarrying operations within the Substitute Consent application area are likely to have been slight as the adjacent permitted area was already subject to these disturbances. Best practice management systems were implemented during overburden stripping of the application area to fully comply with all relevant surface water pollution prevention legislation and thus avoid impacts to surface and groundwater drainage systems.

Noise and dust control were in accordance with EPA guidelines and the operator implemented various best practice methods to ensure that any impacts were negligible.

Social and travel patterns, pedestrian or otherwise, were not disrupted by the works within the application area as no roads or pedestrian ways were altered.

The operations within the site generated employment either directly in the extraction of material or through haulage of materials to end destinations.

This application also involves the regeneration/rewilding of lands within the Substitute Consent application area which reduce the visual impact of the site for onlookers.

Flora and Fauna

Local wetlands and downstream SPAs and SACs were protected by implementation of various mitigation measures to ensure that there was no contamination or impact on the local surface water or groundwater environment and the associated ecological environment as a result of activities within the application area.

Dust and noise impacts on adjacent habitats and fauna were minor as dust and noise controls were implemented in accordance with EPA Guidelines. In addition, the impact on local fauna would have been slight as the adjacent permitted area was already subject to these disturbances and species were already utilising relatively disturbed zones.

Soils/Geology and Hydrogeology

All overburden was managed on site according to best practice. This mitigated against any adverse effects on the local environment. There was no significant alteration to the natural geological conditions within the surrounding lands as a result of activities within the application area.

Water

Mitigation measures were implemented to ensure that there was no contamination or impact on the surface water, groundwater and the associated ecological environment as a result of water runoff from the site.

The groundwater environment in the vicinity of the quarry was not significantly impacted by the development, as there was no significant impact on the water table as a result of works in the application area. There has been no record of adverse effect on groundwater levels or areas outside the property boundary of Ballysheedy Quarry.

Air Quality and Climate

Works within the application area have had no effect on the microclimate in the immediate vicinity of the site or surrounding area.

Dust suppression and site management mitigated against the impact of windblown dust around the site and to nearby dwellings. These measures reduced the impact on human beings and material assets in the community.

Noise and Vibration

Noise and Blasting Vibration would have emanated from the working of machinery and activities associated with the operations within the application area. However, site activities were effectively managed to ensure that all potential noise and vibration impacts were minimised to acceptable levels at nearest sensitive receptors.

Landscape & Visual Assessment

A number of landscape & visual impacts interact with both the local human population, and flora and fauna as detailed above.

Cultural Heritage & Archaeology

There are no items of cultural heritage, archaeological sites, monuments or artefacts or designated or undesignated structures known or recorded within the application area.

Traffic

Traffic generated from the site did not have a significant impact on traffic on the L8500. The volume of traffic from Ballysheedy Quarry would have resulted in a minor to negligible impact on traffic capacity on the surrounding road network which would not have impacted on the use of the L8500 by local residents and/or passers-by.

14.6 Conclusion

While there was potential for the above parameters to interact and result in a cumulative impact, it has been demonstrated within this remedial EIAR (and associated rNIS) that none of these cumulative impacts resulted in significant environmental degradation. The mitigation measures implemented at Ballysheedy Quarry were designed to ameliorate the impact of the works within the application area and the overall site on the wider environment.

Appendix 1.1 Leave to apply for Substitute Consent

E 542908
N 700180

M 18 GALWAY

LEGEND

- Site Boundary
- Land in control of Applicant

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES.
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD.

Rev	Date	Description	By	Chkd.
A	16.06.2022	First Issue	JK	BR

Client: John Madden & Sons Ltd.

Project: Application for substitute consent for previous development at this site within the townland Ballysheedy Gort, Co. Galway. June 2022

Title: Regional Site Location Map

Scale @ A3:	1:50 000	
Prepared by: JK	Checked: BR	Date: June 2022
Project Director:	Brian Carroll	
Drawing Status:	Planning	

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Galway,
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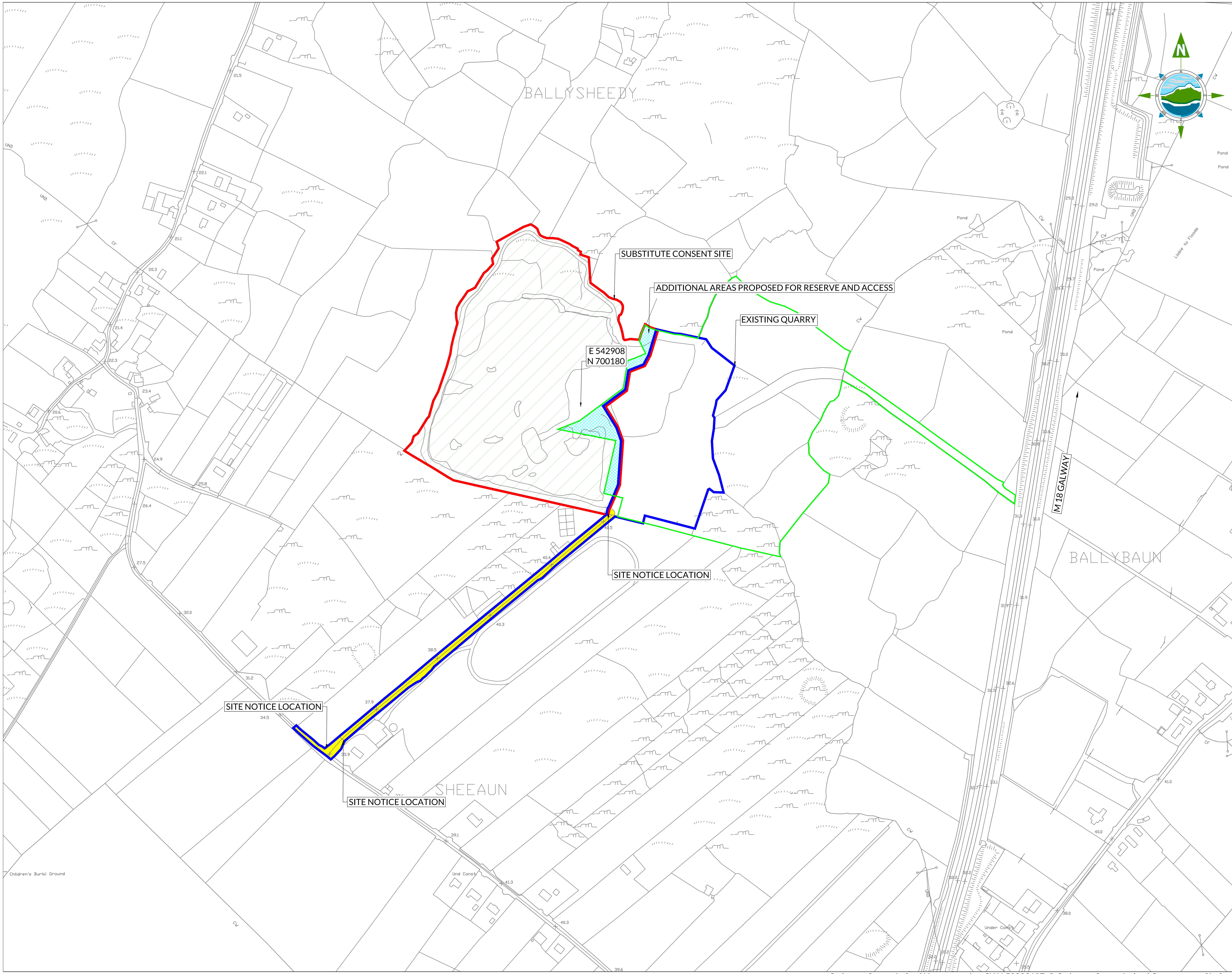
Tel: +353 (0)91 565 211
www.tobin.ie

Drawing No.: 10925-3000

Revision: A



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THE INFORMATION ON THIS DRAWING IS TO THE ORDNANCE SURVEY IRELAND ITM COORDINATE SYSTEM

LEGEND

- Site Boundary
- Extent of dormant area since 2012
- Land in control of Applicant
- Right of Way
- Planning Boundary 2009 Quarry area permitted under Pl. Ref. No. 09/415 (EOD 15/724)
- Additional areas proposed to be reserved & for Access

SITE BOUNDARY AREA	8.7820 ha

OSI Sheet No: 3859-D

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
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Rev	Date	Description	By	Chkd.
B	20.06.2022	Minor revision	JK	BR
A	16.06.2022	First Issue	JK	BR

Client: John Madden & Sons Ltd.

Project: Application for substitute consent for previous development at this site within the townland Ballysheedy Gort, Co. Galway. June 2022

Title: Site Location Map

Scale @ A1: 1:2500 @ A3 1:5000

Prepared by: JK | Checked: BR | Date: June 2022

Project Director: Brian Carroll

Drawing Status: Planning

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www.tobin.ie

Drawing No.: 10925-3001 Revision: B

THE INFORMATION ON THIS DRAWING IS TO THE ORDNANCE SURVEY IRELAND ITM COORDINATE SYSTEM

EXISTING DORMANT AREAS	
HIGH GROUND	2.5926 ha
LOW GROUND	0.9660 ha
(PREVIOUSLY STOCKPILE AREA)	
WATER	4.7715 ha
TOTAL AREA	8.3301 ha

RED LINE AREA	8.7820 Ha
BLUE LINE AREA	3.9074 Ha
TOTAL MADDEN LANDHOLDING AREA	12.6894 Ha

LEGEND

- Site Boundary
- Land in control of Applicant
- Site Boundary Planning 2009
- Quarry area permitted under Pl. Ref. No. 09/415 (EOD 15/724)
- Site Boundary Pl. Ref. No. 70238 (Dated 1994)
- Existing Security Fence and Gate
- Existing Maintenance Track
- Existing Cliff and Pond Edges
- 31.20 Existing Level
- Existing Pond
- 5 Existing Pond Features and Numbers

RECOLONISING WOODLAND / SCRUB

EXISTING SAFETY FENCE ERECTED BY RECEIVER APPROXIMATELY IN 2012

EXISTING SITE BOUNDARY AND SAFETY FENCING MAINTENANCE TRACKS

RECOLONISING WOODLAND / SCRUB

SUBSTITUTE CONSENT SITE
RED LINE SITE BOUNDARY AREA = 8.7820 HA

EXISTING SITE BOUNDARY WALL

INDICATIVE LOCATION OF RECORDED MONUMENT GA128-021 SITES AND MONUMENTS RECORD, DIA. E-W=26M , N-S=34M

RECOLONISING BARE GROUND MEADOW

RECOLONISING WOODLAND / SCRUB

EXISTING POND

SUMMER WATER LEVEL 29.50mOD
WINTER WATER LEVEL 30.30mOD

RECOLONISING BARE GROUND PRESENTLY UNFENCED, STOCKPILE AREA FOR 09/415, 15/724

ADDITIONAL AREAS PROPOSED FOR RESERVE AND ACCESS
AREA 0.4519 Ha
NOW GIVEN FROM PL REF 09/415 TO THE SUBSTITUTE CONSENT SITE

EXISTING QUARRY
AREA WITHIN MADDEN OWNERSHIP AND QUARRY PERMITTED UNDER PL REF 09/415.
BLUE LINE SITE BOUNDARY
TOTAL AREA = 3.9074 HA
QUARRY SITE = 3.4762 HA

Recorded Monument GA07475 dia.23m

RECOLONISING WOODLAND / SCRUB

ORANGE LINE SITE BOUNDARY AREA = 1.7528 HA
LIVE PLANNING PERMISSION PL. REF NO.70238

EXISTING GATE TO MAINTENANCE TRACKS

SITE NOTICE LOCATION

ACCESS TO ADJACENT LANDS NOT FENCED IN WITH RESERVED LANDS SINCE 2012. AREA 0.0530 HA

RIGHT OF WAY

MATCH LINE

M18 MOTORWAY

GALWAY

OSI Sheet No: 3859-D

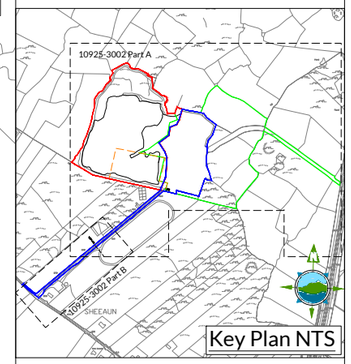
Existing Site Layout Part A
Scale @ A1 1:1250 @A3 1:2500

SITE NOTICE LOCATION

SITE NOTICE LOCATION

MATCH LINE

Existing Site Layout Part B
Scale @ A1 1:1250 @A3 1:2500



Key Plan NTS

NOTES:

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Rev	Date	Description	By	Chkd.
B	20.06.2022	Minor Revision	JK	BR
A	16.06.2022	First Issue	JK	BR

Client: John Madden & Sons Ltd.

