REMEDIAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

SUBSTITUTE CONSENT APPLICATION FOR A SAND AND GRAVEL PIT AT CLONFINLOUGH, CO. OFFALY.

Prepared For:

Dermot Nally Stone Ltd.
Lowerwarren,
Baylin
Athlone
Co. Westmeath

Prepared By:

Earth Science Partnership Ire. Ltd
Tonranny
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Co. Mayo
July 2019

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1.0 INTRODUCTION

This remedial Environmental Impact Assessment Report (rEIAR) has been prepared to accompany an application for Substitute Consent to An Bord Pleanála regarding the historic development of a sand and gravel pit located at Clonfinlough, Co. Offaly. This application is being submitted on behalf of Dermot Nally Stone Ltd. (the 'Applicant').

The development consists of 0.97 Hectares of an existing sand and gravel pit which was subject to extraction of material after expiry of planning permission on 31st day of December 2009. This extraction area is contained within the overall pit area of 15.34 hectares consisting of areas ancillary to the extraction area (0.97 Ha.) that were used for processing and storage of extracted material and storage of overburden pending restoration. The applicant is submitting this application in order to regularise the planning status of this sand and gravel pit.

This chapter of the rEIAR details an introduction to the Section 261A process, the history of the application site and past extraction activities. It also outlines the structure of the rEIAR and the competencies of the expert team employed to undertake the assessment. The application for Substitute Consent is also accompanied by a remedial Natura Impact Statement (rNIS).

The reserve of material at the application site has been exhausted and no future extraction will be undertaken at the pit. As stated above the applicant is submitting this application in order to regularise the development and restore in line with the landscape and restoration plan discussed in Section 13.0.

1.1 Section 261A Process (Substitute Consent)

Substitute Consent is a special provision made for quarries under Section 261A of the Planning & Development Act 2000 (as amended) whereby for a limited period quarries which were deemed to be in breach of the EIA/ Habitats Directive would be permitted to apply for Substitute Consent. It is essentially a form of retrospective consent for an existing development and requires submitting an application which is accompanied by either a remedial Environmental Impact Assessment Report (rEIAR) or a remedial Natura Impact Statement (rNIS) or both to An Bord Pleanála.

Local Authorities were required to assess each quarry in its administrative area in relation to the EIA and Habitats Directive and where they determined that a quarry was in breach of one or both, the Local Authority was required to make a further decision in relation to the following:

i) The quarry development had commenced prior to the inception of the planning law system in 1964;
   OR
ii) Had obtained a relevant planning permission in the past;
   AND
iii) The quarry must have also registered under Section 261, if required to do so.

Based on the relevant Planning Authority assessment which is subject to the relevant conditions outlined above being in place, the Planning Authority issued a notice in relation to the assessment detailing a decision under Subsection 3(a), 4(a) or 5(a) or issued a notice stating 'No Further Action is required'.

Where it is established that the EIA or Habitats Directive have not been offended a 'No Further Action Notice' is submitted in respect of that quarry under section 261A. A notice under Subsection 3(a) directed the quarry owner/operator to apply for Substitute Consent with the application to be accompanied a remedial Environmental Impact Statement (rEIS) (now named an Environmental Impact Assessment Report (rEIAR) under the recently updated EIA Directive 2014/52/eu) and/or a remedial Natura Impact Statement (rNIS).

Should conditions (i) or (ii) and (iii) listed not be adhered to, a notice under Subsection 4(a) or 5(a) was issued to a quarry owner/operator requiring that the quarry owner/operator to cease operations and that an enforcement notice will be issued. The determination and decision of the Local Authority could be appealed to An Bord Pleanála who confirmed, amended or set aside the Local Authority Determination and Decision.

1.2 Project Background

In 2012, Offaly Co. Co. (OCC) examined the development for the purposes of Section 261A and concluded that 'No Further Action' was required under that section, even though small scale development was continuing apparently out of term but wholly within the previously authorised area, all of which had undergone EIA by virtue of the overall site activities having been assessed during the second extension planning permission. In making its conclusions, OCC also found that no NIA offence had occurred by that time either.

The operator continued to operate in this manner thereafter. In 2015, OCC issued a Warning Letter to the operator in relation to the continued development post expiration of the 2004 permission authorisation deadline, and with regard to restoration of the site. The operator then elected to regularise the development and approached OCC with regard to this course of action.

Despite, (A) the entire site having undergone EIA previously, (B) the outcome of the Section 261A process being 'No Further Action', and (C) the area extracted post 2009 being a small percentage of even the threshold for determination for sub-threshold EIA, OCC decided that EIA was required, and would not entertain arguments to the contrary that EIA was not required based on (A) – (C). In making its decision, OCC insisted that EIA be undertaken and that it was legally permissible with a retention element as the site had undergone EIA pre development previously.

The operator, with reservations, complied with the direction of OCC and applied to regularise the site and for prospective permission to complete the site works. In the course of processing the application, OCC then requested a Stage 2 Natura Impact Statement, again something which had not been raised prior to application even though submission of an Environmental Impact Statement had been discussed, but was asked for purely on foot of a request by the Dept. of Arts, Heritage and the Gaeltacht. Even though OCC had ruled out NIA as an issue at that time and previously during Section 261A in 2012, with no significant change to the site in the meantime, and with all development within the previously authorised areas, the operator was forced to comply with this Further Information request.

OCC made a decision to grant permission with the decision to grant appealed to An Bord Pleanála (hereafter the Board) by a known local objector. The Board overturned the decision to grant based on there being a retention element within an application for development with EIA and NIA under Section 34(12).

Following on from the refusal of planning permission the only planning process now available towards regularisation was to Apply for Leave to Apply for Substitute Consent to An Bord Pleanála under Section 177(C). An application for leave to apply for Substitute Consent was submitted to An Bord Pleanala on 21st August 2017. The application was assessed by An Bord Pleanála who decided by order dated 8th January 2019 that exceptional circumstances existed such that it would be appropriate to permit the opportunity for regularisation of the development by permitting an application for Substitute Consent. A copy of the Order is attached in Appendix I.

The applicant requested an extension of time to submit the application for Substitute Consent to An Bord Pleanála. An Bord Pleanála reviewed the application and granted an extension of time with the revised deadline for submission extended to 22nd July 2019. Please see the An Bord Pleanála order attached in Appendix II.

1.3 Substitute Consent Application Site

The existing sand and gravel pit is located in the townland of Clonfinlough, Co. Offaly which is located approximately 6km south west of the village of Ballinahown, 8.7km north west of Ferbane and 8.6km north east of Shannonbridge. Figure 1.1 attached at the end of this chapter and Plate 1.1 details the location of the sand and gravel pit.

The existing pit has an overall area of approximately 15.34 hectares and consists of a Pre-63 area and areas which were authorised by way of two separate planning permissions. Material was extracted by excavators and was processed into various grades depending on market demand at the existing processing plant on site.

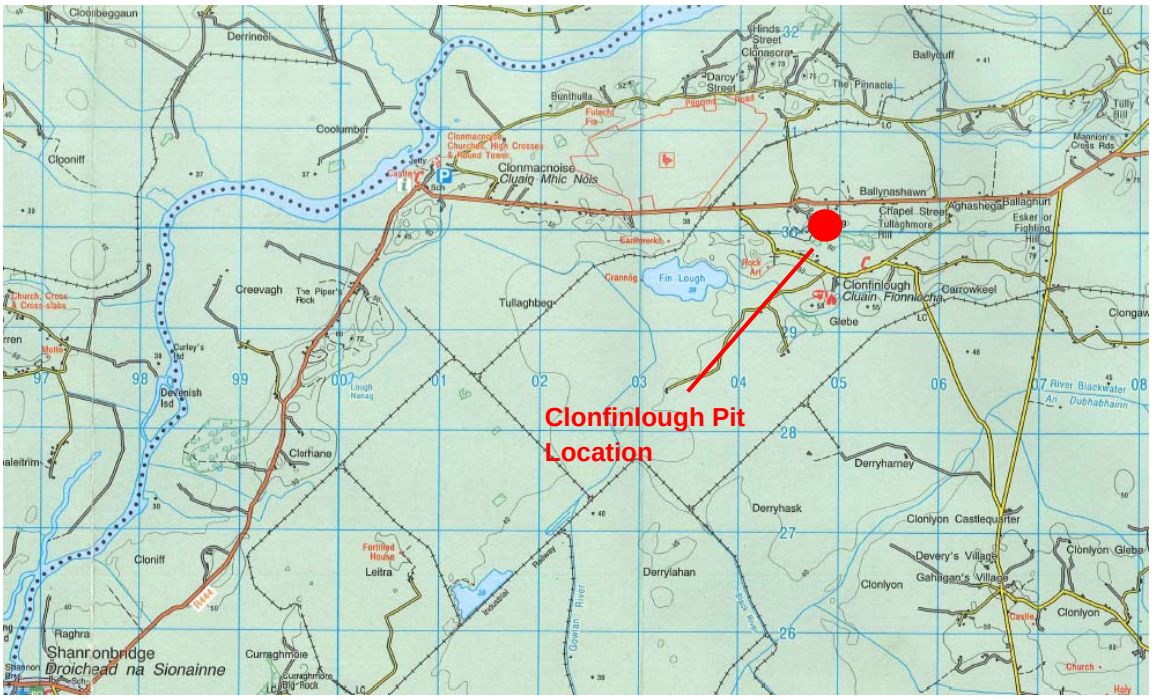
The Board direction states that *the application for substitute consent shall be in respect of the entire quarry of 15.34 hectares, and shall relate only to the quarrying development that has taken place since the first day of January 2010, and shall not include any proposed further quarrying.* Therefore the application is being submitted in respect of the area illustrated on Figure 1.3 attached at the end of this chapter which details the 15.34 hectare area and the 0.97 hectare area which was subject to extraction since the first day of January 2010.

Plant and machinery which operated in the application area consisted of tracked excavators, wheel loaders, dump trucks, processing plant and road trucks to haul material off site. Ancillary plant such as a water bowser for dust suppression was deployed where required.

The topography of the sand and gravel pit varies as a result of past extraction undertaken. The pit is located on an esker feature composed of a narrow ridge of sand and gravel which more or less runs in a continuous line from Shannonbridge to Clonmacnoise and on to Clara. Existing berms and hedgerows in place around the boundary of the pit screen the pit from public view at the majority of locations. Access to the pit is gained via an existing entrance off the R444 Regional Road which links Shannonbridge to the N62 south of Ballinahown village.

Land surrounding the application site consists predominantly of agricultural land which is subject to livestock grazing and areas of peatland which are subject to peat extraction. The area is sparsely populated with one off dwellings and farmhouses located along roads in the vicinity of the site.

Plate 1.1: Site Location



1.4 The Applicant

Dermot Nally Stone Ltd. operates a number of gravel pits within a twenty kilometre radius of Athlone, and this is the fourth generation of the family involved in the gravel business. The company supplies a range of sand, gravel and stone products to the construction industry, the main customers being local authorities and civil engineering/building contractors, farmers and private house holders. The company employs 8 full-time staff and 2 part-time staff. The applicant also owns and operates a number of pits in the Offaly Westmeath area.

1.5 Remedial EIAR Methodology

1.5.1 Remedial EIAR Preparation

Section 177F (1) of the Planning and Development Acts 2000-2010 states that a remedial Environmental Impact Statement (now rEIAR) shall contain the following information:

(a) A statement of the significant effects, if any, on the environment, which have occurred or which are occurring or which can reasonably be expected to occur because the development the subject of the application for substitute consent was carried out.

(b) Details of:

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

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

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

The following guidelines were considered as part of the preparation of this rEIAR:

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DHP&LG, August 2018)
- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR) (EPA, August 2017)
- Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU) (European Union, 2017)
- Draft Advice Notes for Preparing Environmental Impact Statements (EPA, September 2015).
- Guidance for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of the Environment, Community and Local Government, 2013).

Information on the project and the receiving environment was obtained through a number of means including:

- Satellite imagery (Bing and OSI);
- Historic online maps (6" and 25");
- Site visits and field surveys;
- Site investigations (geotechnical, environmental etc.);
- Review of existing data for the general area of the site;
- Review of previous studies carried out at the site and locality;
- Consultation with interested parties.

Article 3 of the EIA Directive (2014/52/EU) states that the following environmental factors/topics should be described and assessed:

1. *"The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:*
   (a) population and human health;
   (b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
   (c) land, soil, water, air and climate;
   (d) material assets, cultural heritage and the landscape;
   (e) the interaction between the factors referred to in points (a) to (d).

2. *The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned."*

1.5.1 Remedial EIAR Format

The rEIAR is presented in the 'Grouped Format Structure' which gives an introduction and overall project description, then examines each topic within individual chapters. The coverage of each topic includes descriptions of the relevant characteristics of the proposed project, the existing environment, predicted impacts, mitigation measures and residual impacts.

The rEIAR is structured under the following subject headings:

- 1.0 – Introduction
- 2.0 – Screening & Alternatives
- 3.0 – Planning and Legislative Framework
- 4.0 – Project Description
- 5.0 – Population and Human Health
- 6.0 – Biodiversity
- 7.0 – Land, Soils and Geology
- 8.0 – Water
- 9.0 – Climate
- 10.0 – Air
- 11.0 – Noise and Vibration
- 12.0 – Traffic
- 13.0 – Landscape
- 14.0 – Material Assets
- 15.0 – Cultural Heritage

- 16.0 – Interactions
- 17.0 – Remedial Measures and Monitoring Summary

Chapter 1.0 provides an introduction to the development and gives details in relation to the project team and their relevant expertise and competencies, including external consultants retained to assess various environmental factors/topics.

Chapter 2.0 provides details in relation to screening and consideration of alternative designs and processes.

Chapter 3.0 provides details relating to the historic work methods within the development including day to day processes that were undertaken at the existing development.

Chapter 4.0 sets out the planning and development context relating to the development. This chapter reviews the national, regional and local planning policy relevant to the development.

Chapter 5.0 – 15.0 details information on all aspects of the existing environment including any impacts or potential impacts identified. Existing measures are reviewed and remedial measures are proposed where required in order to offset potential impacts identified.

Chapter 16.0 addresses the cumulative impacts, indirect impacts and main interactions between different aspects of the environment likely to be significantly affected by the historic activities at the application site. Only topics that could be logically linked to the development have been examined in detail. Accordingly, when a topic is not mentioned, it is concluded that no potential for conflict exists.

Chapter 17.0 provides a summary of the mitigation measures and monitoring measures proposed in order to offset potential impacts identified.

1.5.2 Chapter Layout

In accordance with the EPA (2017) draft guidance document, Chapters 5.0 to 15.0 of the rEIAR follow the same general layout, as follows:

1. **Introduction** – Describes the purpose of and rationale for inclusion of the particular environmental topic within the rEIAR.
2. **Methodology** – Details the sources of baseline information and data and the methods employed to gather data.
3. **Existing Environment** – A description of baseline information/data relating to the aspects relevant to each particular environmental topic. The description of aspects

of the environment provides sufficient data to facilitate the identification and evaluation of the likely significant effects of the topic. Systematic, accurate and comprehensive descriptions of the environment are presented under the following headings within each chapter:

- Context – Description of the location, magnitude, spatial extent and trends of the environmental factor;
- Character – An indication of the distinguishing aspects of the environment under consideration e.g. the types of habitats present or the current status of onsite water quality;
- Significance – The quality, value and/or designation assigned to the aspect of the existing environment under consideration, and;
- Sensitivity – An evaluation of the sensitivity of the aspect of the environment to change e.g. would any increase in nutrients cause eutrophication of local waterbodies or would disturbance cause nesting birds to disperse?