Project: Application for substitute consent for previous development at this site within the townland of Ballysheedy, Gort, Co. Galway. June 2022

Title: Existing Site Layout

Scale @ A1:	1:1250 @A3: 1:2500	
Prepared by: JK	Checked: BR	Date: June 2022
Project Director:	Brian Carroll	
Drawing Status:	Planning	

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www.tobin.ie

Drawing No.: 10925-3002 Revision: B

THE INFORMATION ON THIS DRAWING IS TO THE ORDNANCE SURVEY IRELAND ITM COORDINATE SYSTEM

RECOLONISING WOODLAND / SCRUB

EXISTING SAFETY FENCE ERECTED BY RECEIVER APPROXIMATELY IN 2012

EXISTING SITE BOUNDARY AND SAFETY FENCING MAINTENANCE TRACKS

RECOLONISING WOODLAND / SCRUB

EXISTING SITE BOUNDARY WALL

SUBSTITUTE CONSENT SITE
RED LINE SITE BOUNDARY AREA = 8.7820 HA

INDICATIVE LOCATION OF RECORDED MONUMENT GA128-021 SITES AND MONUMENTS RECORD, DIA. E-W=26M , N-S=34M

RECOLONISING BARE GROUND MEADOW

RECOLONISING WOODLAND / SCRUB

EXISTING POND

SUMMER WATER LEVEL 29.50mOD
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QUARRY SITE = 3.4762 HA

Recorded Monument GA07475 dia.23m

RECOLONISING WOODLAND / SCRUB

ORANGE LINE SITE BOUNDARY AREA = 1.7528 HA
LIVE PLANNING PERMISSION PL. REF NO.70238

EXISTING GATE TO MAINTENANCE TRACKS

ACCESS TO ADJACENT LANDS NOT FENCED IN WITH RESERVED LANDS SINCE 2012. AREA 0.0530 HA

RIGHT OF WAY

MATCH LINE

M18 MOTORWAY

GALWAY

Pond

OSI Sheet No: 3859-D

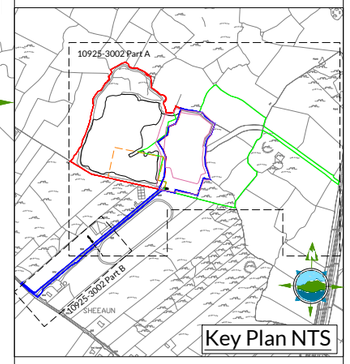
PROPOSED DORMANT AREAS 2021

HIGH GROUND	2.5926 ha
LOW GROUND (PREVIOUSLY STOCKPILE AREA)	0.9660 ha
WATER	4.7715 ha
ADDITIONAL AREA	0.4519 ha
TOTAL AREA	8.7820 ha

RED LINE AREA	8.7820 Ha
BLUE LINE AREA	3.9074 Ha
TOTAL MADDEN LANDHOLDING AREA	12.6894 Ha

LEGEND

- Site Boundary
- Land in control of Applicant
- Site Boundary Planning 2009
- Quarry area permitted under Pl. Ref. No. 09/415 (EOD 15/724)
- Site Boundary Pl. Ref. No. 70238 (Dated 1994)
- Existing Security Fence and Gate
- Existing Maintenance Track
- Existing Cliff and Pond Edges
- 31.20 Existing Level
- Existing Pond
- 5 Existing Pond Features and Numbers
- Additional Reserve Area & for Access



NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
3. ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
4. THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES.
5. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD.

Rev	Date	Description	By	Chkd.
B	20.06.2022	Minor Revision	JK	BR
A	16.06.2022	First Issue	JK	BR

Client: John Madden & Sons Ltd.

Project: Application for substitute consent for previous development at this site within the townland of Ballysheedy, Gort, Co. Galway. June 2022

Title: Site Layout with additional Reserve Area

Scale @ A1: 1:1250 @A3: 1:2500

Prepared by:	Checked:	Date:
JK	BR	June 2022

Project Director: Brian Carroll

Drawing Status: Planning

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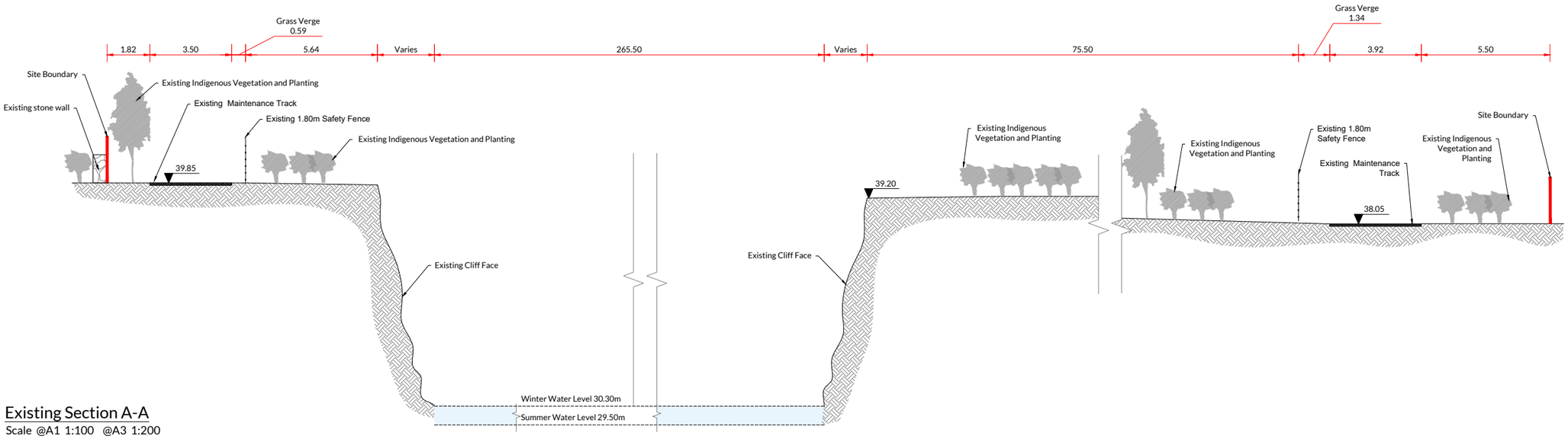
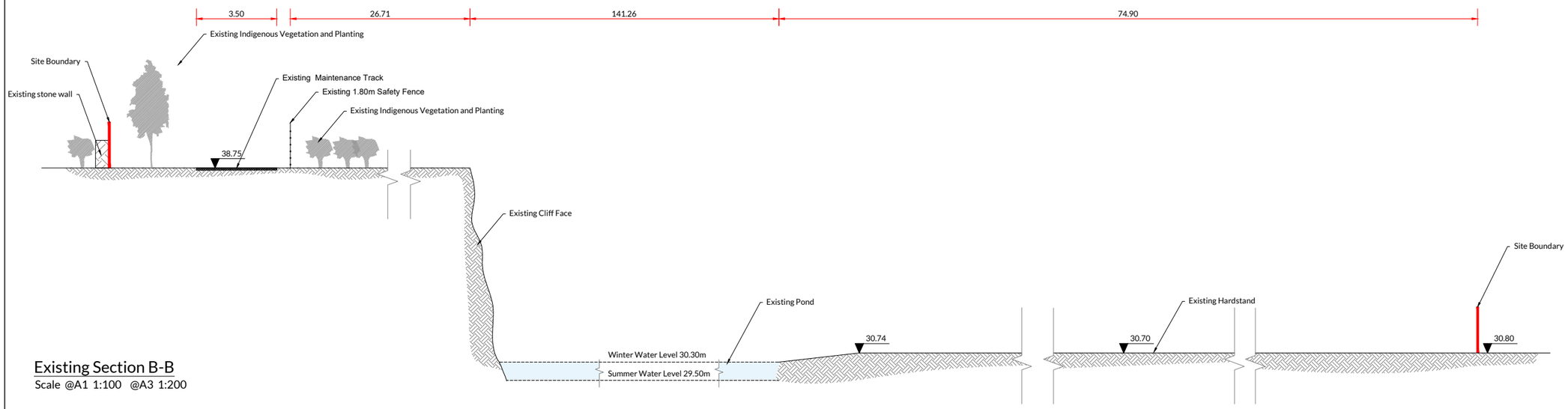
www.tobin.ie

Drawing No.: 10925-3003 Revision: B



Existing Section A-A

Scale @A1 1:100 @A3 1:200



Existing Section B-B

Scale @A1 1:100 @A3 1:200

THE INFORMATION ON THIS DRAWING IS TO THE ORDNANCE SURVEY IRELAND ITM COORDINATE SYSTEM

NOTES:

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
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Rev	Date	Description	By	Chkd.
A	16.06.2022	First Issue	JK	BR

Client: John Madden & Sons Ltd.

Project: Application for substitute consent for previous development at this site within the townland Ballysheedy Gort, Co. Galway. June 2022

Title: Existing Sections A-A, B-B

Scale @ A1: 1:100 @A3: 1:200

Prepared by:	Checked:	Date:
JK	BR	June 2022

Project Director: Brian Carroll

Drawing Status: Planning

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Drawing No.: 10925-3004

Revision: A

An Bord Pleanála

Board Direction
BD-010377-22
ABP-310605-21

The submissions on this file and the Inspector's report were considered at a Board meeting held on 28/03/2022.

The Board decided that consent be granted to the applicant to be permitted to apply for substitute consent, based on the following reasons and considerations set out below.

Reasons and Considerations

Having regard to Section 177D of the Planning and Development Acts, 2000-2016, as inserted by Section 57 of the Planning and Development (Amendment) Act 2010, and taking account of the following matters:

- the regularisation of the development would not circumvent the purpose and objectives of the Environmental Impact Assessment Directive or Habitats Directive;

- the applicant had, or could reasonably have had, a belief that the development was not unauthorised;

- the ability to carry out an assessment of the environmental impacts of the development for the purpose of an EIA and AA and in particular to provide for public participation in such assessment, has not been substantially impaired;

-

- the actual or likely significant effects on the environment or adverse effects on the integrity of a European Site, if any, resulting from the carrying out of the development, could likely be substantially remediated;

- the applicant has not otherwise carried out any unauthorised development.

the Board is satisfied that the development is one where an EIA or a determination as to whether EIA is required, where Appropriate Assessment (AA) is also required, having regard to its proximity to European Sites, and where exceptional circumstances exist, and concluded that it would be appropriate to consider an application for the regularisation of the development by means of an application for substitute consent.

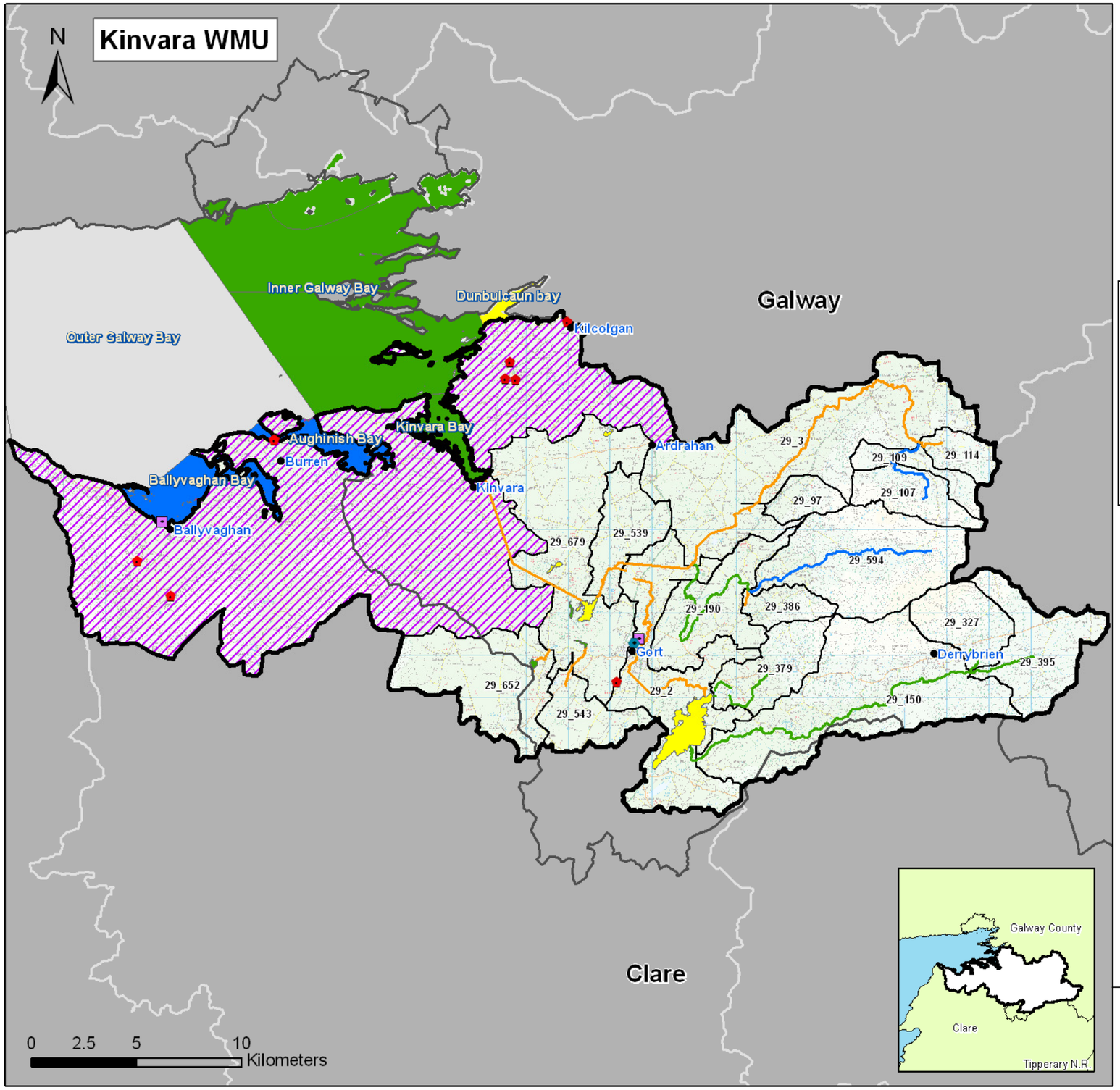
Board Member _____ **Date:** 28/03/2022

Dave Walsh

Appendix 7.1 Surface water

Kinvara Water Management Unit Action Plan

River water bodies labelled on map



Kinvara Water Management Unit	western river basin district
Area	637 km^2
River Basin District	Western RBD
Main Counties	Galway
Number of river water bodies	17
Number of lake water bodies	7

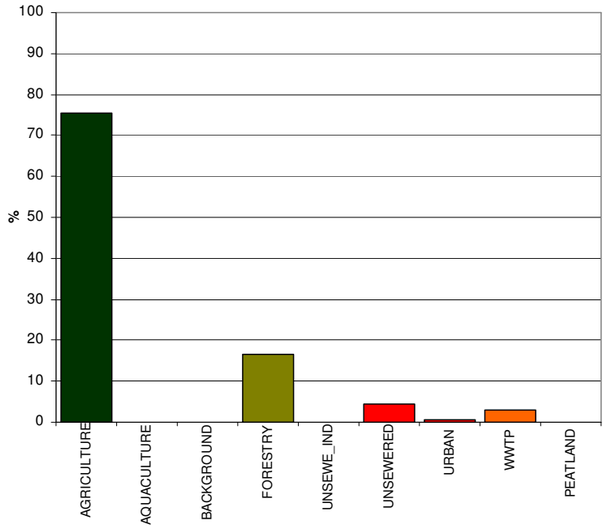
Legend

- Waste Water Treatment Plants
- EPA Licensed Facility (IPPC)
- Local Authority Licensed Discharge
- Coastal Interbasins
- County/City Boundary
- Water Management Units
- WMU Boundary

Status

- High
- Good
- Moderate
- Poor
- Bad
- Unassigned

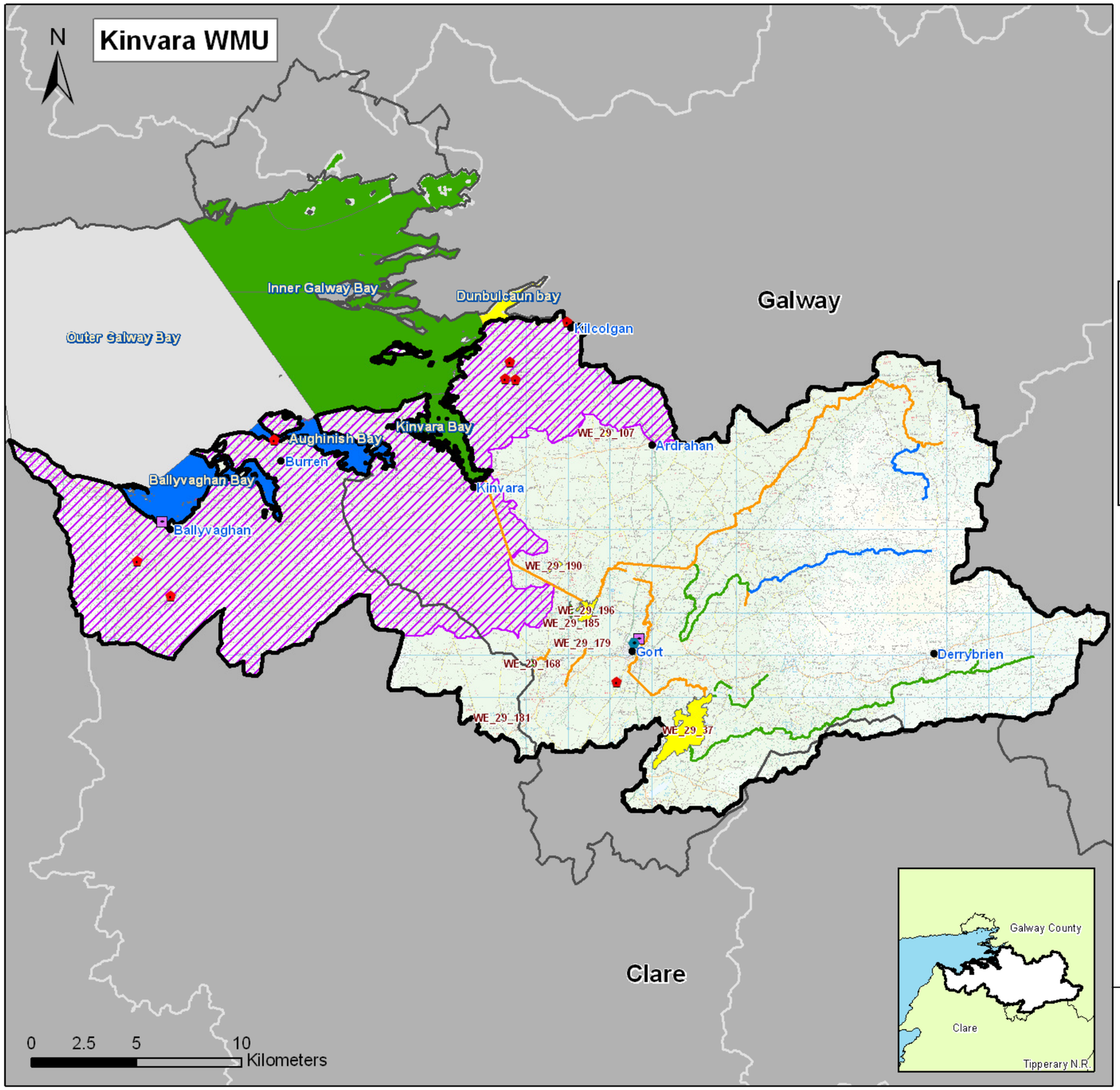
Sectoral Total Phosphorus Source
(This does not imply impact)



March 2010

Kinvara Water Management Unit Action Plan

Lake water bodies labelled on map



Kinvara Water Management Unit	western river basin district
Area	637 km²
River Basin District	Western RBD
Main Counties	Galway
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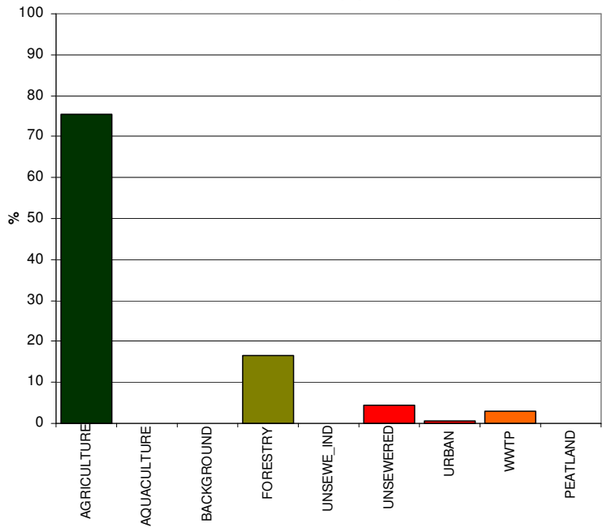
Legend

- Waste Water Treatment Plants
- EPA Licensed Facility (IPPC)
- Local Authority Licensed Discharge
- Coastal Interbasins
- County/City Boundary
- Water Management Units
- WMU Boundary

Status

- High
- Good
- Moderate
- Poor
- Bad
- Unassigned

Sectoral Total Phosphorus Source
(This does not imply impact)