4. **Impact Assessment** – A clear and concise description of the *likely significant effect*s of the proposed development on the environmental topic in terms of the following (Table 1.1):

- Quality of effects - whether an effect is positive, negative or neutral;
- Significance of effects - imperceptible, not significant, slight, moderate, significant, very significant, profound;
- Extent and context of effects – size of the area/number of sites/proportion of population effected and whether this will conform or contrast with established baseline conditions;
- Probability of effects – likely or unlikely;
- Duration and frequency of effects – momentary, brief, temporary, short-term, medium-term, long-term, permanent, reversible, frequency.

Table 1.1: Definition of Effects (EPA, 2017)

Characteristic	Level	Description
Quality	Positive	A change which improves the quality of the environment.
	Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative	A change which reduces the quality of the environment.
Significance	Imperceptible	An effect capable of measurement but without significant consequences.
	Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends.
	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound	An effect which obliterates sensitive characteristics.
	Extent	Describe the size of the area, number of sites and the proportion of a population affected by an effect.
	Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions.
Probability	Likely	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Duration and Frequency	Momentary	Effects lasting from seconds to minutes.
	Brief	Effects lasting less than a day.
	Temporary	Effects lasting less than a year.
	Short-term	Effects lasting one to seven years.
	Medium-term	Effects lasting seven to fifteen years.
	Long-term	Effects lasting fifteen to sixty years.
	Permanent	Effects lasting over sixty years.
	Reversible	Effects that can be undone, for example through remediation or restoration.
	Frequency	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).

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

5. **Mitigation Measures** – existing measures which were in place when operational were assessed in terms of their penitential to avoid, reduce and where practicable remedy significant adverse effects.

6. **Remedial Measures** – a description of the measures designed to avoid, prevent, reduce, remedy or offset any identified significant adverse effects on the environment, as follows:

   - Avoidance – when no effect is caused (often through consideration of alternatives);
   - Prevention – when a potential effect is prevented by a measure thus avoiding the possibility of the effect occurring;
   - Reduction – when an effect is lessened;
   - Remedy – when an effect is resolved by remedial action
   - Offset – when an adverse effect is balanced by a positive effect.

   The description also explains the extent to which significant adverse effects on the environment are avoided, prevented, reduced or remedied/offset. The proposals of any monitoring arrangements are also outlined in this chapter.

7. **Residual Impacts** – a description of the final or intended effects which remain after the proposed remedial measures have been implemented. These are the remaining environmental "costs" of a project that could not be reasonably avoided

and will be a key consideration in deciding whether the project will be permitted or not. For this reason, residual effects are clearly described in accordance with the system of effects description as set out above i.e. quality, significance, extent, etc.

1.6 Competency of Experts

Article 5(3) (a) of the amended Directive requires that "*the developer shall ensure that the environmental impact assessment report is prepared by competent experts…*" and Recital (33) of the Directive 2014/52/EU requires that "*sufficient expertise, in the relevant field of the project concerned, is required for the purpose of its examination by the competent authorities in order to ensure that the information provided by the developer is complete and of a high level of quality."* As such, Table 1.2 presents details of all competent experts involved in the preparation of this EIAR.

1.7 Technical Limitations

Data limitations and technical difficulties associated with the compilation of the EIAR are detailed in relevant chapters of the EIAR.

Table 1.2: The EIAR Study Team and their relevant competencies

Chapter	Company	Competent Expert	Area and Level of Expertise
1.0 Introduction	Earth Science Partnership (Ire.) Ltd.	David Killeen BSc. Env Patrick O'Donnell C Eng. BSc. Eng. Dip Eng. MIEI	Senior Environmental Consultant Principal Environmental Engineer
2.0 Screening & Alternatives			
3.0 Project Description			
4.0 Planning & Legislative Framework			
5.0 Population & Human Health			
6.0 Biodiversity	Sean Meehan Ecology	Seán Meehan BSc (Hons) MSc ACIEEM	Senior Ecologist
7.0 Land, Soils & Geology	Earth Science Partnership (Ire.) Ltd.	David Killeen BSc. Env Patrick O'Donnell C Eng. BSc. Eng. Dip Eng. MIEI	Senior Environmental Consultant Principal Environmental Engineer
8.0 Water	Hydro-Environmental Services	David Broderick BSc, H.Dip Env Eng, MSc	Consultant Hydrogeologist
9.0 Climate	Earth Science Partnership (Ire.) Ltd.	David Killeen BSc. Env Patrick O'Donnell C Eng. BSc. Eng. Dip Eng. MIEI	Senior Environmental Consultant Principal Environmental Engineer
10.0 Air			
11.0 Noise			
12.0 Traffic			
13.0 Landscape			
14.0 Material Assets			
15.0 Cultural Heritage			
16.0 Interactions			
17.0 MiMeasures & Monitoring Summary			

1.8 References

Dept. of the Environment, Community and Local Government (2013) Guidance for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessments

Directive 2014/52/EU European Parliament and of the Council EIA Directive (April, 2014)
Environmental Protection Agency (2006) Environmental Management Guidelines – Environmental Management in the Extractive Industry (Non – Scheduled Minerals)

Environmental Protection Agency (2006) Environmental Management Guidelines: Environmental Management in the Extractive Industry (Non-Scheduled Minerals)

Environmental Protection Agency (2015) Advice Notes on Preparing Environmental Impact Statements (Draft) September 2015

Environmental Protection Agency (2017) Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft) August 2017

Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU) (European Union, 2017)

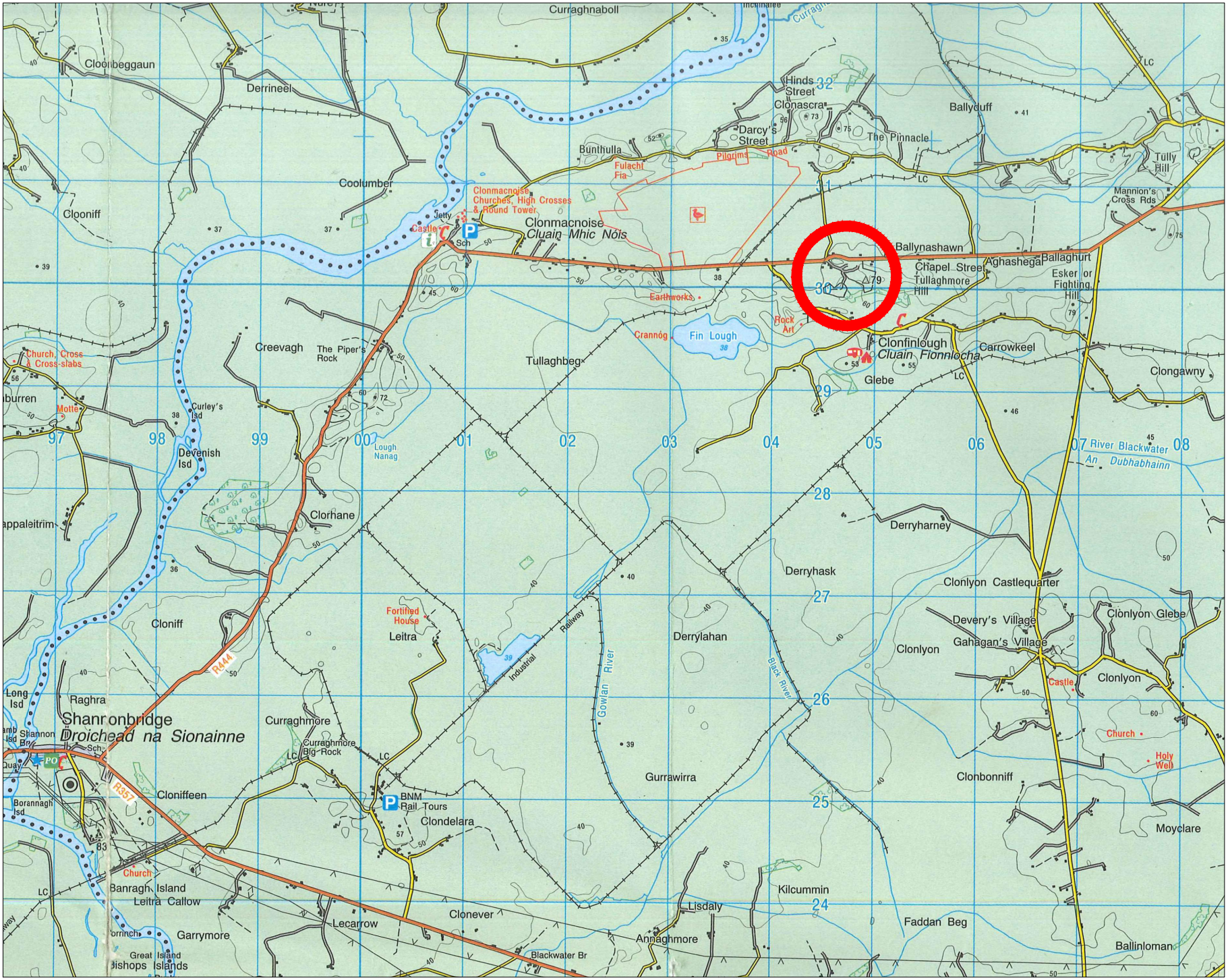
S.I. No. 600 of 2001: Local Government (Planning and Development) Regulations, 2001

S.I. No. 93 of 1999: European Communities (Environmental Impact Assessment) Regulations, 1989 to 1999, Second Schedule

S.I. No. 93 of 1999: European Communities (Environmental Impact Assessment) Regulations, 1989 to 1999, Third Schedule

S.I. No. 349 of 1989: European Communities (Environmental Impact Assessment) Regulations, 1989 to 1999.

Figures



Legend

Site Location

N

O.S. Ref No. Discovery Map 47

ITM Coords: 604783 E, 730080 N

Rev.	Description	Date

EARTH SCIENCE PARTNERSHIP
CONSULTING ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS
Tonranny Westport Co. Mayo
tel.:- +353(098) 28999 fax:- +353(098) 24727
e-mail: earthsciencepartnership@gmail.com

Client: Dermot Nally Stone Ltd.

Project: Remedial Environmental Impact Assessment Report to Accompany a Substitute Consent Application for a Sand & Gravel Pit at Clonfinlough, Co. Offaly

Title: Site Location Map

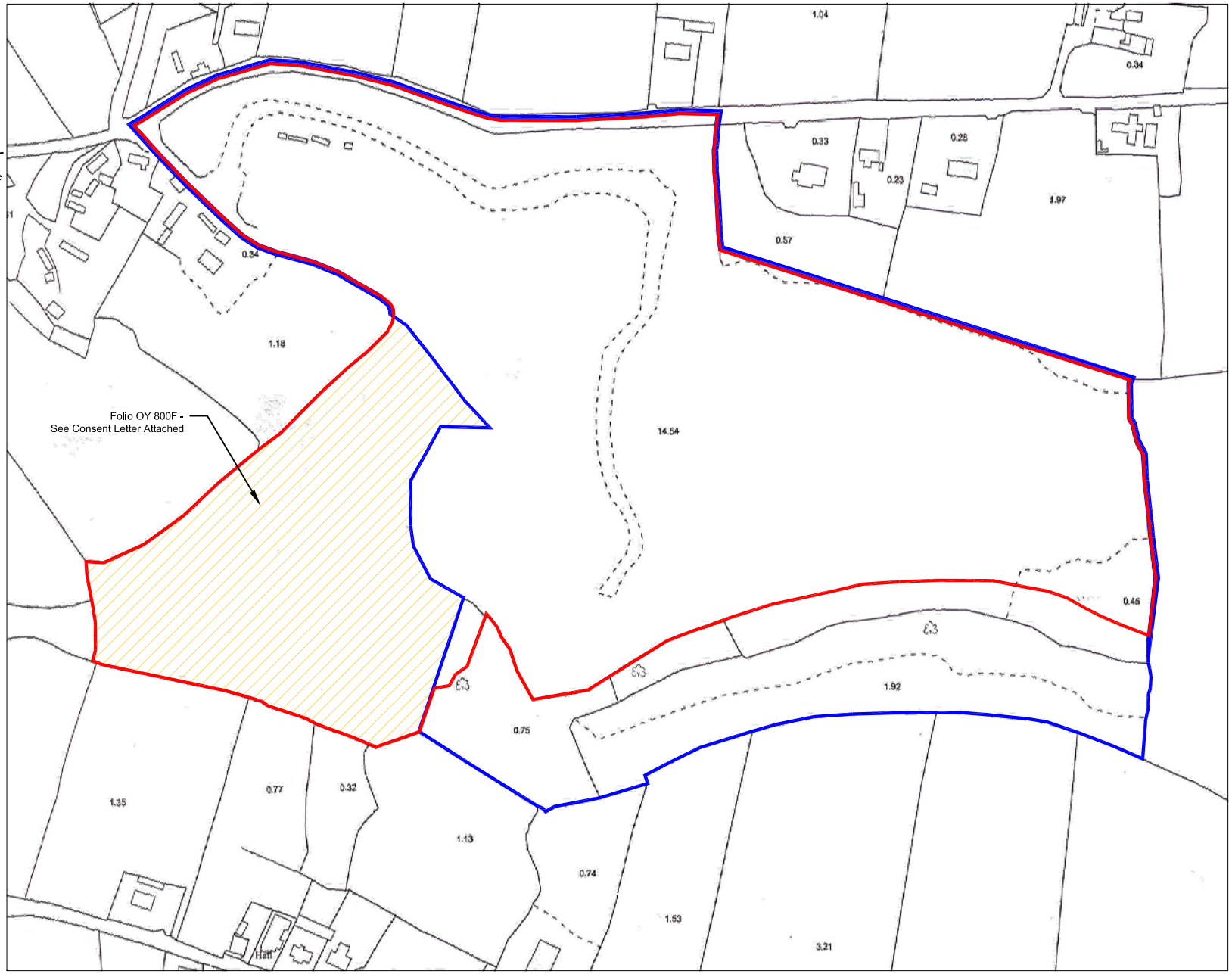
Drawn By: Sean O' Donnell

Checked By: Patrick O' Donnell

Scale: 1:50,000 @ A4 | Date: July 2019

Job No: EI 171 | Rev: 0

Figure 1.1



Legend

Ownership Boundary

Application Area

Area = 15.34 Ha

Folio OY 800F
Consent Letter Attached

N

O.S. Map Ref No.3301

ITM Coords: 604783 E, 730080 N

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EARTH SCIENCE PARTNERSHIP
CONSULTING ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS
Tonranny Westport Co. Mayo
tel:- +353(098) 28999 fax:- +353(098) 24727
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Client: Dermot Nally Stone Ltd.