March 2010

Kinvara Water Management Unit Action Plan

PROTECTED AREAS
SAC – 22: Black Head - Poulsallagh Complex, Moneen Mountain, Caherglassaun Turlough, Castletaylor Complex, Coole-Garryland Complex, Galway Bay Complex, Kiltartan Cave (Coole), Lough Cutra, Peterswell Turlough, Lough Finglall Complex, Ballyvaughan Turlough, Kiltiernan Turlough, Termon Lough, Sonnagh Bog, East Burren Complex, Lough Coy, Gortacarnaun Wood, Drummin Wood, Ardrahan Grassland, Carrowbaun/ Newhall and Ballylee Turloughs, Cahermore Turlough, Ballinduff Turlough. **SPA** – 4: Coole-Garyland SPA, Inner Galway Bay SPA, Lough Cutra SPA and Slieve Aughty Mountains SPA **NHA** – 1: Slieve Aughty Mountains **pNHA** – 17: Galway Bay Complex, Black Head-Poulsallagh Complex, East Burren Complex, Moneen Mountain, Ballyvaughan Turlough, Turloughnagullaun, Lough Fingall Complex, Castletaylor Complex, Kiltiernan Turlough, Peterswell Turlough, Sonnagh Bog, Coole-Garryland Complex, Caherglassaun Turlough, Kiltartan Cave (Coole), Polldugh Cave, Gort, Lough Cutra, and Termon Lough. **Nutrient Sensitive Surface Water (UWWT Directive)** – none **Drinking water** - 1: Lough Cutra (this is proposed for future Gort RWSS not yet inuse). 7 Surface water drinking waters – Streamstown River and Coole River, Ballylee river, River discharging from Newtown Lough, River discharging from Hawkhill Lough to the seasonal Mannagh Lough, and river discharging from Coole Lough to Kinvara Bay. **Bathing waters** – 2: Traught and Bishopsquarter. **Shellfish waters** – 3: The Bay at Aughinish, Ballyvaughan/Poulnaclough Bay and Clarinbridge/Kinvara Bay.

STATUS/IMPACTS	
Overall status	50% of the water bodies within the WMU are at Good or High Status whilst the remaining 50% are at poor or bad status. The WMU contains 7 lakes which were assessed with their status either Moderate or Good, or in 1 case, unclassified (Skeardeen Lough). The WMU flows into Kinvara Bay and Dunbulcaun Bay transitional water bodies which are both at moderate status. Coastal water bodies that the WMU flows into include Ballyvaghan Bay and Aughinish Bay which are both at high status.
Status elements	For the rivers within the WMU the Q score (macroinvertebrates) dictates status, however only three rivers have monitoring information, the status is extrapolated for the other rivers. There are no chemical monitoring sites in the WMU. For 3 of the monitored lakes the status is dictated by macrophytes and nutrient results combined with expert opinion. The remainder of the lake status is assigned through extrapolation. One lake in Co. Clare (Skeardeen Lough) remains unclassified.
Status of the main rivers within the WMU	The prIncipal rivers within the Kinvarra WMU are the Owendalulleegh (flowing into Lough Cutra), the Beagh river flowing out of Lough Cutra sinking at the Punchbowl and emerging west of Gort as Ceannahowna river, Boleynneendoorsih which drains the north side of the Slieve Aughty Mountains via the Ballychalan/Streamstown/Annagh/Turra river (the OSi names for sections of this river), the Ballyee river which drains the northeastern part of the catchment and the Gort and Coole rivers which flow into Coole Lough . Many of the rivers flow partly through underground channels (Coole river for example) and are not apparent on the surface. The outflow from Coole Lough flows entirely underground to the sea at Kinvarra. The most recent EPA status classifications for these rivers indicates that 15% of all river channel length is of High status and 36% is classed as Good. The remaining main channel lengths are classed as Poor (49%). **OWENDALULLEEGH**: The upper reaches of the Owendalulleegh River was seriously impacted by the Derrybrien landslide which occurred on 16/17 October 2003. Recent EPA monitoring of this river water body has indicated good recovery subsequent to the landslide. The status of the river which flows into Lough Cutra is now Good. **BEAGH**: The Beagh River flows from Lough Cutra, sinking at the Puncbowl and emerging at the Ceannahowna river southwest of Gort. Its current status is rated as Poor but this is based on monitoring of the Ceannnahowna near Gort. **BOLEYNEENDORRISH**:The Boleyneendorrish River is classed as High status in its upper reaches above Kenny's bridge (Farnaun townland) and is of Good status along its lengths known as Ballychalan river, Streamstown river, Annagh river and Turra river before the confluence with the Ballyee. Thereafter the river sinks and later emerges into the Coole river. **BALLYEE:** This river drains the northeastern part of the catchment and is classed as Bad status by the EPA (based on extrapolation from similar monitored water bodies). **CEANNAHOWNA and GORT:** The Ceannahowna forms part of the current water supply for Gort. It flows north through Gort being renamed the Gort river before sinking north of Gort and emrfging as part of the Coole river. Both sections of river have been classed as at Poor status by the EPA (on the basis of biological monitoring data). **COOLE:** The Coole river flows into the northern part of Coole Lough, in the Coole Garryland Complex cSAC, which drains underground to Kinvarra. The Coole river has been classed as at Poor status. **Lakes:** Lough Cutra is a proposed future source for regional water supply to the area and is at Moderate status. Coole Lough in the SAC is also at Moderate status

Kinvara Water Management Unit Action Plan

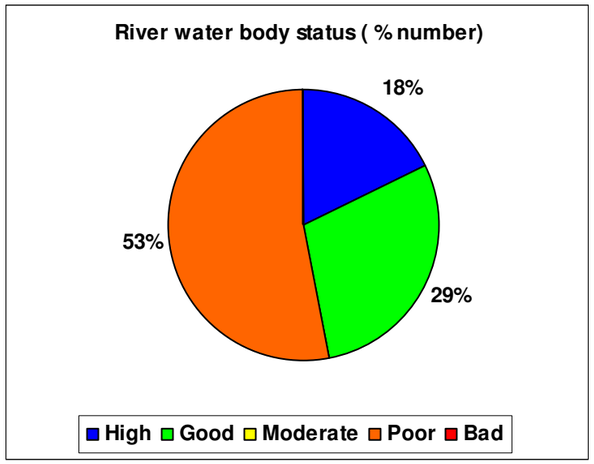
PRESSURES/RISKS	
Nutrient sources	Over 90% of Total Phosphorus generate din the catchment is diffuse in nature with agriculture accounting for over 70% and Forestry accounting for over 15% of TP.
Point pressures	**WWTP** – 1: Gort WWTP, **IPPC** – 1: Duffy Exports Ltd **Communal Septic Tank** – 1: Ballyvaughan communal septic tank – discharges to Ballyvaughan Bay. **Untreated discharge** – 1: Kinvara collection and outfall to bay. **Section 4** Licenced facilities – 8: 3 Section 4 licences in Clare:. 5 Section 4 licences in Galway: **WTP** – 5: Gort, Kinvara, Tourlough Borehole, Newtown Borehole, Kileedy.
Wastewater Treatment Plants (WWTP) and Industrial Discharges	**Ballyvaughan –** Wastewater treatment needs requires further investigation prior to capital works **Gort WWTP** - risks to water quality include insufficient future WWTP capacity, insufficient assimilative capacity for BOD and nutrients, and historical deterioration of Q value downstream of the discharge. Awaiting DEHLG approval to enter planning phase. Plant requires capital works, implementation of performance management system and the investigation of CSO's. Ensure capacity of treatment plant is not exceeded **Kinvara** - Kinvara collection and direct discharge (no treatment) – Untreated discharge poses risks to shellfish. Design review of proposed WWTP awaiting DEHLG approval, due to go to construction by 2012. No risks associated with Section 4s. Agglomerations requires further investigation prior to capital works, plant requires implementation of pollution reduction programmes for Shellfish Waters
Quarries, Mines & Landfills	2 quarries within WMU - Ardrahan Quarry and Gort Quarry but no risk associated with the quarries. No Landfills or mines within WMU.
Agriculture	There is 1 water body at risk from agriculture within WMU : IE_WE_29_543
On-site systems	There are 5,040 OSWTS within the WMU Boundary. 2,759 OSWTS (0 of which are at risk) lie within 17 river water bodies, (0 of which are at risk). The remainder of OSWTS lie between the RWBs and the seashore.
Forestry	There are 4 water bodies that have been determined to be at risk from forestry within WMU: IE_WE_29_327, IE_WE_29_395, IE_WE_29_150 and IE_WE_29_594.
Dangerous substances	There are no water bodies at risk from dangerous substances within the WMU.
Morphology	There are no water bodies at risk from morphology within the WMU.
Abstractions	There are no water bodies at risk from abstraction within the WMU.
Other	There are no HMWB or AWB within the WMU.

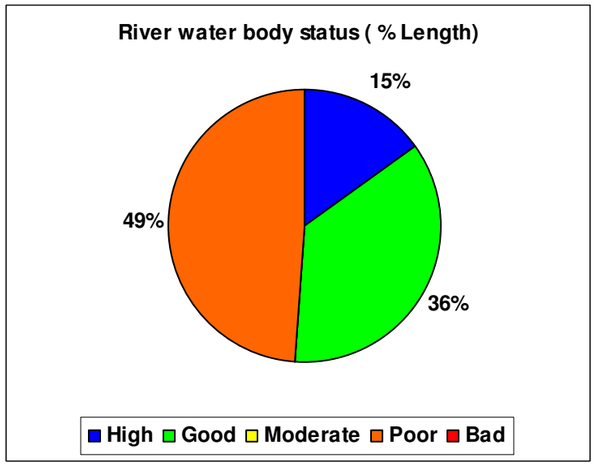
SELECTED ACTION PROGRAMME *NB All relevant basic measures and general supplementary measures/surveys apply*	
Point Sources	WWTP licensing and upgrades will be applied where identified in the needs assessment. Gort WWTP has been prioritised for capital works upgrades as this scheme is necessary to ensure compliance with the Water Framework Directive.
Diffuse Sources	Forestry supplementary measures include: measures to address forest acidification such as basic material use, drainage management and increased stream production. In relation to sedimentation issues the following supplementary measures are required riparian zone management, enhanced sediment control and drainage management. Particular measures will be required to address diffuse pollution pressures from agriculture such as the Good Agricultural Practices Regulations inspections and enforcement.
Other	The Shellfish Pollution Reduction Plans for Shellfish growing areas will apply at Aughinish, Ballyvaughan/Poulnaclogh Bay and Clarinbridge/Kinvara Bays Compliance with the Bathing Water Directive will also be required.

OBJECTIVES	
Good status 2015	All water bodies within the WMU must achieve Good status by 2015 unless a specific alternative objective is set out below.
Alternative Objectives	**Extensions Agriculture (Phosphorous Karst Groundwater) (2021)** IE_WE_29_539, IE_WE_29_679, IE_WE_29_652, IE_WE_29_543, IE_WE_29_3 **Extensions required for wastewater infrastructure to be put in place (2021)** IE_WE_29_2 **Extensions for Status Recovery due to prolonged timescale for improvement due to measures to manifest (Poor and Bad status water bodies) (2021)** IE_WE_29_97, IE_WE_29_114, IE_WE_29_386

Kinvara Water Management Unit Action Plan - Rivers

Status of river water bodies within the WMU

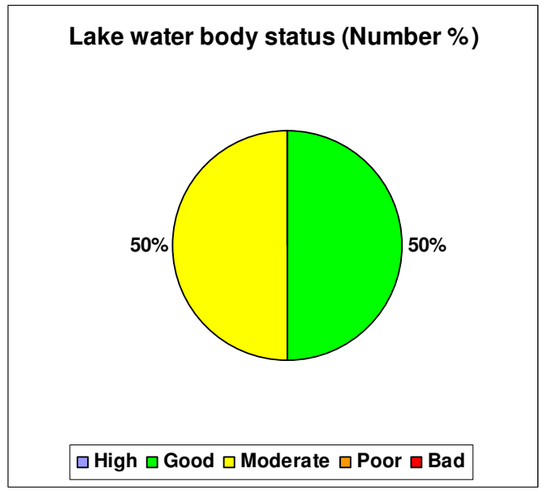


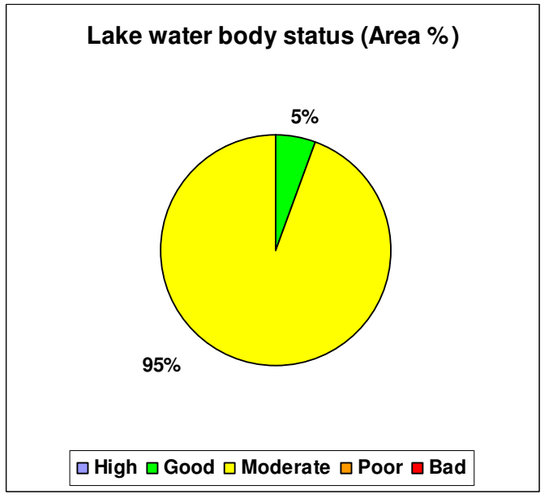


IE_WE_Kinvara																	
			Biological Elements				Supporting Elements					Protected Areas					
Member State Code	Monitored Y (Extrapolated N)	Donor Waterbody	Macroinvertebrates (Q)	FreshWater Pearl Mussel	Fish	Phytobenthos (Diatoms)	Morphology	Specific Polutants	Physio-chemical	Ecological Status	Chemical Status	Special Area of Conservation	Special Protection Area	Nutrient Sensitive Waters	Drinking Water	Objective	Date objective to be achieved
WE_29_107	N	WE_31_1323								H		Y	Y			HES	2009
WE_29_109	N	WE_29_594								H			Y			HES	2009
WE_29_114	N	WE_29_403								P			Y			GES	2021
WE_29_150	Y		G						H	G		Y	Y			GES	2009
WE_29_190	N	WE_29_426								G			Y			GES	2009
WE_29_2	Y		P						H	P		Y	Y			GES	2021
WE_29_3	N	WE_29_403								P		Y	Y			GES	2021
WE_29_327	N	WE_29_150								G			Y			GES	2009
WE_29_379	N	WE_29_150								G		Y	Y			GES	2009
WE_29_386	N	WE_29_2								P			Y			GES	2021
WE_29_395	N	WE_29_150								G			Y			GES	2009
WE_29_539	N	WE_29_2								P		Y	Y			GES	2021
WE_29_543	N	WE_29_263								P		Y				GES	2021
WE_29_594	Y		H							H		Y	Y			HES	2009
WE_29_652	N	WE_29_2								P		Y	Y			GES	2021
WE_29_679	N	WE_29_2								P		Y	Y			GES	2021
WE_29_97	N	WE_29_403								P			Y			GES	2021

Kinvara Water Management Unit Action Plan

Status of lake water bodies within WMU





IE_WE_Kinvara																
			Biological Elements			Supporting Elements					Protected Areas						
Member State Code	Name	Monitored Y (Extrapolated N)	Macrophytes	Chlorophyll	Fish	Morphology	Nutrient Enrichment	Physico Chemical	Ecological Status	Chemical Status	Special Area of Conservation	Special Protection Area	Nutrient Sensitive Waters	Bathing Water	Drinking Water	Objective	Date objective to be achieved
WE_29_107		N							M		Y					GES	2021
WE_29_168	Mannagh (Lough)	N							G		Y					GES	2009
WE_29_179	Nacarriga (Lough)	N							G		Y	Y				GES	2009
WE_29_181	Skeardeen (Lough)	Y						M	u		Y						
WE_29_185		N							G		Y	Y				GES	2009
WE_29_196	Coole Lough	Y		G			M	M	M		Y	Y				GES	2021
WE_29_37	Cutra (Lough)	Y	G					M	M		Y	Y			Y	GES	2015

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Carrigeen Business Park, Clonmel, Co. Tipperary
Tel: +353 (0) 52 617 8100
Fax:+353 (0) 52 617 8103
www.alsglobal.ie

Report No: TCEG-114230720
Document No: EF0011

CERTIFICATE OF ANALYSIS

Client **Tobin Consulting Engineers**
Block 10-4
Blanchardstown Corporate Park
Dublin 15

Date Received 23/07/2020
Date Reported 28/07/2020
Order Number N/A

For the Attention of: John Dillon

Sample Reception 2 sample(s) received in good condition.

Comments N/A

Report Authorised by: David Kinsella

David Kinsella
Deputy Environmental Chemistry Manager

Conditions:
1. Results in this report relate only to the items tested
2. Reports may not be reproduced except in full without the approval of ALS Life Sciences Ltd
3. All queries regarding this report should be addressed to the Technical Manager at the above address
*4. A * next to a method reference signifies that ALS Life Sciences Ltd is NOT INAB accredited for this method*
5. Results reported as CFU/cm² are calculated based on information supplied by customer regarding area swabbed
6. SUBCON indicates analysis subcontracted to approved subcontractors who do not hold accreditation for this test*
7. SUBCON^ indicates analysis subcontracted to approved subcontractors who hold accreditation for this test
8. Where sampling is undertaken by ALS personnel, sampling activities are outside the scope of INAB accreditation
9. Dil next to a method reference indicates that a dilution of the water sample was undertaken during testing

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Tel: +353 (0) 52 617 8100
Fax:+353 (0) 52 617 8103
www.alsglobal.ie

Report No: TCEG-114230720

Document No: EF0011

CERTIFICATE OF ANALYSIS

Date Received 23/07/2020
Date Reported 28/07/2020
Order Number N/A

Sample Type Dust
Client ID 22.07.2020 GD1
Date Tested 27/07/2020
ALS ID 4081509

Test	Result	Unit	Method
Dust Deposition	224.88	mg/m2/day	P524*

Sample Type Dust
Client ID 22.07.2020 GD2
Date Tested 27/07/2020
ALS ID 4081510

Test	Result	Unit	Method
Dust Deposition	28.25	mg/m2/day	P524*

Report Authorised by: David Kinsella

David Kinsella
Deputy Environmental Chemistry Manager

Complete Laboratory Solutions
[Tel] 091 574355
[Fax] 091 574356
[Email] services@cls.ie
[web] www.cls.ie

CERTIFICATE OF ANALYSIS

Client : John Dillon
Tobin Consulting Engineering
Block 10-4
Blanchardstown Corporation Park
Dublin 15

Report No. : 419012
Date of Receipt : 18/06/2020
Start Date of Analysis : 19/06/2020
Date of Report : 30/06/2020
Order Number :
Sample taken by : Client

Lab No	Sample Description	Test	Ref.	Result	Units
1057457	SW1 JML - gort	COD	I, R	16	mg/l
		pH	I, R	8.2	pH Units
		Conductivity @20C	I, R	302	uS/cm
		Nitrate as N	I, R	<0.1	mg/l
		Ammonia as N	I, R	0.071	mg/l

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 108T

Approved by:

AnnMarie Nee
Environmental
Services Administrator

See below for test specifications and accreditation status.
This report only relates to items tested and shall not be reproduced but in full with the permission of CLS.
est. is an estimated count.
CLS will test food, water and swabs samples within 24 hours of receipt.
Where samples have been taken by the Client, results apply to the samples as received.

Complete Laboratory Solutions,
Ros Muc, Connemara,
Co. Galway

Complete Laboratory Solutions,
MedPharma Division,
Unit 3a, Small Business Park, Mervue, Galway

Symbol Reference - I:17025 accredited; S:Subcontracted; R:Analysis carried out in Ros Muc; M:Analysis carried out in MedPharma

Complete Laboratory Solutions
[Tel] 091 574355
[Fax] 091 574356
[Email] services@cls.ie
[web] www.cls.ie

In-House Test	Specification	17025	GMP/FDA*	ISO**
COD	CLS 52	Yes	No	Yes
pH	CLS 26	Yes	No	Yes
Conductivity @20C	CLS 67	Yes	No	Yes
Nitrate as N	Konelab CLS 39	Yes	No	Yes
Ammonia as N	Konelab CLS 40	Yes	No	Yes

*Analysis carried out in a GMP approved, FDA inspected facility (MedPharma site only).
**Laboratory Analysis, Sampling, Food Safety Monitoring and Analysts on Contract are all ISO 9001 certified.

Lab No	Sample ID	Sample Condition on Receipt	Sampling Date
1057457	SW1 JML -gort	Good condition	17/06/2020

Complete Laboratory Solutions,
Ros Muc, Connemara,
Co. Galway

Complete Laboratory Solutions,
MedPharma Division,
Unit 3a, Small Business Park, Mervue, Galway

Symbol Reference - I:17025 accredited; S:Subcontracted; R:Analysis carried out in Ros Muc; M:Analysis carried out in MedPharma

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	20-08801-1		
Initial Date of Issue:	25-Mar-2020		
Client	Tobin Consulting Engineers		
Client Address:	Block 10-4 Blanchardstown Corporate Park Dublin 15 Dublin Ireland		
Contact(s):	John Dillon		
Project	7624 Gort		
Quotation No.:	Q20-19462	**Date Received:**	19-Mar-2020
Order No.:	762501	**Date Instructed:**	20-Mar-2020
No. of Samples:	1		
Turnaround (Wkdays):	5	**Results Due:**	26-Mar-2020
Date Approved:	25-Mar-2020		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Chemtest
The right chemistry to deliver results

Results - Water

Project: 7624 Gort

Client: Tobin Consulting Engineers			**Chemtest Job No.:**		20-08801
Quotation No.: Q20-19462			**Chemtest Sample ID.:**		988775
			Sample Location:		SW1
			Sample Type:		WATER
			Date Sampled:		18-Mar-2020
Determinand	**Accred.**	**SOP**	**Units**	**LOD**	
Chemical Oxygen Demand	U	1100	mg O2/l	10	29
Ammonium	U	1220	mg/l	0.050	< 0.050
Nitrate	U	1220	mg/l	0.50	7.7
Orthophosphate as PO4	U	1220	mg/l	0.050	0.081
Mineral Oil	N	1670	µg/l	10	< 10
Total TPH >C6-C40	U	1670	µg/l	10	[C] < 10

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
988775			SW1	18-Mar-2020	C	Plastic Bottle 1000ml

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1100	Chemical Oxygen Demand	Chemical Oxygen demand (COD)	Dichromate oxidation of organic matter in sample followed by colorimetric determination of residual Cr[VI].
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

ALS Life Sciences Ltd
Trading as ALS
Carrigeen Business Park, Clonmel, Co. Tipperary
Tel: +353 (0) 52 617 8100
Fax:+353 (0) 52 617 8103
www.alsglobal.ie

Report No: TCEG-486150420

Document No: EF0011

CERTIFICATE OF ANALYSIS

Client **Tobin Consulting Engineers**
Block 10-4
Blanchardstown Corporate Park
Dublin 15

Date Received 15/04/2020
Date Reported 16/04/2020
Order Number D7625-1

For the Attention of: John Dillon

Sample Reception

Comments 1 sample(s) received in good condition.