Project: Remedial Environmental Impact Assessment Report to Accompany a Substitute Consent Application for a Sand & Gravel Pit at Clonfinlough, Co. Offaly

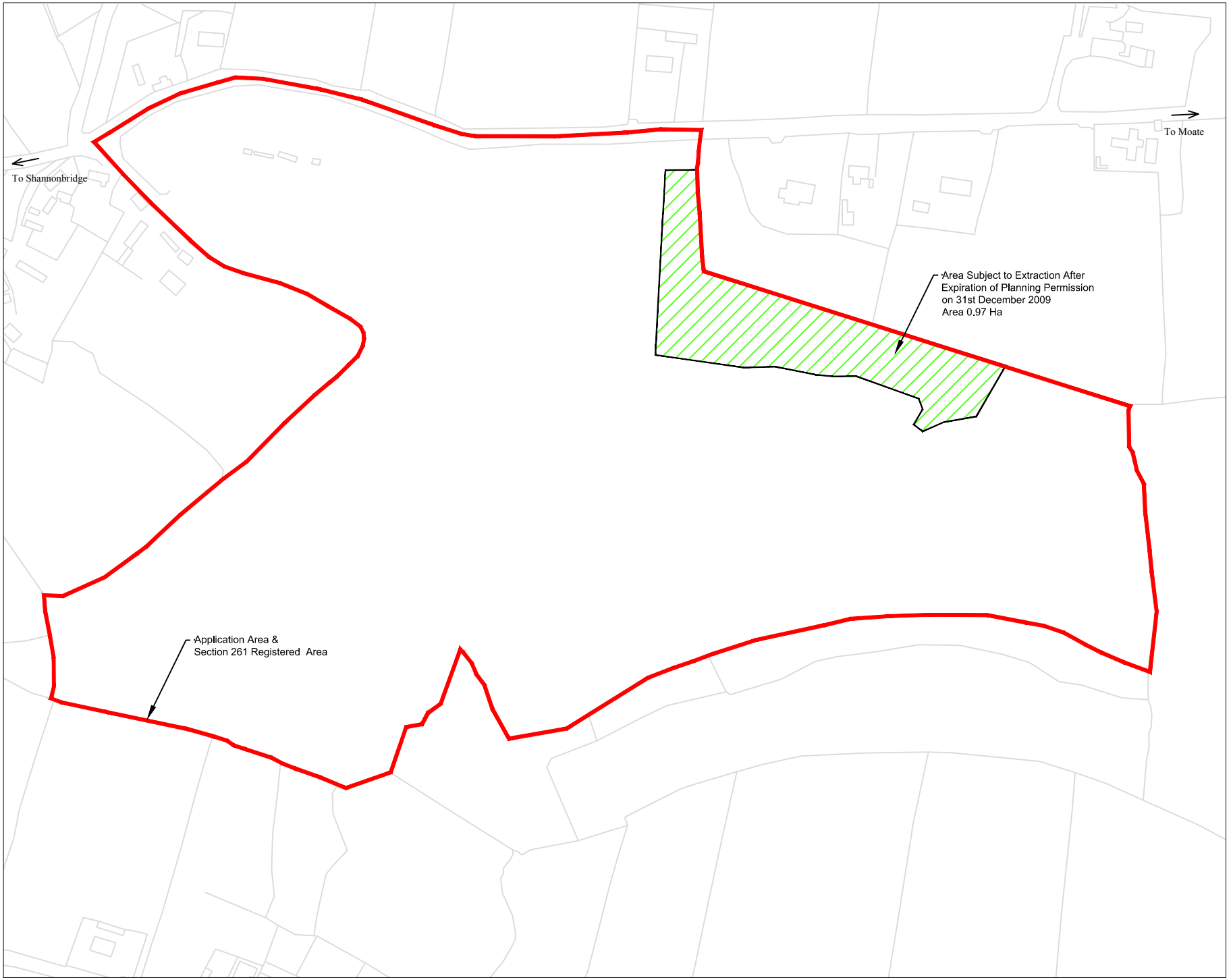
Title: Application Area Location Map

Drawn By: Sean O' Donnell

Checked By: Patrick O' Donnell

Scale: 1:3,500 @ A4	Date: July 2019
Job No: EI 171	Rev: 0

Figure 1.2



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Application Area &
Section 261 Registered Area

Area = 15.34 Ha

Area Subject to Extraction After
Expiration of Planning Permission
on 31st December 2009 (Area = 0.97 Ha)

N

O.S. Map Ref No.3301

ITM Coords: 604783 E, 730080 N

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EARTH SCIENCE PARTNERSHIP
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Checked By: Patrick O' Donnell

Scale: 1:3,000 @ A4	Date: July 2019
Job No: EI 171	Rev: 0

Figure 1.3

Table of Contents

2.0 SCREENING & ALTERNATIVES

2.1 Introduction

This chapter of the rEIAR details the screening exercise carried out in relation to the proposal and the alternative locations, layouts and designs considered as part of the process.

2.2 Screening for a Remedial EIA and Remedial AA under Section 261A

As detailed in Section 1.0, the applicant applied to An Bord Pleanála for Leave to Apply for Substitute Consent under Section 177(C) on 21st August 2017. The application was assessed by An Bord Pleanála who decided by order dated 8th January 2019 that exceptional circumstances existed such that it would be appropriate to permit the opportunity for regularisation of the development by permitting an application for Substitute Consent.

The Board Direction states that the application for substitute consent shall be in respect of the entire quarry of 15.34 hectares, and shall relate only to the quarrying development that has taken place since the first day of January 2010, and shall not include any proposed further quarrying. Therefore the application is being submitted in respect of the area illustrated on Figure 1.3 which details the 15.34 hectare area and the 0.97 hectare area which was subject to extraction psot 31st December 2009.

Therefore as directed by the Board a remedial Environmental Impact Assessment Report has been compiled. A remedial Natura Impact Statement has also been compiled an accompanied the application as a separate document.

2.3 Alternatives

No alternative designs or processes were considered as the application is being submitted to An Bord Pleanála in order to obtain Substitute Consent for an existing development. The landscaping and restoration of the pit was assessed and the plan proposed was assessed to be the most advantageous in that it will return the pit to an appropriate end use and will also benefit biodiversity of the site and area. The landscape and restoration of the site is discussed in Section 13.0 of this report.

2.4 References

European Communities (Environmental Impact Assessment) (Amendment) Regulations, 1999 (S.I. No. 93/1999)

European Communities (Environmental Impact Assessment) (Amendment) Regulations, 2001 (S.I. No. 538/2001)

European Communities (Environmental Impact Assessment) (Amendment) Regulations, 2006 (S.I. No. 659/2006)

European Union (Planning and Development)(Environmental Impact Assessment) Regulations 2018, (S.I. No. 296/2018)

Planning and Development Act, 2000 (As Amended)

Local Government (Planning & Development) Regulations, 2001 (S.I. No. 600 of 2001 as amended)

Guidelines on the information to be contained in Environmental Impact Statements, Environmental Protection Agency (EPA, 2002)

Advice notes on current practice in the preparation of Environmental Impact Statements (EPA, 2003)

Environmental Management Guidelines – Environmental Management in the Extractive Industry (Non – Scheduled Minerals) (EPA, 2006)

Guidance for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DECLG, 2013)

Guidance for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of the Environment, Community and Local Government, 2013)

Draft Revised Guidelines on the Information to be contained In Environmental Impact Statements (EPA September 2015)

Draft Advice Notes for Preparing Environmental Impact Statements (EPA September 2015).

Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR) (EPA, August 2017)

Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU) (European Union, 2017)

Environmental Impact Assessment of Projects Guidance on Scoping (Directive 2011/92/EU as amended by 2014/52/EU) (European Union, 2017)

Environmental Impact Assessment of Projects Guidance on Screening (Directive 2011/92/EU as amended by 2014/52/EU) (European Union, 2017)

Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DHP&LG, August 2018)

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Plates

3.0 PLANNING & LEGISLATIVE FRAMEWORK

3.1 Introduction

This section of the rEIAR sets out the planning and development context relating to the historical development of the sand and gravel pit. This section reviews the national, regional and local planning policy relevant to the development.

3.2 Government Policy

In recent years, there has been a conscious move in Ireland towards strategic planning with various policy documents and plans introduced over the years to support strategic planning and development. Policies and objectives of the Government are contained in documents such as *Sustainable Development: a Strategy for Ireland (1997), National Spatial Strategy 2002 – 2020* and more recently *Ireland 2040 - Our Plan*. These in turn have derived their authority from higher order World and European Union (EU) agreed agendas and directives. Policy support filters down from national and regional levels through to specific County Development Plans and Local Area Plans (LAPs). The following planning documents are relevant to the assessment of the development.

3.2.1 The National Spatial Strategy 2002 – 2020

In early 2000 work began on the National Spatial Strategy which ended with its publication in November 2002. The National Spatial Strategy (NSS) was a 20-year strategy designed to enable every place in the Country to reach its potential, no matter what its size or location. It recognised that the various regions of the Country have different roles and it sought to organise and co-ordinate these roles to benefit the regions. It aimed to achieve a better balance of social, economic, physical development and population growth between regions and focused on people, places and on building communities.

In order to drive development in the regions, the NSS required that areas of sufficient scale and critical mass be built up through a network of gateways and hubs. While the National Development Plan 2000-2006 identified Dublin, Cork, Limerick/Shannon, Galway and Waterford as existing gateways, the NSS designated four new national level gateways - the towns of Dundalk and Sligo and the linked gateways of Letterkenny/Derry and the Midland towns of Athlone/ Tullamore/Mullingar.

This Strategy proposed to address the contrast between rapid development in the east of the Country and slower rates of development in other regions. To redress this imbalance, the Strategy identified gateways and hubs that would have the capacity to support the stronger urban-rural structure needed to drive the development of these other regions. A

review of the NSS was announced by Government on 2nd February 2017 which resulted in the new government strategy *'Project Ireland 2040'*.

3.2.2 Project Ireland 2040

Project Ireland 2040 is the Government's policy initiative which aims to provide balanced regional development and to improve the State's infrastructure. It consists of two plans. The National Planning Framework (NPF) which aims to achieve balanced regional development. This plan prioritises growth in the major cities of Dublin, Cork, Galway, Limerick and Waterford.

The second strand is the National Development Plan (NDP) 2018 – 2027. The ten year plan demonstrates the Government's commitment to meeting Ireland's infrastructure and investment needs. The NDP sets out the significant level of investment, almost €116 billion, which will underpin the National Planning Framework and drive its implementation over the ten year period.

The Government is committed to the delivery of the NPF as a blueprint for spatial planning in Ireland to 2040. In setting out a strategic framework for public capital investment, the National Development Plan will support its delivery over the next ten years. Ten National Strategic Outcomes (NSOs) are outlined in the NPF and these are illustrated on Plate 3.1 along with corresponding Strategic Investment Priorities.

In March 2017, ICF made a submission to Government on the draft National Planning Framework. The submission highlighted that aggregates must be recognised as a strategic national resource, essential for the future development of Ireland and that access to aggregates must be safeguarded to facilitate the creation of the places, infrastructure and environment required to meet the economic, environmental and societal needs of Ireland for the coming two decades and beyond. Recognising this fact, Project Ireland 2040 states the following in relation to aggregates:

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

Plate 3.1: NPF and its NSO Outcomes and Priorities of the NDP

3.2.3 Regional Planning Guidelines

The Planning and Development Act, 2000 called for the drawing up of Regional Planning Guidelines (RPGs) which were first adopted in March 2004 as a key implementation mechanism of the Government's overall framework for achieving more balanced regional development and more strategic physical and spatial planning. The principal function for RPGs was to link national strategic spatial planning policies to the planning process at City and County Council level by co-ordinating the Development Plans of the local authorities through the Regional Planning Guidelines.

Following on from the enactment of the Local Government Reform Act 2014 a number of changes were made to the regional structures in Ireland where the eight regional authorities were dissolved. Three new Regional Assemblies came into effect on 1st January 2015, namely the Southern Regional Assembly, the Eastern and Midland Regional Assembly and the Northern & Western Regional Assembly.

3.2.3.1 Eastern and Midland Regional Assembly

The Eastern and Midland Regional Assembly comprises of 38 elected Members nominated by the 12 constituent local authorities within the region which are detailed in Plate 3.2.

Plate 3.2: EMRA Local Authorities

Dublin	Fingal, Dublin City, South Dublin, Dún Laoghaire-Rathdown
Eastern	Louth, Kildare, Meath, Wicklow
Midlands	Longford, Laois, Offaly, Westmeath

The main roles of the Eastern and Midland Regional Assembly are to:

- Implement the appropriate Regional Planning Guidelines operational within its geographical area.
- Prepare, adopt and implement the Regional Spatial and Economic Strategies.
- Ensure consistency with RPG/RESES in relation to the Local Economic and Community Plans of the 12 constituent Local Authorities.
- Participate on EU operational programme monitoring committees.
- Identify, participate and co-ordinate certain EU projects.
- Support the national delegation to the Committee of the regions.
- Support the work of the National Oversight and Audit Commission.

3.2.4 Offaly County Development Plan 2014 – 2020

The current County Development Plan was adopted 15th September 2014 and consists of a land use plan and overall strategy for the development of County Offaly over the period 2014-2020. The plan sets out an overall vision, strategies, policies and objectives for the County as a whole.

The plan contains specific actions or statements which Offaly County Council endeavour to follow to ensure that policies are implemented, that goals and targets are attained and to ensure that development proposals are consistent with the proper planning and sustainable development of the County.

Since the previous plan was adopted, the nature and rate of development that has taken place in the County has significantly changed. The change and slowdown can largely be attributed to the economic downturn. One of the major challenges is to ensure that enterprise and employment grows and develops in Co. Offaly over the lifetime of the plan.

The Council recognises the importance of sand and gravel extraction in the economic life of the County and its importance as a valuable source of employment in parts of the County. However, it is also recognised that exploitation of deposits can have a seriously damaging environmental impact on the scientific, recreational and amenity value of the County's natural landscape, in particular its esker network. Offaly County Council acknowledges that a satisfactory balance is required between the needs of the building industry and the need to protect the environment.

The suitability of any extraction enterprise shall be assessed on the basis of the sensitivity of the local environment to such impacts, the scale of the development proposed and the capacity of the road network in the area to accommodate associated traffic. It shall be the Council's policy to ensure that those extractions which would result in a reduction of the visual amenity of areas of high amenity or damage to areas of scientific importance or of geological, botanical, zoological and other natural significance including all designated European Sites shall not be permitted.

It is Council policy that all such workings should 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, amenity and end-of-life uses. The use of these rehabilitated sites shall be limited to wastes such as soil, stone and subsoils and sites shall be authorised under the appropriate waste regulations.

The Planning Authority will have regard to the Department of the Environment's Guidelines for Planning Authorities for Quarries and Ancillary Activities 2004 when assessing applications relating to the extraction industry in the County. In this regard, bonds or levies will be required by the Council as a condition of any planning permission granted to ensure satisfactory reinstatement on completion of extraction. The following polices of the County Development Plan refer to the extractive industry:

RDP–14 *It is Council policy to ensure those extractions (quarries / sand and gravel pits) which would result in a reduction of the visual amenity of areas of high amenity or damage to designated sites, habitat types or species shall not be permitted. It is Council policy that all such workings should 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 wastes such as soil, stone and subsoils and sites shall be authorised under the appropriate waste regulations. Where the Council considers and accepts that in cases where inert material (i.e. soil, stones and subsoil etc.) cannot be recycled or otherwise sold, such materials may be considered for the phased restoration and landscaping of the site in line with standard planning conditions imposed.*

RDP–16 *It is Council policy to continue to protect existing resource based industry from encroachment by residential development, for example mining, quarrying, gravel pits, peat extraction and intensive agriculture.*

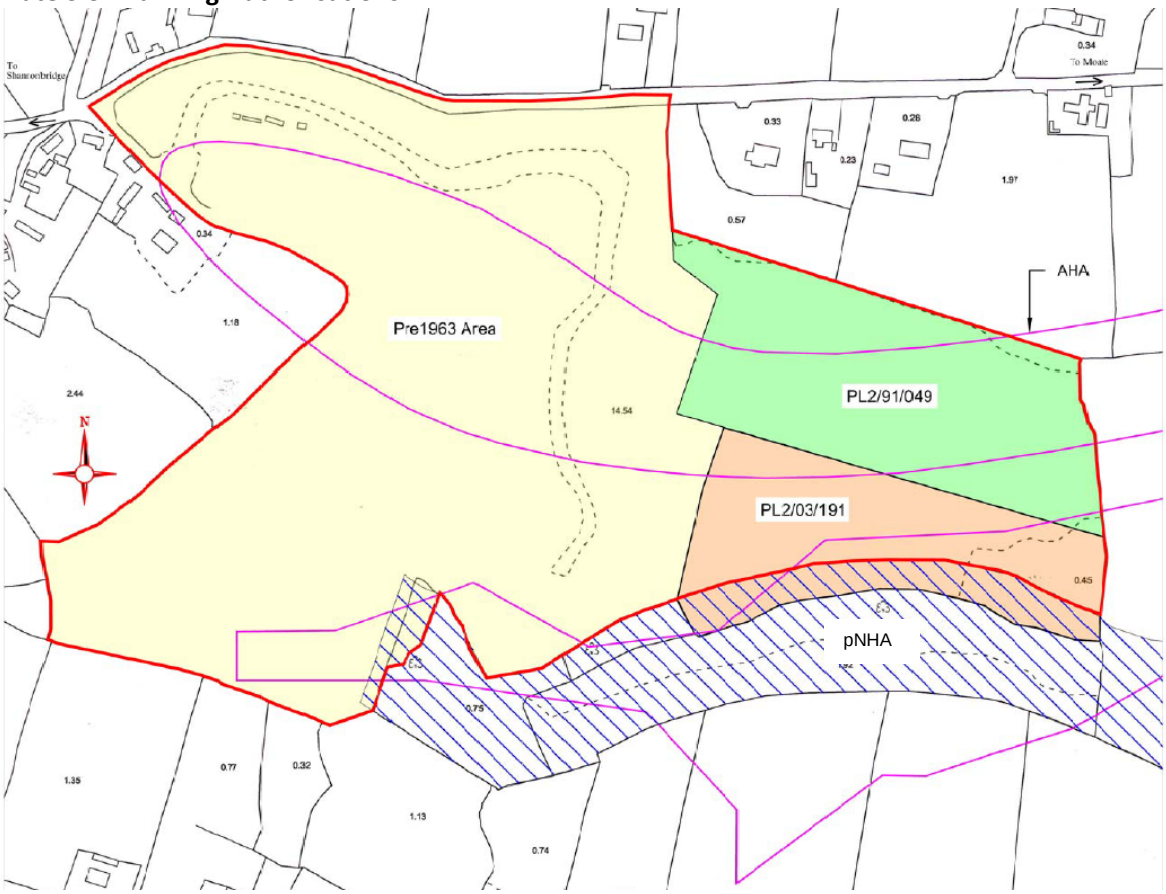
NHP-17 *It is the policy to the Council to recognise the natural heritage value of disused quarries as rich habitat, and to provide appropriate protection to these renewing habitats.*

Areas of High Amenity (AHA) are identified in this plan to protect and enhance areas of scenic and amenity value in the County Offaly which are worthy of special protection in order to preserve their uniqueness and amenity value. These designations are additional to statutory environmental designations National and European which may overlap these AHAs. It shall be Council priority to protect and preserve the county's primary Areas of High Amenity.

County Offaly's landscape contains a number of eskers which are a glacial feature composed of narrow ridges of sand and gravel and are located throughout the county, the most prominent being the Eiscir Riada. The Eiscir Riada runs in a more or less continuous line from Shannonbridge to Clonmacnoise and onto Clara, Durrow and Rahugh, Co. Westmeath and dominates much of the landscape in the north west of the county.

The application site extracted sand and gravel from the Clonfinlough Esker which is a southern spur off the main Eiscir Riada system and which is designated as an Area of High Amenity. This extraction from the pit was authorised by way of being a Pre-1963 development and by two subsequent planning applications; P91/049 and P03/191. Plate 3.3 below illustrates the Pre-63 area and planning areas associated with the pit. Details in relation to the planning applications are summarised below. The Area of High amenity (magenta line) and the Clonfinlough Esker pNHA (blue hatched area) are illustrated on Plate 3.3.

Plate 3.3: Planning Authorisations



- Pre-63 Area - The sand and gravel pit is a long established development in the area and originated Pre-63. There were two pits, which eventually joined under the Nally family ownership, totalling 10.81 hectares or thereabouts. This was the original pit operated by the Nally family in the area.

- PL2/91/49 – Permission for opening of a sand and gravel pit at Back Road, Clonfinlough. This application related to planning permission for the opening of a

sand and gravel pit with an area of 2.735 hectares. This application was granted planning permission on the 16th July 1991, subject to six conditions.

- PL2/03/191 (PL19.205910) - Retention permission for an extension of gravel extraction operation at existing gravel pit with an area of 2.039 hectares. Offaly County Council granted planning permission subject to conditions on the 8th January 2004. The application was appealed to An Bord Pleanala who upheld the decision of Offaly County Council.

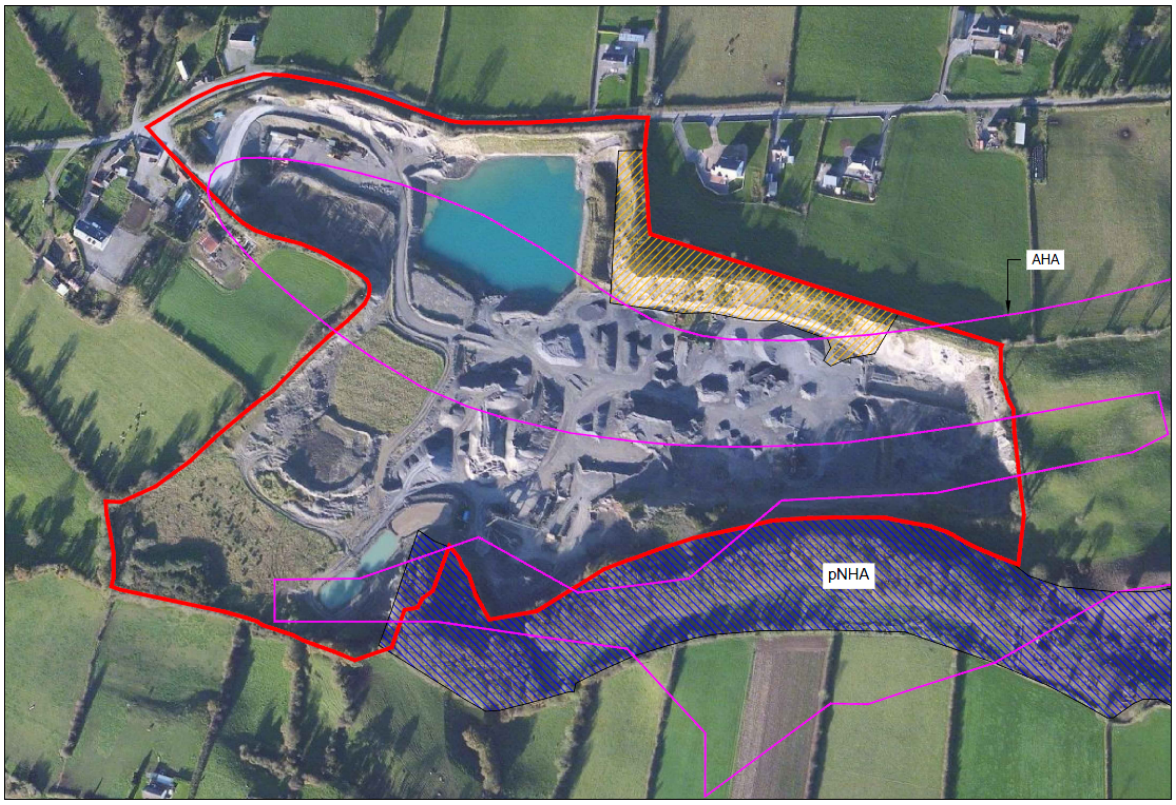
- The sand and gravel pit was registered under Section 261 by Offaly Co. Co. therefore acknowledging that the quarry was a Pre-1963 development. Offaly Co. Co. restated, modified and added to the conditions in relation to the operation of the pit and assigned the reference number QY78. Condition No. 2 of the Section 261 Order stated that *'this permission shall be valid until the 31st day of December 2009'*.

As seen from Plate 3.3 the extraction of material from the pit was authorised by way of the Pre-63 authorisation and two planning permissions. In granting both planning permissions, Offaly Co. Co. would have taken into consideration the compatibility of the planning proposals with regards to the Clonfinlough Esker pNHA located along the southern boundary and the Area of High Amenity which traverses the site.

Plate 3.4 details an aerial photo from circa 2010 which shows the development which had taken place at the pit up to the date of the aerial photo. The entire pit area had been worked to some extent with restoration works undertaken in some areas of the pit. Plate 3.4 also shows the 0.97 Ha. area (hatched in yellow) in relation to the Clonfinlough Esker pNHA located along the southern boundary and the Area of High Amenity (magenta line).

As seen from the aerial photo, extraction from the 0.97 Ha. did not impact on the pNHA due to the distance between both areas. In relation to the AHA, only 0.064 Ha. of the 0.97 Ha. area (6.6%) is located within the AHA boundary and this area had been subject to sand and gravel extraction prior to 31st December 2009 in line with previous authorisations attached to the pit. Therefore the development undertaken post 31st December 2009 did not result in an impact on the AHA.

Plate 3.4: 2010 Aerial Photo



3.2.5 Compliance with County Development Plan

The development is located in a rural area where peat extraction and agriculture is the dominant land-use. The location of any pit is dictated by the availability of resources at a particular location. Similarly the extent of operations on any site is dictated by the extent of those resources. In this case the pit was located in this particular area due to the presence of available materials which have been exhausted.

As stated, part of the pit and surrounding area is designated as an Area of High Amenity due to the presence of the Eiscir Riada which sand and gravel was extracted from. The majority of the site was extracted in compliance with the various planning permissions attached to the pit and prior to the designation of the esker feature as an Area of High Amenity (AHA).

The applicant now proposes by way of this application to regularise the development and to landscape and restore the pit to satisfy the requirements of the County Development Plan. The plan proposes to return the pit to agricultural land and to create habitats which will increase the biodiversity of the area.

3.3 Planning History of Site

A number of planning permissions are attached to the pit which are discussed above and illustrated on Figure 3.1.

3.4 References

Local Government (Planning & Development) Regulations, 2001 (S.I. No. 600 of 2001)

National Spatial Strategy for Ireland 2002 – 2020 (Department of Environment, Heritage and Local Government, 2002)

Eastern & Midland Regional Assembly Corporate Plan 2015-2020

Environmental Management Guidelines – Environmental Management in the Extractive Industry (Non – Scheduled Minerals) (EPA, 2006)

Offaly County Development Plan 2014 – 2020 (Offaly County Council, September 2014)

European Union (Environmental Impact Assessment and Habitats) Regulations 2015, S.I. No 301 of 2015

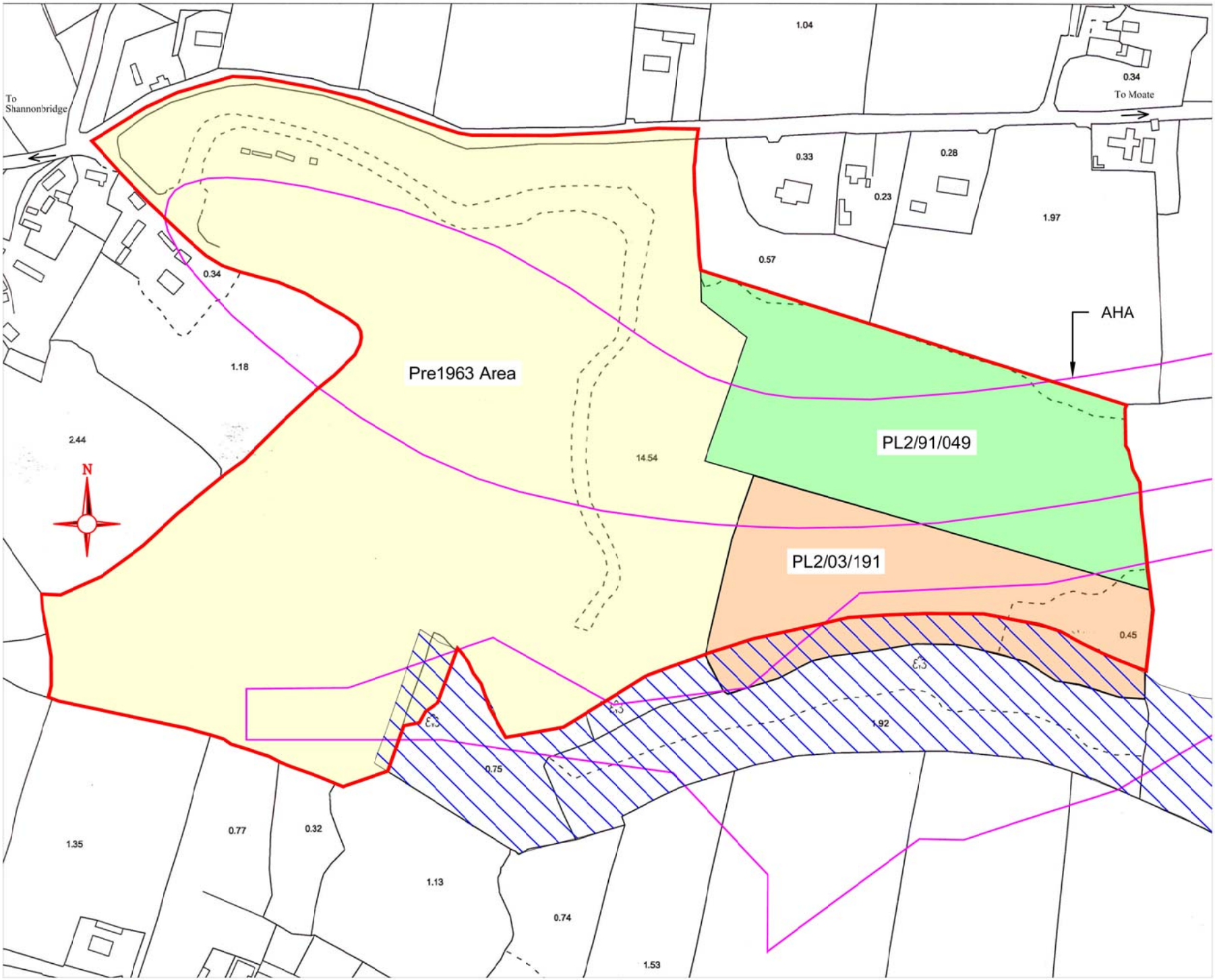
Circular Letter PL 3/15 (Department of Environment, Community and Local Government, 21 July 2015)

Irish Concrete Federation - http://www.irishconcrete.ie

Offaly County Council - www.offaly.ie

Eastern and Midland Regional Assembly – www.emra.ie

Ireland 2040 Our Plan – www.npf.ie



Legend

Application Area & Section 261 Registered Area

Area = 15.34 Ha

Planning Area PL2/91/049

Planning Area PL2/03/191

Pre 1963 Area

pNHA

AHA Line

O.S. Map Ref No.3301

ITM Coords: 604783 E, 730080 N

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Client: Dermot Nally Stone Ltd.	
Project: Remedial Environmental Impact Assessment Report to Accompany a Substitute Consent Application for a Sand & Gravel Pit at Clonfinlough, Co. Offaly	
Title: Application Boundary Map	
Drawn By: Sean O' Donnell	
Checked By: Patrick O' Donnell	
Scale: 1:3,000 @ A4	Date: July 2019
Job No: EI 171	Rev: 0

Figure 3.1

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4.0 PROJECT DESCRIPTION

4.1 Introduction

This chapter of the rEIAR provides supporting information in relation to the activities that were undertaken at the application site on a day to day basis.