N/A

Report Authorised by: Rosemary Thomas

Rosemary Thomas
Environmental Chemistry Manager

Conditions:
1. Results in this report relate only to the items tested
2. Reports may not be reproduced except in full without the approval of ALS Life Sciences Ltd
3. All queries regarding this report should be addressed to the Technical Manager at the above address
*4. A * next to a method reference signifies that ALS Life Sciences Ltd is NOT INAB accredited for this method*
5. Results reported as CFU/cm² are calculated based on information supplied by customer regarding area swabbed
6. SUBCON indicates analysis subcontracted to approved subcontractors who do not hold accreditation for this test*
7. SUBCON^ indicates analysis subcontracted to approved subcontractors who hold accreditation for this test
8. Where sampling is undertaken by ALS personnel, sampling activities are outside the scope of INAB accreditation
9. Dil next to a method reference indicates that a dilution of the water sample was undertaken during testing

ALS Life Sciences Ltd
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Carrigeen Business Park, Clonmel, Co. Tipperary
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Fax:+353 (0) 52 617 8103
www.alsglobal.ie

Report No: TCEG-486150420

Document No: EF0011

CERTIFICATE OF ANALYSIS

Date Received	15/04/2020
Date Reported	16/04/2020
Order Number	D7625-1

Sample Type	Other
Client ID	15.04.20 GD1 Bergerholf 30Days 1 March - 30 March
Date Tested	15/04/2020
ALS ID	3959045

Test	Result	Unit	Method
Dust Deposition	46.89	mg/m2/day	P524*

Report Authorised by: Rosemary Thomas

Rosemary Thomas
Environmental Chemistry Manager

City Analysts Limited,
Pigeon House Road,
Ringsend,
Dublin 4.

Tel:(01) 613 6003 /6 /9
Fax:(01) 613 6008
Email:info@cityanalysts.ie

www.cityanalysts.ie

Customer Contact: John Dillon

Customer: Tobin Consulting Engineers,

Customer Address: Block 10-4.,
Blanchardstown Corporate Park,
Blanchardstown,
Dublin 15

Report Reference: 14-05947-
Report Version: 1

Report Date: 17/12/2014

Customer PO No.:
Chain of Custody No.: 21722

Certificate Of Analysis

Analysis of 8 sample(s) submitted on 18/11/2014 is now complete.
We have the pleasure of enclosing your certificate of analysis.

Should you have any queries regarding the report or require any further services, we would be happy to discuss your requirements. For additional information about the company please log-on to our web site at the above address.

Thank you for choosing City Analysts Limited. We look forward to assisting you again.

Authorised By: Laura Walsh **Date:** 17/12/2014

Note: Information on methods of analysis and performance characteristics is available on request.

City Analysts Limited
Environmental Laboratories

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Ringsend,
Dublin 4.

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Email:info@cityanalysts.ie

www.cityanalysts.ie

Certificate of Analysis

Customer Contact: John Dillon

Customer: Tobin Consulting Engineers,

Customer Address: Block 10-4.,
Blanchardstown Corporate Park,
Blanchardstown,
Dublin 15

Report Reference: 14-05947-
Report Version: 1

Sample Description: GD1
Sample Type: Dust
Date Sampled: 18/11/2014
Lab Reference Number: 193560

Site/Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value	Accreditation Status
D/3119	11/12/2014	Dust Inorganic	6.339	mg/m2/day	-	NON
D/3119	19/11/2014	Dust Organic	10.4	mg/m2/day	-	NON
L/4001	19/11/2014	Dust	16.7	mg/m2/day	-	NON

Note:
NAC & ATC - No abnormal change and acceptable to customers.
TVC - Total Viable Count
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014, and relates only to drinking water samples.
Site D = Analysed at City Analysts Dublin. Site L = Analysed at City Analysts Shannon. Site SUBC= Analysed at a subcontracted lab

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Certificate of Analysis

Customer Contact: John Dillon

Customer: Tobin Consulting Engineers,

Customer Address: Block 10-4.,
Blanchardstown Corporate Park,
Blanchardstown,
Dublin 15

Report Reference: 14-05947-
Report Version: 1

Sample Description: GD2
Sample Type: Dust
Date Sampled: 18/11/2014
Lab Reference Number: 193561

Site/Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value	Accreditation Status
D/3119	11/12/2014	Dust Inorganic	4.320	mg/m2/day	-	NON
D/3119	19/11/2014	Dust Organic	11.3	mg/m2/day	-	NON
L/4001	19/11/2014	Dust	15.7	mg/m2/day	-	NON

Note:
NAC & ATC - No abnormal change and acceptable to customers.
TVC - Total Viable Count
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014, and relates only to drinking water samples.
Site D = Analysed at City Analysts Dublin. Site L = Analysed at City Analysts Shannon. Site SUBC= Analysed at a subcontracted lab

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www.cityanalysts.ie

Certificate of Analysis

Customer Contact: John Dillon

Customer: Tobin Consulting Engineers,

Customer Address: Block 10-4.,
Blanchardstown Corporate Park,
Blanchardstown,
Dublin 15

Report Reference: 14-05947-
Report Version: 1

Sample Description: GD3
Sample Type: Dust
Date Sampled: 18/11/2014
Lab Reference Number: 193562

Site/Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value	Accreditation Status
D/3119	11/12/2014	Dust Inorganic	14.755	mg/m2/day	-	NON
D/3119	19/11/2014	Dust Organic	13.0	mg/m2/day	-	NON
L/4001	19/11/2014	Dust	27.7	mg/m2/day	-	NON

Note:
NAC & ATC - No abnormal change and acceptable to customers.
TVC - Total Viable Count
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014, and relates only to drinking water samples.
Site D = Analysed at City Analysts Dublin. Site L = Analysed at City Analysts Shannon. Site SUBC= Analysed at a subcontracted lab

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Certificate of Analysis

Customer Contact: John Dillon

Customer: Tobin Consulting Engineers,

Customer Address: Block 10-4.,
Blanchardstown Corporate Park,
Blanchardstown,
Dublin 15

Report Reference: 14-05947-
Report Version: 1

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 138T

Sample Description: GW1
Sample Type: Water
Date Sampled: 18/11/2014
Lab Reference Number: 193563

Site/Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value	Accreditation Status
D/3000	21/11/2014	Nitrate as NO3	<8.9	mg/l	-	INAB
D/3000	21/11/2014	Ortho-phosphate as P	<0.025	mg/l	-	INAB
D/1049	21/11/2014	TSS	<2	mg/l	-	INAB
L/1016	27/11/2014	Benzene	<0.5	ug/l	-	INAB
L/1016	27/11/2014	Toluene	<1.0	ug/l	-	INAB
L/1016	27/11/2014	Ethyl Benzene	<0.5	ug/l	-	INAB
L/1016	27/11/2014	M&P-Xylene	<0.5	ug/l	-	INAB
L/1016	27/11/2014	O-Xylene	<0.5	ug/l	-	INAB

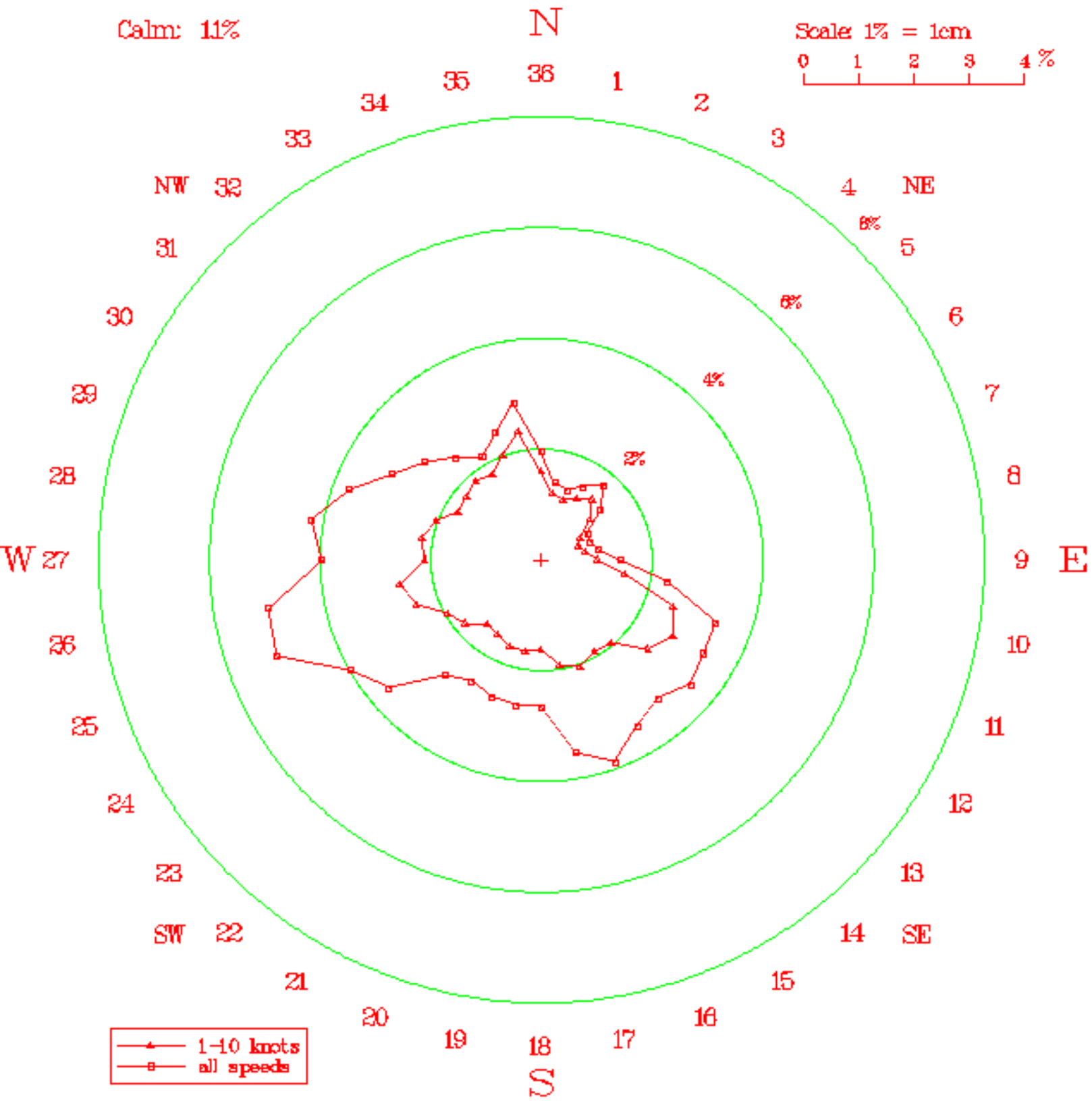
Note:

NAC & ATC - No abnormal change and acceptable to customers.
TVC - Total Viable Count
PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014, and relates only to drinking water samples.
Site D = Analysed at City Analysts Dublin. Site L = Analysed at City Analysts Shannon. Site SUBC= Analysed at a subcontracted lab

Appendix 8.1 Windrose

Wind Rose - Shannon Airport 1974 - 2003

Percentage Frequency of Occurrence of Wind Directions



Percentage Frequency of Occurrence of Wind Speeds

+ less than 0.1

0	1-3	4-6	7-10	11-16	17-21	22-27	28-33	34-40	41-47	over 48	knots
11	12.1	20.6	30.2	26.0	7.2	2.3	0.4	+	+	+	%

mean wind speed: 9.3 knots

standard deviation: 5.4 knots

anemometer height: 12m

Met Eireann, Glasnevin Hill, Dublin 9.