4.2 Existing Environment

The existing sand and gravel pit is located in the townland of Clonfinlough, Co. Offaly which is located approximately 6km south west of the village of Ballinahown, 8.7km north west of Ferbane and 8.6km north east of Shannonbridge. Access to the pit is gained via an existing entrance off the R444 Regional Road which links Shannonbridge and Ballinahown. The study area is relatively flat and consists of peatlands which are subject to peat extraction and agricultural land predominantly under permanent pasture interspersed by hedgerows. Esker formations are also present within the study area and generally run in an east to west direction.

The existing sand and gravel pit consists of approximately 15.34ha of which 0.97 Ha. was extracted after the expiration of planning permission attached to the area and which now requires Substitute Consent in order to regularise the area. The pit area (15.34 Ha.) consists of extraction areas, processing infrastructure, vehicle parking areas, aggregate stockpiling areas, settlement ponds and areas where overburden has been stored pending restoration.

The topography of the sand and gravel pit varies as a result of past extraction undertaken. Existing berms and hedgerows in place around the boundary of the pit screen the pit from public view at the majority of locations. Land surrounding the application site consists predominantly of agricultural land which is subject to livestock grazing and areas of peatland which are subject to peat extraction. The area is sparsely populated with one off dwellings and farmhouses located along the road network in the vicinity of the site.

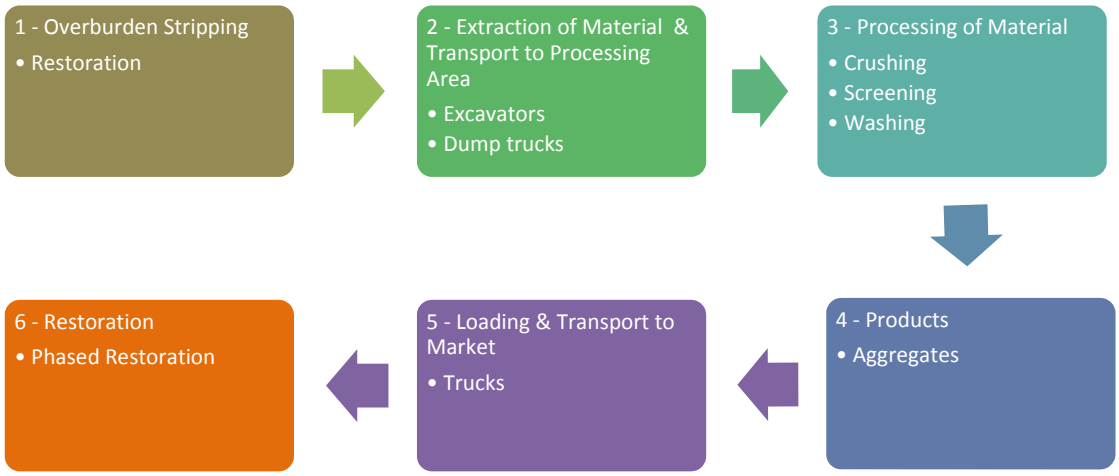
4.3 Description of the Existing Development

As stated above the pit consists of 15.34 Ha. which was previously subject to extraction of sand and gravel and related activities. The pit consists of previously extracted areas, processing infrastructure, vehicle parking areas, aggregate stockpiling areas and areas used for the storage of overburden. The activities undertaken at the pit are detailed on Plate 4.1 and described under each subsection:

1. Overburden Stripping
2. Extraction of Material & Transport to Processing Area

3. Processing of Material
4. Products
5. Loading and Transporting Offsite
6. Phased Restoration

Plate 4.1: Flowchart Describing Activities Undertaken



4.3.1 Overburden Stripping

Approximately 0.2m to 0.5m of topsoil and subsoil was removed in order to excavate the underlying sand and gravel material. This material was removed using an excavator and loaded onto dump trucks. The material was stored on site at various locations for restoration of the pit on removal of the available sand and gravel resource.

4.3.2 Extraction of Material & Transport to Processing Area

Once the overburden was removed the underlying reserve was excavated, loaded onto dump trucks and transported to the processing plant located close to the southern boundary of the pit.

4.3.3 Processing of Material

Material was processed at the sand and gravel pit using a fixed wet screening and crushing plant. The material was unloaded into the feed hopper which consists of a scalping screen to remove boulders. The material which passes through the scalping screen was crushed, screened and washed and directed to individual stockpiles around the plant via conveyors. Oversize material was stockpiled on site and crushed using a mobile crusher at a frequency of approximately two days every quarter.

Run-off water associated with washing of aggregate was directed to a series of lagoons located adjacent to the processing plant. Suspended solids settled out of suspension as water passed through the lagoons. Water was pumped from the final lagoon back to the washing plant and used for washing aggregate. An on-site well was used to top up water required for washing.

4.3.4 Products

The excavated material was graded into a range of aggregates and stockpiled on site to meet the market demand.

4.3.5 Loading & Transporting Off-Site

Material from stockpiles was loaded onto trucks using loading shovels and issued with a docket which accompanied the load to market.

4.3.6 Restoration

Continuous landscaping and restoration works were undertaken during the working life of the pit. This involved placing a layer of overburden on pit faces and the pit floor in order to stimulate growth of vegetation. This will be undertaken in the remaining areas of the pit and is discussed in more detail in Section 13.0 Landscape & Restoration.

4.3.7 Description of On-Site Plant

The following plant and equipment was used during past activities at the pit:

- Excavators
- Fixed wet screening and crushing plant
- Mobile crusher
- Dump trucks
- Wheel loaders
- Tractor and bowser
- Road trucks

4.3.8 Fuel and Chemical Storage

Fuel was delivered to site by fuel companies and dispensed directly into plant and equipment. A small volume of fuel was stored at the existing double bunded fuel tanks located in north western corner of the sand and gravel pit. This was used in the event that deliveries from fuel companies could not be met.

4.3.9 Surface and Groundwater Management

A closed water management system was provided for in the sand & gravel washing plant. This plant removed the fine material (clays /silts) and recycled/ reused the wash water in

the washing process. It is a closed system and there was no requirement to discharge water from the treatment process. Top-up water for the washing plant was supplied by a groundwater well on site. Precipitation falling on the sand gravel pit percolated through the underlying material or evaporated off the surface.

4.3.10 Working Hours and Employment

The development operated during the hours of 07:00 to 19:00 Monday to Friday, and 07:00 to 16:00 Saturday. The applicant provides employment for 8 full-time staff and 2 part-time staff associated with the subject pit and other pits operated by the applicant.

4.3.11 Utilities and Services

There is an existing electrical and telecommunications connection at the pit. Water for dust suppression purposes was sourced from the main lagoon located to the north of the pit with the washing plant topped up by an on-site well. A potable water supply is obtained from a well on-site.

4.3.12 Transport and Access

Access is from the existing site entrance which leads onto the R444 road. A lockable gate is located at the entrance to the pit. The sand and gravel pit development generated a number of traffic movements associated with the transport of material from the pit to market. The historical traffic movements associated with the development of the 0.97 Ha. extraction area which took place post 31st December 2009 was on average 5 loads per day.

4.3.13 Offices and Facilities

A porta-cabin facility is located within the pit for staff usage and this will remain at the pit during the proposed restoration works.

4.3.14 Waste Management

<u>Overburden and Soil Screenings</u>

All overburden material arising from the pit was stockpiled on site for restoration purposes or used for berm construction. Soil screened from processing of material was also stored on-site for restoration of the pit.

<u>Waste Metal</u>

Waste metal from parts replaced on plant and vehicles and end of life vehicles were sent to a registered waste facility for recycling.

4.3.15 Safety and Security

Stock proof post and wire fencing is in place around the boundary of the landholding which will be upgraded where required. There is a gate located at the entrance to the pit which was locked outside operating hours.

4.3.16 Resource

The extraction of material from the 0.97 hectare area resulted in the removal of approximately 100,000 m^3 or 200,000 tonnes (2 tonnes/m^3) of sand and gravel material which was processed on-site and transported off-site to market.

4.3.17 Dust Generation and Control

During the past operation of the pit, the extraction and processing of material and vehicle movement would have had the potential to create wind-blown dust if it was not managed effectively. Dust generation and control are dealt with within Chapter 10.0 (Air) of the rEIAR.

4.3.18 Noise Generation and Control

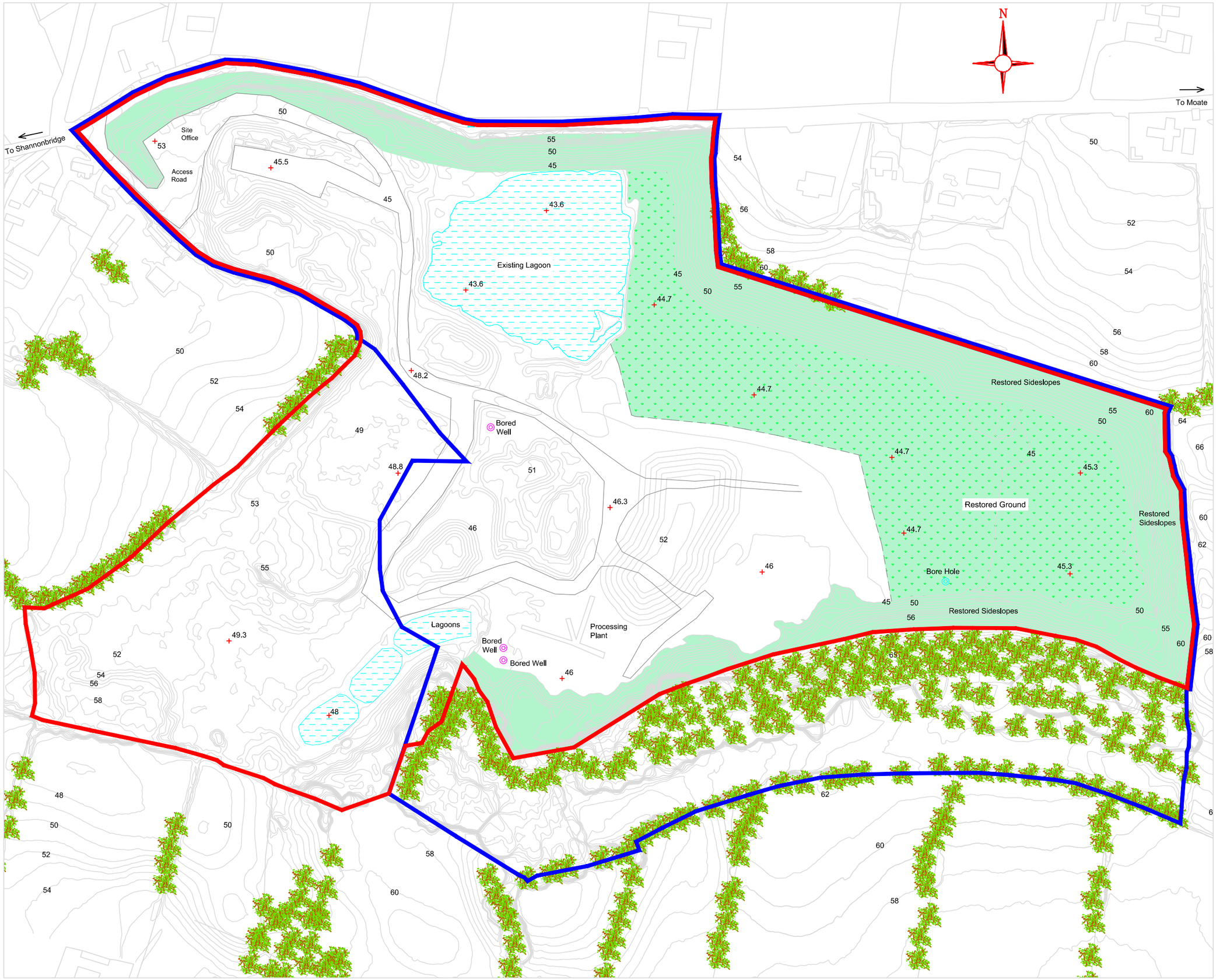
Sources of noise as a result of day to day activities that were undertaken at the pit were associated with extraction and processing of material and vehicle movement. All necessary precautions were put in place to ensure that the operations at the pit did not impact significantly on the local environment. Noise is dealt with within Chapter 11.0 of the rEIAR.

4.3.19 Landscape, Restoration, Decommissioning and Aftercare

As the excavation of material at the existing pit has resulted in the creation of a void, it is important that the area is restored to an appropriate end use. A landscape and restoration plan for the site is drafted and included in Chapter 13.0. Landscape & Restoration and consists of the following:

1. All plant and machinery where present will be removed off the site.
2. Landscaping works will be undertaken where required.
3. All site boundaries will be secured.
4. Remaining overburden stored on-site will be used to complete the restoration of the pit. This will be spread on the floor and side slopes of the pit. The pit floor will be seeded and restored to agricultural land.
5. Planting of trees and shrubs will be undertaken where required.

Figures



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Legend

Ownership Boundary

Application Area

Area = 15.34 Ha

Borehole

Bored Well

Water

Restored Ground

Restored Sideslopes

Vegetation

All Levels Relative to Ordnance Datum

ITM Coords: 604783 E, 730080 N

Rev.	Description	Date

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Client: Dermot Nally Stone Ltd.

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Title: Existing Site Layout Map

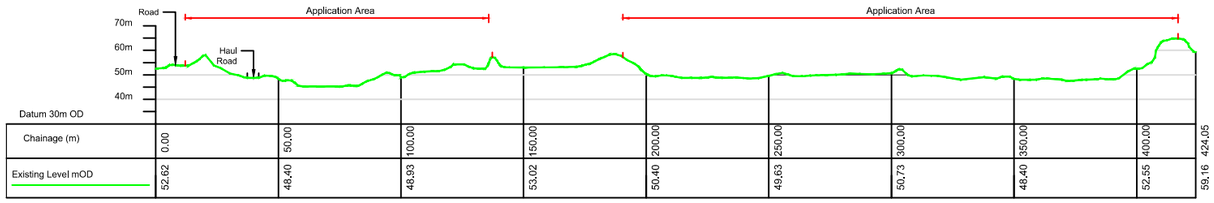
Drawn By: Sean O' Donnell

Checked By: Patrick O' Donnell

Scale : 1:2,000 @ A3 | Date: July 2019

Job No: EI 171 | Rev: 0

Figure 4.1



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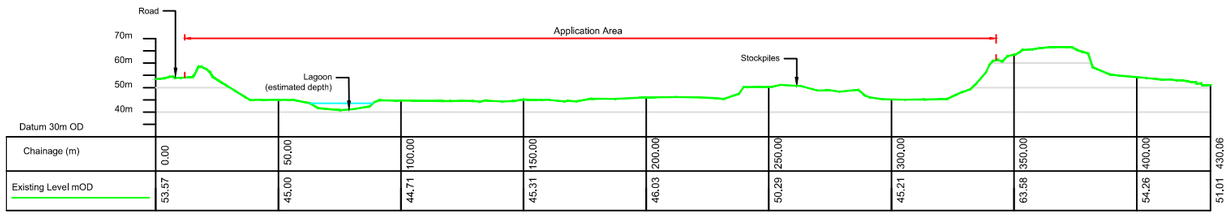

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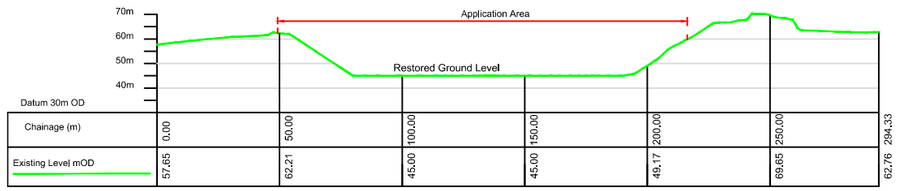

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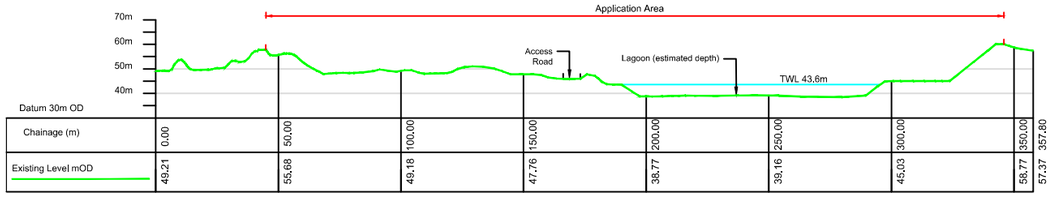
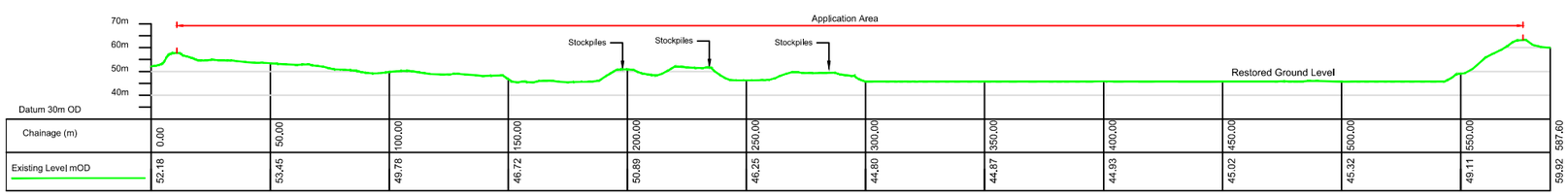
Existing Level mOD	57,65	62,21	45,00	45,00	49,17	69,65	62,76

SectionC - C Scale 2,500



Chainage (m)	0.00	50,00	100,00	150,00	200,00	250,00	300,00	350,00	357,60
Existing Level mOD	49,21	55,68	49,18	47,76	38,77	39,16	45,03	58,77	57,37

SectionD - D Scale 2,500



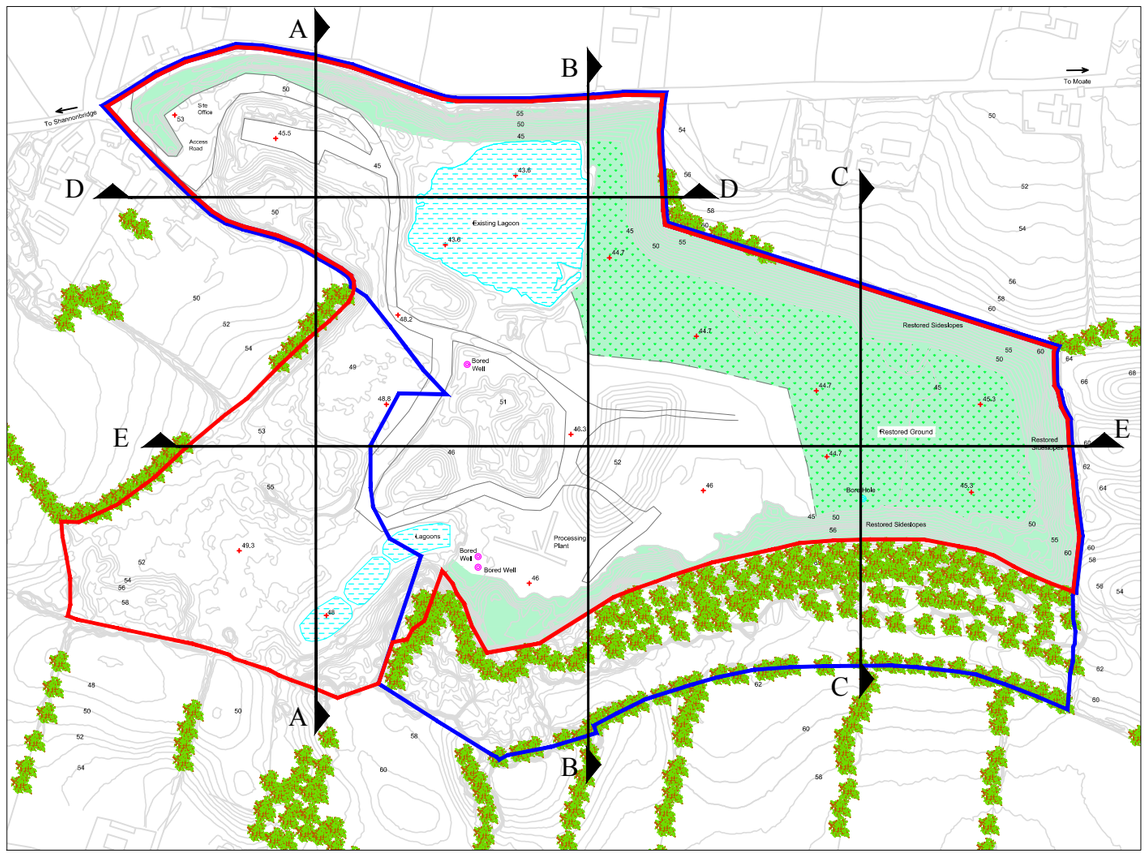
Chainage (m)	0.00	50,00	100,00	150,00	200,00	250,00	300,00	350,00	400,00	450,00	500,00	550,00	587,60
Existing Level mOD	52,18	53,45	49,78	46,72	50,89	46,25	44,80	44,87	44,93	45,02	45,32	49,11	59,92

Section E - E Scale 2,500

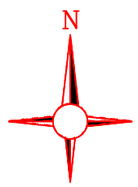
Restored Sideslopes

Restored Ground

Water



Key Plan NTS



Legend

Ownership Boundary

Application Area

Area = 15.34 Ha

Fencelines and Boundaries

Existing Level

Vegetation

OS. Map Reference : 3301

ITM Coords: 604783 E, 730080 N

All Levels Relative to Ordnance Datum

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Project: Remedial Environmental Impact Assessment Report to Accompany a Substitute Consent Application for a Sand & Gravel Pit at Clonfinlough, Co. Offaly

Title: Site Sections

Drawn By: Sean O' Donnell

Checked By: Patrick O' Donnell

Scale: 1:2,500 @ A3	Date: July 2019
Job No: EI 171	Rev: 0

Figure 4.2

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Tables

Figures

5.0 POPULATION AND HUMAN HEALTH

5.1 Introduction

This Chapter assesses the existing environment in addition to the potential effects on population and human health arising from the day to day activities associated with the past development of the pit when operational.

Section 5.2 focuses on Population including potential direct and indirect effects of the development with regard to principal socio-economic indicators, including population, land use, employment, tourism and residential amenity. Section 5.3 assesses the potential effects on human health associated with the development.

Measures are proposed where required to mitigate any potential effects arising from the past development of the pit. Other aspects of potential direct and indirect effects on human beings are also considered in the other Sections of this rEIAR which include the following:

- Section 8.0 - Water
- Section 9.0 - Air
- Section 10.0 – Noise
- Section 12.0 - Traffic
- Section 13.0 - Landscape and Restoration

5.2 Population

This assessment on population includes potential direct and indirect effects of the past development of the pit with regards to principal socio-economic indicators, including population, land use, employment, tourism and residential amenity.

5.2.1 Methodology

The assessment of impacts on human beings entails the identification of key populations which were most likely to be impacted on by day to day activities previously undertaken at the pit. Key populations that had the potential to be impacted upon by past development have been identified as persons residing and engaging in activities in close proximity to the existing pit, persons with a stake in the general economy of the local and regional area and persons enjoying the recreational and cultural amenities of the area. The principal sources of information are sourced from the Central Statistics Office (CSO). A number of other sources of information and guidance documents were referred to as part of the compilation of this chapter which are listed in Section 5.8 – References.

5.2.2 Existing Environment

The sand and gravel pit is located in the townland of Clonfinlough, Co. Offaly which is situated in the Clonmacnoise District Electoral Division (DEDs). The study area has been identified having regard to both the location of the subject site and data availability. Firstly, DEDs are the lowest level of geography definition at which detailed demographic data is available. Small Area Population Statistics (SAPS) published by the Central Statistics Office are also available for rural areas. The nearest urban centres are Ballinahown (6.3km), Ferbane (8.7km) and Shannonbridge (8.7km).

In describing the receiving environment in relation to human beings, this section provides an overview of the local area, including settlement patterns, age structure, population change, social indicators including employment, education, and social class, and economic activity. Figure 5.1 at the end of this chapter illustrates the dwellings within approximately 1km of the application site.

5.2.2.1 *Population and Age Profile*

Based on the latest census data (CSO, 2016), a total of 341 persons resided in the Clonmacnoise DED on Census Night in 2016. The majority of the populations of the DED live in one off houses and farmsteads, which are sparsely populated throughout the DED.

The 45-64 (26.7%) age group constitutes the highest proportion of the demographic in the Clonmacnoise DED (Table 5.1). The DED has a lower proportion of people in the 25-44 age group and a higher proportion of people in the 45-64 and 65+ age groups than the County and State.

Table 5.1: Age Profile of the Study Area Compared to the County and State

Area	0-14	15-24	25-44	45-64	65+	Dependency Ratio
DED	20.5%	11.7%	24.6%	26.7%	16.4%	37.0%
Co. Offaly	22.7%	12.0%	27.2%	24.5%	13.6%	36.3%
Ireland	21.1%	12.1%	29.5%	23.8%	13.4%	34.5%

5.2.2.2 *Principal Economic status*

The 2016 Census results show that the Clonmacnoise DED has a labour participation rate of 55.4%, which is moderately higher than that of the County (50.3%) and the State (53.4%). This is reflected in the lower proportion of ‘Unemployed’ and ‘Unable to Work’.

Table 5.2: Labour Force by Principal Economic Status

	Area	DED	Co. Offaly	Ireland
Economic Status	**At work**	55.4%	50.3%	53.4%
	Looking for first regular job	0.4%	0.9%	0.8%
	Unemployed	3.0%	8.6%	7.1%
	Student	11.1%	10.7%	11.4%
	Looking after home/family	11.4%	9.8%	8.1%
	Retired	15.9%	14.3%	14.5%
	Unable to work	3.0%	5.0%	4.2%
	Other	0.0%	0.3%	0.4%

5.2.2.3 *Socio- Economic Groups*

The CSO establishes several principal socio-economic groups within the population. These are classified as follows:

A Employers and Managers
B Higher Professional
C Lower Professional
D Non-Manual
E Manual Skilled
F Semi-Skilled
G Unskilled
H Own Account Worker
I Farmers
J Agricultural Workers
Z All Others Gainfully Employed

Table 5.3 below indicates that the main 'known' socio-economic group in the Clonmacnoise DED is 'Farmers' (20.3%), which is significantly higher than that of the County (7.4%) and the State (4.9%). This is followed by 'Non-manual' (20.1%) which is also higher than that of the County (16.3%) and the State (18.0%).

Table 5.3: Labour Force by Principal Economic Status

Area	A	B	C	D	E	F	G	H	I	J	Z
DED	13.7%	3.5%	7.6%	20.1%	12.8%	8.7%	2.3%	3.8%	20.3%	0.6%	6.7%
Co. Offaly	12.4%	3.9%	9.9%	16.3%	12.7%	10.1%	4.3%	4.8%	7.4%	1.3%	16.9%
Ireland	15.5%	7.1%	11.7%	18.0%	9.3%	8.6%	3.6%	5.2%	4.9%	0.5%	15.6%

5.2.2.4 *Employment Sources and Travel Patterns*

Due to the DED predominantly being made up of a rural area, only 3.4% of people travel 'On Foot' compared to the County (11.2%) and States (13.9%). The main means of travel as anticipated is by Motor Car with 47.5% being the principal driver and 13.6% passengers which is similar to that of the County (62.9%) and State (57.9%). Given the semi-rural location of the DED, this result can be expected.