Appendix 11.1 Blast Monitoring

Rocblast Ltd

Environmental Impact of Blasting

for

Goode Concrete Limited

at

Gort

Co. Galway

February 2009

Contents

1.0 INTRODUCTION

Quarryplan, acting on behalf of Goode Concrete Limited, have instructed Rocblast Ltd to compile this report as part of the Environmental Impact Assessment for the proposed extension to their quarry at Gort, Co. Galway.

This report will assess the potential impact upon surrounding residential properties from blasting that will be generated by the development of the quarry, which forms part of the planning application to which this Environmental Impact Assessment pertains.

The design and control of blasting operations are considered, with respect to maintaining safe ground vibration and air overpressure levels, and good blasting practices to reduce the risk of flyrock are described.

There are residential properties 460m to the South West of the Quarry at Sheeaun (numbered 1 on Figure 1), 320m to the North at Ballysheedy (numbered 2 on Figure 1), 420m to the West off the Kilmaldgah Road (numbered 3 on Figure 1), and on the Carrabee/Tubber road 600m to the South East (numbered 4 on Figure 1).

Of the above, the nearest property to the proposed extension is 320m to the North (Numbered 2 on Figure1).

As the impact of blasting operations is a product of the distance of the blast from the receptor structure, it is considered that if the impact can be shown to be within appropriate target levels for the most critical locations above, then all other properties around the site may be assumed to have lower impact and also be within target levels.

Rock excavation in quarries is normally carried out by bench blasting, the proposed operation is no exception. This method consists of drilling holes through the upper rock surface parallel to the artificially created rock face. Occasionally, additional holes may be required at the floor level to assist in the break out if some hard spots should remain from a previous blast.

The maximum charge weight (total weight of explosive material) to be used in a blast, the amount of rock to be produced, borehole diameter and other blast design parameters are matters which must remain entirely within the control of the shotfirer and explosives supervisor. They will of course be limited by safety and environmental considerations.

2.0 Control of Ground Vibration and Air Overpressure.

By its very nature blasting cannot be conducted without causing environmental disturbance, but by employing modern techniques the effects of both ground vibration and air overpressure can be minimised to recognised safe levels.

Well-designed quarry blasts produce optimum rock fragmentation economically. In doing so, explosives energy, which is expended non-productively in creating environmental disturbance, is minimised. An efficient blast therefore from the quarry operator's point of

view also has the additional bonus of causing the least amount of external environmental disturbance.

2.1 Ground Vibration Control

The ground vibration produced by blasting is characterised by being impulsive and of short duration, usually less than 2 seconds, and is therefore quite different from other forms of impulsive shock which are of a repetitive nature. Unfortunately, there is no universally accepted standard for safe ground vibration levels. Different countries have produced their own recommendations, which vary according to prevailing rock conditions, building types and construction methods.

Perhaps the most extensive investigation into structural response from ground vibration was conducted by the U.S. Bureau of Mines. Their report published October 1980 R.I. 8507 *"Structural Response and Damage produced by Ground Vibration from Surface Mines Blasting"* reviewed previous work and added the results of their own research carried out over a number of years.

Their conclusion are summarised as follows:-

Structure type	Vibration Measured as Peak Particle Velocity	
	Frequency <40 Hz	Frequency >40 Hz
Modern Homes	19 mm/s	51 mm/s
Old Houses – Plaster on wood lathe, interior walls	12.7 mm/s	51 mm/s

These figures are given as safe levels unlikely to produce cosmetic damage e.g. paint flaking, hairline plaster cracking.

More recently, the British Standard B.S. 7385 1993 quotes guide values for cosmetic damage for residential or light commercial-type buildings as follows:-

15mm/s at a dominant frequency of 4Hz, increasing to 20mm/s at 15Hz and increasing further to 50mm/s for frequencies of 40Hz. and above.

In Ireland the Environmental Protection Agency (EPA) recognises these limits in its own publication, The State of the Environment in Ireland (February 1996) and states the following:-

For well maintained residential type structures there appears to be almost a consensus on a limit level below which damage is not expected. An overview of the data would suggest a conservative limit of 12mm/s peak particle ground velocity for normal quarry type blasts.

More recent Environmental Management Guidelines published by the EPA (Environmental Management in the Extractive Industry (Non-Scheduled Minerals), 2004) recommends a level of 12mm/s for frequencies below 40hz.

Any doubt that such low levels of vibration are perfectly safe should be dispelled by taking notice of induced strain within a residential type property from daily environmental changes and domestic activity. Daily changes in humidity and temperature can readily induce strain of an order equivalent to blast-induced vibration of between 30 and 70 mm/sec.

2.1.1 Factors Affecting Vibration Levels

It is generally accepted that the magnitude of the ground vibrations (PPV) at any given point will vary according to the maximum weight of explosive charge to be detonated at any instant during the blast (MIC), and the distance from the blast to that position (D).

An approximate relationship between the magnitude of ground vibration and the maximum charge weight per delay, has been developed by the U.S. Bureau of Mines and is as follows:-

$$PPV = C\,[D \div \sqrt{MIC}]^{-B}$$

where C & B are site constants
PPV is in mm/s, MIC is in kg and D is in m

However other factors also have a marked effect. In our experience, the degree of confinement of the explosive charge is potentially the next most influential factor (after D and MIC). Doubling the degree of confinement either by excessive burdens or too much sub-grade drilling can increase the magnitude of the seismic wave by up to a factor of five. The relative degree of confinement can also be raised by under charging of shot holes, i.e. if the rock cannot be broken easily and efficiently due to insufficient charging, a larger proportion of the explosive energy is radiated from the site as shock waves.

2.1.2 Blast Design to control vibration

Insufficient vibrograph data exists to construct a regression curve for properties adjacent to this site, therefore recommendations regarding blast design and predicted vibration levels are drawn from average results from typical Irish Quarries.

These can be represented by a regression curve of Log PPV V's Log Scaled Distance (SD) where (SD)= Distance/$(MIC)^{1/2}$, (Figure 2).

The maximum charge sizes for the initial blast should be calculated (or taken from Table 1) using a Scaled Distance of 20 $mkg^{-1/2}$ in relation to the nearest residence.

From the regression curve, this would be expected to produce a peak velocity in the 6mm/s to 7mm/s range, which is less than half of the safe level recommended in B.S. 7385 1993.

The vibrations from subsequent production blasts should be monitored at or near the nearest residential property and the results used to establish a Scaled Distance relationship for the site.

We recommend that blasts be designed within the following parameters.

i) Burden from (30 to 45) x hole diameter

ii) Spacing from (1.0 to 1.25) x the burden

iii) Sub-grade Drilling <1/3 x burden

iv) Produced rock / Explosive Charge ratio > 1.8 m^3/kg

v) Top column stemming to be > 0.75 x design burden to a minimum length of 2.7m for burdens under 3.6m.

2.2 Control of Air Overpressure

Noise from a quarry blast is not usually a cause of complaint with regard to its loudness but rather that it may sometimes cause vibration which equates to a slight rattling of windows, similar to a gust of wind or a passing truck and is often mistaken for ground vibration. Noise from blasting is characterised by containing a large proportion of energy of less than 20Hz which is below the normal hearing range of the human ear, and therefore is termed air overpressure rather than noise. It is because of these low frequencies that air overpressure from blasting is measured in the dB-linear rather that the dB-A weighted scale that corresponds to the response of the human ear.

The US Bureau of Mines have carried out considerable research over the years into the effects of noise and vibration from mining and quarrying operations and are generally regarded as a leading authority on the subject. The report No 8485 of 1980 by the US Bureau of Mines concluded that, based on a minimal probability of the most superficial type of damage in residential-type structures a level of **133dB** (Measured with 2Hz high pass instrument) represents a safe maximum air overpressure level. This is equivalent to a pressure of 0.013psi that, for comparative purpose is equal to the dynamic pressure produced from a wind speed of 12 metres per second, i.e. Force 6, being a "strong breeze" on the Beaufort Wind Scale. It should be noted that air overpressure from quarry blasting usually has a duration time of less than 2 seconds whereas wind force may be exerted over a considerable period of time.

2.2.1 Factors Affecting Air Overpressure

Air overpressure can be minimised by correct blast design but meteorological conditions, particularly wind direction and strength, do have an important influence on the pressure level at a particular location, hence some quarry blasts are heard more easily in one direction than another. For this reason the imposition of a maximum permitted level is questionable without some limited exceedance clause. This is particularly relevant in Ireland where, because of the requirement for security during the transport of explosives and at the blast site, quarry blasts have to be arranged days in advance, and therefore take place irrespective of the prevailing weather conditions.

In Ireland, the EPA Guidelines (Environmental Management in the Extractive Industry (Non-Scheduled Minerals), 2004) recommends a level of 125dB (linear maximum peak value) with a 95% confidence limit.

3.0 Safe working systems to reduce the risk of Flyrock

In normal quarry blasting, the limits of the broken rock resulting from a bench blast usually fall on the quarry floor within a distance of 1 to 1.5 times the height of the face.

If blasting operations are carried out in compliance with current best practice, the likelihood of Flyrock occurring is much reduced.

3.1 Blast Design to reduce the risk of Flyrock

The Shotfirer and Explosives Supervisor will consult to determine the amount of rock to be produced. The borehole diameter, bench height and other blast design parameters as described in **2.1.2** above will be chosen, and used to calculate the required amount of explosives per hole.

.

3.1.1 Actual Burdens

The Shotfirer should check the crest burden at each shot hole, and inspect the rock face in front of each shot hole to ensure that the actual burden is adequate. Areas of reduced burden should be taken into account and when deciding the positioning of explosives and stemming within each hole. Sections of holes behind such areas should be loaded with stemming in place of explosives.

3.1.2 Drilling Angles

The Shotfirer should check that holes are drilled at suitable angles and do not converge on the rock face causing the actual burden to be reduced. Neither should the holes converge on each other as this will cause the spacing to be reduced leading to possible overcharging.

3.1.3 Geological Anomalies

Cavities, clay bands, joint planes etc must be considered during the blast design stage. The Driller should report the presence of any such features, discovered during drilling, to the Explosives Supervisor who should consider the reported information, along with any features identified during the face inspection, when deciding the positioning of explosives and stemming within each hole. As with areas of reduced burdens, sections of holes that pass through large fissures or clay seams should be loaded with stemming in place of explosives.

3.1.4 Collar Stemming

Flyrock can occur when the depth of collar stemming is insufficient. Therefore it is important that the collar stemming be carefully controlled.

i) No explosive should be loaded closer to the collar of the hole than a distance equal to 0.75 x the design burden (burdens greater than 3.6m), or 2.7m for burdens less than 3.6m.

ii) Only clean angular chippings will be used.

iii) If the depth of collar stemming is going to be less than planned (see 'i' above) due to an unexpected rise of the explosives charge, or blockage, the Shotfirer will try to remove explosives until the desired depth is attained. If the explosives cannot be removed, the area around the top of the hole will be loaded with quarry dust so that the actual length of collar stemming plus the height of the mound of quarry dust is 3.3m. The danger area should also be reassessed and may include public areas (depending on the location of the hole).

3.1.5 Delay Sequence Timing

Fly rock can be caused by incorrect use of delay sequence timing. The time interval between adjacent holes should be between 5 and 20 ms per metre spacing. Where multi-row blasting is being undertaken the delay periods between rows should be between 10 and 30ms per metre burden.