A. On foot
B. Bicycle
C. Bus, minibus or coach
D. Train, DART or LUAS
E. Motorcycle or scooter
F. Motor car: Driver
G. Motor car: Passenger
H. Van
I. Other
J. Not stated

Table 5.4: Population aged 5 years and over by means of travel to work, school or college

Area	A	B	C	D	E	F	G	H	I	J
DED	3.2%	0.5%	14.5%	0.9%	0.5%	47.5%	13.6%	8.1%	1.8%	5.9%
Co. Offaly	11.2%	1.2%	8.7%	1.1%	0.1%	41.0%	21.9%	5.7%	0.6%	4.0%
Ireland	13.9%	2.7%	10.2%	2.7%	0.3%	39.3%	18.6%	4.2%	0.4%	3.1%

In relation to travel times, the highest percentage of people (29.8%) in the DED take approximately 15-30min to travel to work, school or college with approximately 79.8% of the DED taking between 0-45 minutes which is similar to the County 78.1% and State 78.4%.

Table 5-5: Journey time to work, school or college by the proportion of the population (5 years +)

Area	< 15 mins	15 – 30 mins	31 – 45 mins	46 – 60 mins	61 – 90 mins	90 + mins	Not stated
DED	23.1%	29.8%	26.9%	3.8%	4.3%	6.7%	5.3%
Co. Offaly	39.9%	25.1%	13.1%	4.2%	6.0%	4.0%	7.6%
Ireland	32.3%	28.8%	17.3%	5.9%	6.0%	2.3%	7.4%

5.2.2.5 *Land-Use and Housing*

Table 5.6 contains CSO data on the number of private households in the DED and the number of persons in these households, compared with the County and the State. Results show that the average household size in the DED (2.94) is slightly higher than the county

(2.84) and national average (2.75). Figure 5.1 at the end of this chapter illustrates the dwellings within 1km of the application site.

Table 5.6: Household formation and size

Area	No. of Households	No. of Persons in Households	Avg. Household Size
DED	117	344	2.94
Co. Offaly	27,343	77,755	2.84
Ireland	1,702,289	4,676,648	2.75

The sand and gravel pit is situated in a semi-rural area with one off housing developments and farmsteads located along local roads in the vicinity of the pit. The main land use of the study area is agricultural as reflected in the number of farmers in the DED with livestock grazing being the predominant sector practiced. The existing pit is located adjacent to the Clonfinlough Esker pNHA which is located along the southern boundary of the pit. This site consists of a wooded esker immediately adjacent to the pit. Part of the pit is also designated as an Area of High Amenity.

5.2.2.6 *Local Tourism Amenities*

Tourism is regarded as one of the greatest sources of potential employment nationally and also has potential to benefit the community in an environmentally sustainable way.

The main tourist attraction in the area is the Clonmacnoise Monastic Site which is a sixth century monastic site, located on the banks of the River Shannon. It is home to three high crosses, a cathedral, seven churches and two round towers. This great monastery was founded in 548-9 by St. Ciarán Mac a tSaor ("son of the carpenter"), who studied under St. Finian at the famous Clonard Abbey. The strategic location of the monastery at a crossroads between the major east-west land route through the bogs of central Ireland and the River Shannon helped it become a major centre of religion, learning, craftsmanship and trade by the 9th century.

Clonmacnoise was a centre of learning excellence, and many manuscripts, including the Annals of Tighernach (11th century) and the Book of the Dun Cow (12th century), were written here. The monastery flourished for 600 years as a centre of learning and religious instruction as well as providing much of Ireland's finest Celtic art and illuminated manuscripts. The surrounding area of Clonmacnoise is a microcosm of landscapes within the Midlands. These include the Shannon callows, eskers, boglands both preserved and cutaway.

The River Shannon which is the longest river in Ireland is located approximately 4km west of the pit. Harbours and marinas in towns and villages along the Shannon including Banagher and Shannonbridge provide facilities for water sports and boating enthusiasts.

The Celtic Roots Studio based in Ballinahown Village consists of a tiny living museuem where visitors can learn about the history of a craft practice, meet the artisan or book a simple class and see the finished pieces on display. The artists have completed commissions on behalf of some of Ireland's top companies, organisations and government departments. Many heads of state around the world have received the work on visits to Ireland or abroad.

5.2.2.7 *Social Infrastructure*

The closest Primary School to the sand and gravel pit is SN Chiarain Naofa located in Clonmacnoise. The closest Post Primary Schools are located in the vicinity of Athlone, Ferbane and Ballinasloe. There is no local Garda Station or Fire Station in the immediate vicinity of the application area, with the closest station being Athlone, Ferbane and Ballinasloe. The closest post office is located in Shannonbridge as the post office in Ballinahown recently closed as part of the An Posts initiative to cut costs. Ballinahown Village located to the east of the pit has a shop, public house and Church.

5.2.2.8 *Site Safety*

There may be some concerns in relation to safety of people and agricultural stock as a result of quarry and pit faces. There is also a potential danger to members of the public who may gain access to the site. It is proposed to improve perimeter fencing and safety notices where required as part of the restoration/closure plan in order to make the site more secure.

5.2.2.9 *Traffic*

The sand and gravel pit development generated a number of traffic movements associated with the transport of material from the pit to market. The historical traffic movements associated with the development of the 0.97 Ha. extraction area which took place post 31st December 2009 was on average 5 loads per day.

5.3 Human Health

A human health risk assessment is the process to estimate the nature and probability of adverse health effects in humans as a result of a development. The assessment has had regard to the findings of other chapters of this rEIA Report, in particular to:

- 5.2 Population
- 8.0 Water

- 10.0 Air
- 11.0 Noise
- 12.0 Traffic
- 13.0 Landscape and Restoration

This assessment is focused on potential human health effects associated with potential emissions related day to day today activities which were undertaken at the pit in the past.

5.3.1 Health Based Standards

Health based standards by their nature are set to protect against human health effects. The Irish EPA Guidance favours the Health Based Standards approach. In its publication: EPA Revised Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (August 2017) it states:-

> *'The evaluation of effects on these pathways is carried out by reference to accepted standards (usually international) of safety in dose, exposure or risk. These standards are in turn based upon medical and scientific investigation of the direct effects on health of the individual substance, effect or risk. This practice of reliance upon limits, doses and thresholds for environmental pathways, such as air, water or soil, provides robust and reliable health protectors [protection criteria] for analysis relating to the environment.'*

Environmental monitoring in relation to noise, dust and water which was undertaken during the working life of the pit reflects emissions associated with the development when operational. The monitored levels for each can be compared to relevant thresholds for air, noise and water etc. No detrimental health effects are expected below these thresholds.

5.3.2 Emission Threshold

Emissions to air including noise emissions, emissions to water and traffic associated with the development are identified as the main areas which could impact on human health. The concept of dose response suggests that the greater the dose to which an individual is exposed the greater either the likelihood of a health response and/or the greater the severity of that response. Inbuilt to this concept is the principle of a threshold. The threshold is the level of an agent below which one would expect no adverse response. This is a concept on which many health based standards are based.

Thresholds are set in relation to emissions to various elements of the environment which can be impacted on by quarry developments such as dust deposition and noise associated

with day to day operations, vibration emissions from blasting in relation to quarries and discharges of water to surface water or groundwater where they occur. These are set by way of standards and recommended guideline values which are attached as conditions to a grant of a planning permission or by way of an air emissions licence or discharge licence. In order to ensure compliance routine monitoring of the emissions is undertaken.

Emission levels which are below these threshold levels are taken to have no significant health effects. If however the levels increase above the threshold there is a potential for people to be affected with the severity of that effect increasing with the increase in level. The thresholds in relation to noise and air which are relative to the application site are detailed below. These are conditions which were attached as part of the registration under Section 261.

Condition No.6
Total dust deposition at the site boundaries shall not exceed 350mg/m^2/day averaged over a 30-day period.
Reason: In the interest of public health and the proper planning and sustainable development of the area.

Condition No.8
The facility shall be operated so that it shall not cause noise levels at the nearest residence to exceed LEQ 55 dB(A) between 0800 hours and 2000 hours and LEQ 45 dB(A) between 2000 hours and 0800 hours.
Reason: In the interest of public health and the proper planning and sustainable development of the area.

5.4 Characteristics of the Development

The existing pit has an overall area of approximately 15.34 hectares and consists of an area of 0.97 ha. which was subject to extraction of material after expiry of planning permission on 31st day of December 2009. This extraction area is contained within the overall quarry area of 15.34 hectares consisting of areas ancillary to the extraction area (0.97 Ha.)

The ancillary areas of the pit consists of previously extracted areas, processing infrastructure and stockpiling areas, vehicle parking areas and areas used for the storage of overburden pending restoration.

Overburden material was removed prior to excavation of the underlying reserve and stored pending restoration works. The sand and gravel material was excavated, loaded

onto dump trucks, transported to the fixed wet screening and crushing plant and processed into various grades depending on market demand.

Plant and machinery which operated in the application area consisted of tracked excavators, wheel loaders, dump trucks, processing plant and road trucks to haul material off site. Ancillary plant such as a water bowser for dust suppression was deployed where required.

Due to the porous nature of the underlying material, water falling as precipitation percolated to ground. The existing washing plant operated by way of a closed water management system whereby the plant removed the fine material (clays /silts) with run-off water diverted to a series of settlement lagoons. The water was then recycled for washing with water lost in the aggregate replaced with water from a groundwater well located near the plant.

A significant amount of landscaping and restoration works have been completed which have included placing a layer of overburden on side slopes and the pit floor. It is proposed to restore further areas of the pit as per the landscape and restoration plan detailed in Section 13.0.

5.5 Impact Assessment

5.5.1 Population Impact Assessment

The likely significant effects on humans associated with the development and previous activities undertaken relate to the issues of socio-economic activity, human health and safety, and potential nuisance relating to emissions from the sand and gravel pit when operational. The existing development, as with similar developments of this nature, was brought about by the continued demand for construction materials. Sand and gravel extraction activities have created a long established land use in the area with the existing development an acknowledged pre-1963 development.

5.5.1.1 *Population*

The sand and gravel pit is located in an area which consists of one off dwellings and farm houses situated along local and minor roads in the vicinity. Activities associated with sand and gravel pits can deter people from living within proximity to such developments. The pit is an acknowledged pre-1963 development with a significant portion of the houses in the area constructed during the operational period of the pit.

5.5.1.2 *Economic Activity*

Dermot Nally Stone Ltd. operates a number of sand and gravel pits in the Offaly Westmeath area and provides employment for 8 full-time staff and 2 part-time staff. Additional personnel such as maintenance contractors also give an additional indirect source of employment. The development when operational sustained employment for a number of personnel which contributed to the local economy and also supplied raw materials for the local and regional construction industry.

5.5.1.3 *Land-Use and Housing*

Prior to extraction activity commencing the land was used for agricultural purposes. The majority of land in the proximity of the application site is used for agricultural purposes. Therefore, extraction activity has not led to a significant loss of an existing land-use in the area.

The existing pit is located adjacent to the Clonfinlough Esker pNHA which is a wooded esker located along the southern boundary of the pit. The 0.97 hectare extraction area is located along the northern boundary and was not impacted on by the development of the 0.97 hectare area.

Part of the pit is located in an Area of High Amenity due to the presence of the Esker feature. Although a limited portion of the 0.97 Ha. area is located within the AHA boundary, this area was disturbed and subject to extraction as part of the previous planning permission attached to the area.

The pit is also located within the source protection zone for the Clonfanlough drinking water supply well. As detailed in Section 8.0 Water, there was no impact on groundwater quality associated with previous activity undertaken at the pit.

A number of dwellings were constructed in the vicinity of the pit during the operational period, which demonstrates that day to day activity associated with the pit did not deter people from living in the area.

5.5.1.4 *Tourism, Recreation and Amenity*

The Clonmacnoise Monastic Site is located to approximately 3.5km to the west of the pit and it is unlikely that the past development impacted on the integrity of this site and tourist potential. The pit is also located outside the Clonmacnoise World Heritage Site Management Plan boundary.

The topography of the pit and surrounding lands aids in screening the pit from the surrounding areas. The proposed landscape and restoration plan will mitigate the impact associated with historical extraction of material. Quarrying activity is a long established land use of the area and has not impacted on the tourist amenity of the study area.

Extraction from the 0.97 Ha. did not impact on the pNHA due to the distance between both areas. In relation to the AHA, only 0.064 Ha. of the 0.97 Ha. area (6.6%) is located within the AHA boundary and this area had been subject to sand and gravel extraction prior to 31st December 2009 in line with previous authorisations attached to the pit. Therefore the development undertaken post 31st December 2009 did not result in an impact on the AHA. The proposed landscape and restoration plan will ensure that the pNHA is protected and that vegetation which has established on the esker will extend to the remaining pit faces once restored.

There are a number of designated Natura 2000 sites in the vicinity of the pit. The past development has not impacted on the integrity of these sites as concluded in the rNIS which accompanies this application.

5.5.1.5 *Social Infrastructure*

It is unlikely that sand and gravel extraction activity significantly affected the social infrastructure of the area and may have had a positive impact as materials extracted from the pit were used as a raw material for the local construction industry.

5.5.1.6 *Site Safety*

Security fencing, screening and other landscaping around the perimeter have secured the site from unauthorised access. It is proposed to further improve perimeter fencing and safety notices in order to make the site more secure. Berms have also been constructed in accordance with “Safe Quarry - Guidelines to the Safety, Health and Welfare at Work (Quarry) Regulations 2008”.

5.5.1.7 *Traffic*

The traffic generated associated with the transport of material to market would not have led to a significant increase in traffic on local roads in the vicinity. The historical traffic movements associated with the development of the 0.97 Ha. extraction area which took place post 31st December 2009 was in the region of 5 loads per day.

5.5.2 Human Health Impact Assessment

The key elements of the proposed development which have the potential to impact on Human Health are detailed below. Each element has been assessed in relation to thresholds specified for emissions where relevant.

The various elements have been assessed under other sections of the rEIAR, for example air has been assessed under Section 10.0 (Air) and noise assessed under Section 11.0 (Noise). It can be assumed that provided that the day to day activities did not result in exceedances of the threshold for each element that there was no significant risk or impact. The significance criteria used in the assessment as adapted from the Irish EPA Guidelines, are set out in Table 5.7.

Table 5.7: Criteria Used in the Assessment of Human Health Effects

Effect Level	Significance Criteria
Imperceptible	No significant human health impacts are apparent. An example is no measurable effect attributable to the proposed development.
Slight	A small impact on individual reported symptoms but no change in health status can be attributed to the proposed development. An example is a temporary increase in symptoms in an individual but no change in the severity of the underlying condition or treatment required.
Moderate	A small impact on health status of individuals but no change in morbidity or mortality can be attributed to the proposed development. An example is an individual increasing their use of a treatment attributable to the development but no change in underlying condition.
Significant	A proposed development has the potential to impact on individual health status. An example is an individual's condition becoming measurably more severe as a result of the proposed development.
Very Significant	A proposed development has the potential to impact on the health status of groups. An example is a group of individuals' conditions becoming measurably more severe as a result of the proposed development.
Profound	A proposed development has the potential to impact on the health status of communities. An example is a measurable increase in the incidence or severity of a condition in a community.

5.5.2.1 *Assessment of Impacts Associated with Emissions to Water*

The potential impacts of the development on the water environment have been assessed in Chapter 8.0 of the rEIAR and it was deemed that mitigation measures in place when operational would have safeguarded the water environment.