4.0 Danger Zone

Prior to each blast being initiated a danger zone will be determined to minimise the impact of the blast. The radius of the danger zone around a blast is a matter for the shotfirer. No rigid safety zone radius should be laid down, as it must be up to the shotfirer to judge the level of hazard for each blasting situation. However, It should be as large as possible and apply to blasts in all parts of the quarry (so that there is no chance of confusion between danger areas when blasting in different areas of the quarry). The danger area should be amended if loading conditions cause alterations to the design, for example, Cartridges accidentally placed or jammed in positions likely to cause Flyrock (behind areas of reduced burdens, Geological anomalies or higher than the intended collar stemming).

5.0 Warning System

In order not to startle persons nearby (within 400m.) an advance warning of the impending blast should be given. This advance warning should be limited for security reasons and an agreed siren warning system may be the most effective method.

6.0 Impact and Mitigation Measures

A summary of the likely impacts and proposed mitigation measures, as described in section 2.1.2 to 5.0 are outlined in tabular form below for ease of reference.

Impact and Mitigation Measures

Possible Impacts	Recommended Levels	Mitigation Measures
Ground Vibration	12 mm/s	1 Use a scaled distance of 20mkg$^{-1/2}$ to calculate the maximum instantaneous charge for the initial blast. 2 Monitor the initial and several subsequent blasts to determine the scaled distance to PPV relationship for the site, to be used in following blast designs.
Air Overpressure	125 dB	1 Collar stemming to be greater than either 2.7m or 0.75 times the burden (which ever value is greatest). . 2 Collar to be stemmed with clean angular chippings.
Fly Rock	Unacceptable outside the danger zone	1 Planned Burden to be greater than 30 times the hole diameter. 2 Spacing to be greater than the planned burden 3 Blast ratio to be greater than 1.8 m^3 of rock per kg of explosives. 3 Shotfirer is to check the crest burden and inspect the rock face for signs of weakness or reduced burden. 4 Shotfirer is to check that holes are drilled at suitable angles and do not converge on the rock face (reduced burden) or on each other (reduced spacing). 5 Driller is to report any signs of geological anomalies discovered during drilling. 6 Collar stemming to be greater than either 2.7m or 0.75 times the burden (which ever value is greatest). 7 Collar to be stemmed with clean angular chippings. 8 If explosives are stuck in the stemming area, the area around the top of the hole will be loaded with quarry dust so that the actual length of collar stemming plus the height of the mound of quarry dust is 3.3m. 9 The delay time interval should be between 5 to 20 ms per metre spacing and 10 to 30ms per metre burden.
Danger to persons	Unacceptable	1 Danger zone determined and established by shotfirer and explosives supervisor.
Alarm to Public		1 advance warning system to be agreed and communicated to persons within 400m of the blast

7.0 Conclusion

The intervening distance between the nearest residential properties and the proposed quarry extension is adequate to allow successful quarry blasting operations to be continued while at the same time keeping the environmental emissions within guidance levels.

It is therefore our opinion that if the recommendations given with respect to blast design parameters are implemented, the levels of ground vibration produced will be very unlikely to cause even minimal cosmetic damage to the adjacent properties, and the risk of flyrock will be negligible.

D. Maxwell
Rocblast Ltd

Figure 1. Location map showing positions of nearest properties

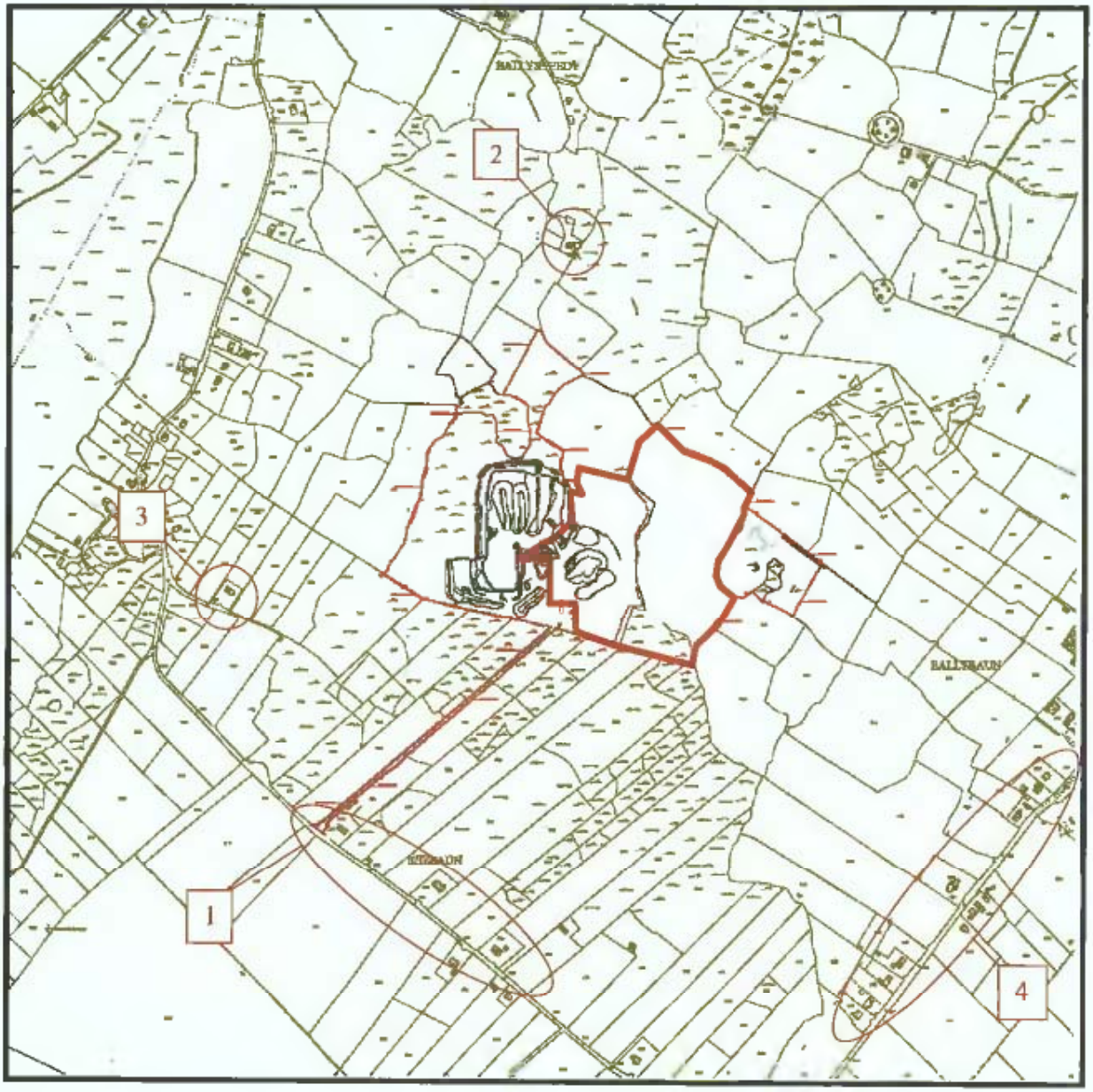


Figure 2. Regression Line for Irish Quarries

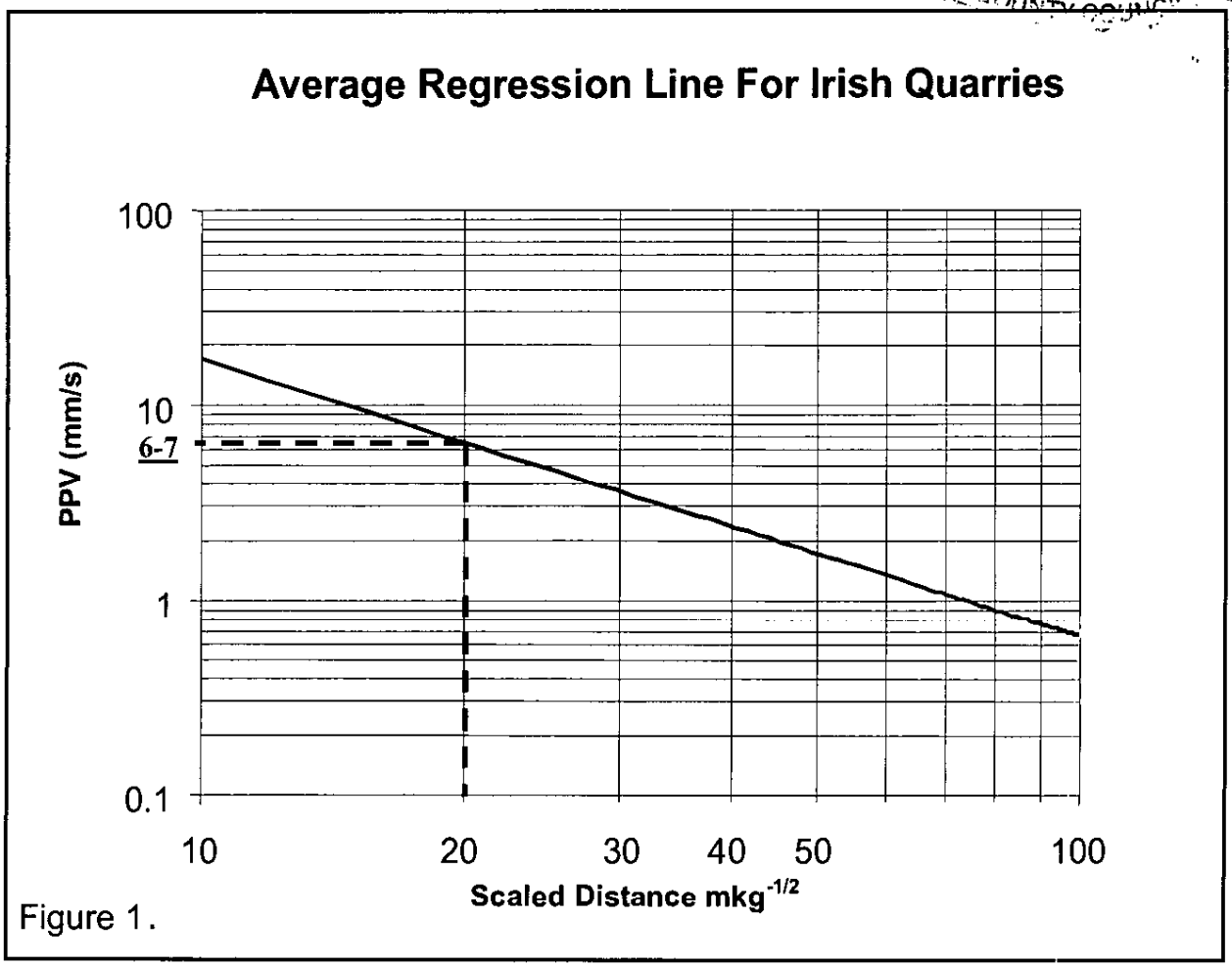


Figure 1.

Table 1. Distance v MIC for a Scaled Distance of 20

Distance V's MIC for a Scaled Distance of 20	
Distance (m)	Max Inst. Charge (kg)
100	25
200	100
300	225
350	306
400	400

Appendix 12.1 Photographs of Ballysheedy Quarry

Appendix 12.1

 v

Location 1 View south from top of internal stockpile (to the east of substitute consent area)

Location 2 View south from R460 flyover. M18, road signage and agricultural building in the foreground

Location 3 View East to Quarry, M18 embankment in the foreground, Burren hills in the background

Location 4 View Northwest to Quarry, Local road in foreground

Location 5 View West from site within Gort Town, local housing in foreground

Photo 6 View east to quarry, Kilmaduagh in the background

Photo 7 – View east to quarry