Assessment of Effect

Given that there was no effect on water quality standards, the effects on human health from water are assessed as Imperceptible.

5.5.2.2 *Assessment of Impacts Associated with Emissions to Air*

The potential impacts of the development on the air environment have been assessed in Chapter 10.0 of the rEIAR. Mitigation measures in place when operational would have safeguarded the water environment.

Assessment of Effect

Dust deposition monitoring undertaken at the development during the operational period has shown that day to day activities did not lead to an increase in dust levels above the recommended guideline value of 350 mg/m^2/day. Thus, the impact on air quality associated with previous activity is assessed as being imperceptible.

5.5.2.3 *Assessment of Impacts Associated with Noise*

As detailed in Chapter 11.0 of this EIAR, a number of noise assessments were undertaken at the application area show that the pit was compliant with the limits of 55dB(A) L_{Aeq} (60 minutes) daytime and 45dB(A) L_{Aeq} (60 minutes) night-time. The assessments concluded that there was no significant noise impact as a result of the day to day activities that were undertaken at the development.

Assessment of Effect

The human health effects on all receptors arising from noise are assessed as being Imperceptible.

5.5.2.4 *Assessment of Impacts Associated with Traffic*

The existing sand and gravel pit development generated a number of traffic movements associated with the transport of material to and from the pit to market. However, the extraction of material from the 0.97 hectare area post December 2009 would have generated in the region of 5 loads per day.

Assessment of Effect

It is concluded that the relatively low volumes of traffic that were generated by the past development would have had a slight impact on the surrounding local road network, which would have operated well within capacity.

5.6 Mitigation Measures

No measures other than those detailed in the following chapters of this rEIAR are required:

8.0 – Water
10.0 – Air
11.0 – Noise
12.0 – Traffic
13.0 – Landscape and Restoration

5.7 Remedial Measures

No remedial measures are proposed.

5.8 Monitoring

Environmental monitoring will be carried out in accordance with the various sections of the rEIAR.

5.9 Residual Effects

The assessment concludes that the development did not give rise to effects on human health.

5.10 References

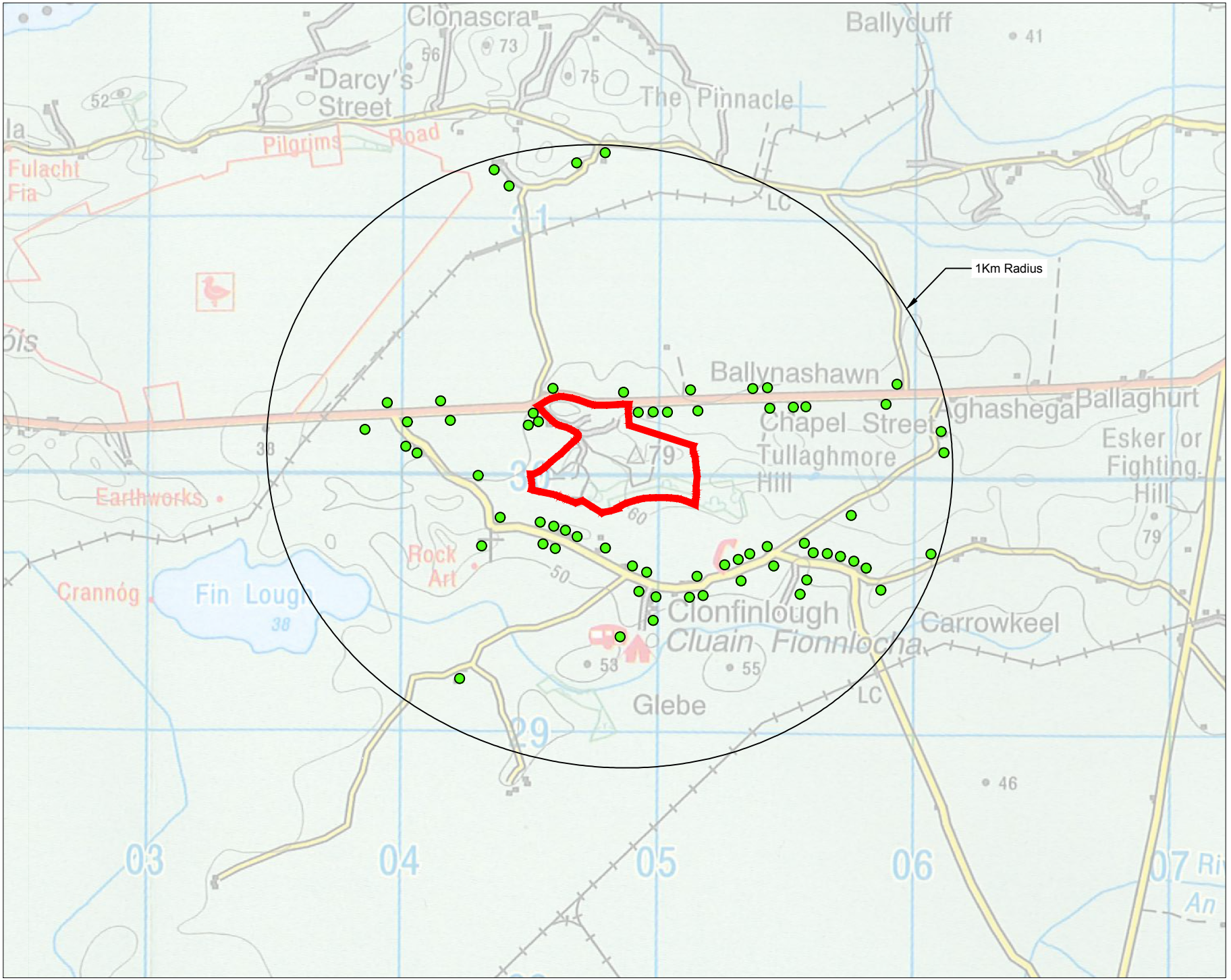
Central Statistics Office (2016) – Results of the 2016 Census - www.cso.ie

Fáilte Ireland - http://www.failteireland.ie/Research-Insights/Current-Tourism-Performance.aspx

Fáilte Ireland (2016) - Domestic Tourism 2015 An overview of Irish residents' travel within the Republic of Ireland

United States Environmental Protection Agency - Conducting a Human Health Risk Assessment - https://www.epa.gov/

Figures



Legend

Application Area

Dwelling Location

1Km off Application Boundary

N

O.S. Ref No. Discovery Map 47

ITM Coords: 604783 E, 730080 N

Rev.	Description	Date

EARTH SCIENCE PARTNERSHIP
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Project: Remedial Environmental Impact Assessment Report to Accompany a Substitute Consent Application for a Sand & Gravel Pit at Clonfinlough, Co. Offaly

Title: Site Location Map

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6.0 BIODIVERSITY

6.1 Introduction

This chapter addresses ecological impacts by describing and evaluating habitats with their representative flora and fauna. The chapter generally follows the structure and protocols detailed in the EPA document Guidelines on The Information to be Contained in Environmental Impact Assessment Reports Draft - August 2017.

Seán Meehan, Ecologist, was requested by Earth Science Partnership, acting on behalf of Dermot Nally Stone Ltd. (pit operator) to complete this remedial Biodiversity Assessment in relation to a sand and gravel pit at Clonfinlough, Co. Offaly. This requirement for a remedial EIAR (rEIAR) is due to the extraction within an area of the pit, of approximately 0.97 Ha, after 31st December 2009, when planning permission expired. Substitute Consent is now required to regularise this area in line with the entire pit which covers an area of 15.34 Ha, inclusive of the 0.97 Ha extraction area. The overall pit, including the 0.97 Ha area, comprises previously extracted areas, processing infrastructure and stockpiling areas, vehicle parking areas and areas used for the storage of aggregate and overburden.

The principal aim of the biodiversity assessment is to:

- Undertake a baseline ecological survey of the study site and evaluate the nature conservation importance of the site;
- Assess the direct, indirect and cumulative ecological implications or impacts of the project during its lifetime;
- Where required, propose measures to remove or reduce those impacts; and
- Achieve the best possible biodiversity outcome in relation to restoring the pit.

6.2 EIAR legislative context

Directive 2011/92/EU on the assessment of certain public and private projects on the Environment as amended by Directive 2014/52/EU of the of the European Parliament and of the Council (“the EIA Directive”) requires that the EIAR provides: “A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.”

Specifically, with respect to biodiversity, Article 3 of the EIA Directive states that the EIA shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on biodiversity, with particular

attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC, and the interaction of impact should also be considered.

The Wildlife Acts, 1976 to 2018, is a group of Acts and Amendments (Wildlife Act 1976 (39/1976), Wildlife (Amendment) Act 2000 (38/2000), Wildlife (Amendment) Act 2010 (19/2010), Wildlife (Amendment) Act 2012 (29/2012) and Heritage Act 2018). This legislation provides the principal mechanism for wildlife conservation in Ireland and outlines protection for species of conservation significance. Consideration must be given in the planning and development of projects (or in relation to works associated with existing infrastructure) to species of flora and fauna that are protected by national or international legislation or that are considered to be rare in a national or international context. Under the Wildlife Acts (as amended), it is an offence to damage or disturb a protected species and its habitat (including breeding and resting places).

Separately, the Flora Protection Order (2015) provides protection for a suite of vascular plant, moss, liverwort, lichen and stonewort species. This legislation makes it illegal to cut, uproot or damage a listed species in any way or to alter, damage or interfere in any way with their habitats. The EU Habitats Directive 92/43/EEC provides legal protection for habitats and species of European importance through the establishment of a network of designated conservation areas known as the Natura 2000 Network. The Natura 2000 network includes sites designated as Special Areas of Conservation (SAC) under the EU Habitats Directive and Special Protection Areas (SPA) designated under the EU Birds Directive 79/409/EEC (as amended by 2009/147/EC). These are collectively referred to as '*European Sites*'.

The Habitats Directive was initially transposed into Irish national law in 1997, with the European Communities (Natural Habitats) Regulations, SI 94/1997. These Regulations have since been amended by SI 233/1998 & SI 378/2005. The European Communities (Birds and Natural Habitats) Regulations 2011 consolidate and replace the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats)(Control of Recreational Activities) Regulations 2010. Part XAB of the Planning and Development Act 2000 (as amended) presents the obligation to carry out a Screening for Appropriate Assessment and, where necessary, an Appropriate Assessment. The requirements for an Appropriate Assessment are set out under Article 6(3) and 6(4) of the Habitats Directive and are presented in detail in the Screening for Appropriate Assessment and Natura Impact Statement (NIS). A remedial NIS has been compiled for this project and is provided as a separate document.

Article 10 of the Habitats Directive recognises the importance of ecological coherence in protecting European Sites and requires Member States to protect landscape features that are of major importance for wild flora and fauna through land use planning and development. Proposed Natural Heritage Areas and Natural Heritage Areas are commonly occurring examples of sites in Ireland that aid in the ecological coherence of European sites and act as 'ecological stepping-stones' across the landscape.

6.2 Ecological Assessment - Methodology

The assessment was carried out in accordance with the following guidelines:

- EPA (2002), 'Guidelines on the information to be contained in Environmental Impact Statements', Environmental Protection Agency,
- EPA (2003), 'Advice Notes on current practice in the preparation of Environmental Impact Statements', Environmental Protection Agency,
- EPA (2017), Draft Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports.
- Fossitt, J., 2000, 'A Guide to Habitats in Ireland'. The Heritage Council, Kilkenny,
- IEEM (2006), 'Guidelines for Ecological Impact Assessment in the United Kingdom', Institute of Ecology and Environmental Management,
- NRA (2008) 'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes', National Roads Authority.

6.2.1 Desktop Study

A preliminary desk-based study was undertaken and involved collating data, examining published data relating to the environs of the application site and a defined search area centred on this site. Obtained data included details of designated sites within a precautionary 15km radius of the site as well as any protected, rare and notable species within hectads N02 and N03 (a hectad is a 10km² area). Note that the application site straddles the boundary line between these two hectads. At a closer range, the application site is located on the boundary line between tetrads N03K and N02P (a tetrad is an area of 2km² commonly used in biological recording). Searches for biological records of note for both hectads and tetrads were made.

Sources of information that were used to inform the assessment were:

- The National Parks and Wildlife Service (NPWS) natural heritage database (www.npws.ie)
  was consulted for designated sites of nature conservation interest in the study area (Natura 2000 sites),

- The National Biodiversity Data Centre (NBDC) species database (www.biodiversityireland.ie) was consulted to obtain species records in the hectads and tetrads in which the application site is located.

- A review of Ordnance Survey maps and ortho-photography,

- Environmental Protection Agency map viewer (www.gis.epa.ie/Envision), and

- Water Framework Directive (WFD) website and Water Maps viewer (www.wfdireland.ie/maps)

6.2.2 Biological Records

Searches of NPWS and NBDC databases returned the following records of notable protected species within hectads N02 and N03, listed in Table 6.1.

Table 6.1. Notable protected species recorded from hectads N02 and N03

Species	Legal protection
Hen Harrier *Circus cyaneus*	EU Birds Directive Annex I
Corncrake *Crex Crex*	EU Birds Directive Annex I *
Kestrel *Falco tinnunculus*	EU Birds Directive Annex I
Snipe *Gallinago gallinago*	EU Birds Directive Annex II
Red Grouse *Lagopus lagopus scoticus*	EU Birds Directive Annex II
Eurasian Curlew *Numenius arquata*	EU Birds Directive Annex II
Common Kingfisher *Alcedo atthis*	EU Birds Directive Annex I
Northern Lapwing *Vanellus vanellus*	EU Birds Directive Annex II
European Golden Plover *Pluvalis apricaria*	EU Birds Directive Annex I
European Nightjar *Caprimulgus europaeus*	EU Birds Directive Annex I
Grey Partridge *Perdix perdix*	EU Birds Directive Annex I
Common Tern *Sterna hirundo*	EU Birds Directive Annex I
Dunlin *Calidris alpina*	EU Birds Directive Annex I
Greater White-fronted goose *Anser albifrons*	EU Birds Directive Annex I
Little Gull *Larus minutus*	EU Birds Directive Annex I
Merlin *Falco columbarius*	EU Birds Directive Annex I
Whooper Swan *Cygnus Cygnus*	EU Birds Directive Annex I
Freshwater white-clawed crayfish *Austropotamobius pallipes*	EU Habitats Directive Annex II
Common Frog *Rana temporaria*	EU Habitats Directive Annex IV
Otter *Lutra lutra*	EU Habitats Directive Annex II
Marsh Fritillary *Euphydryas aurinia*	EU Habitats Directive Annex II
Geyer's Whorl Snail *Vertigo geyeri*	EU Habitats Directive Annex II
Pine marten *Martes martes*	EU Habitats Directive Annex V
Common pipistrelle *Pipistrellus pipistrellus*	EU Habitats Directive IV
Soprano pipistrelle *Pipistrellus pygmaeus*	EU Habitats Directive Annex IV
Daubenton's bat *Myotis daubentonii*	EU Habitats Directive Annex IV

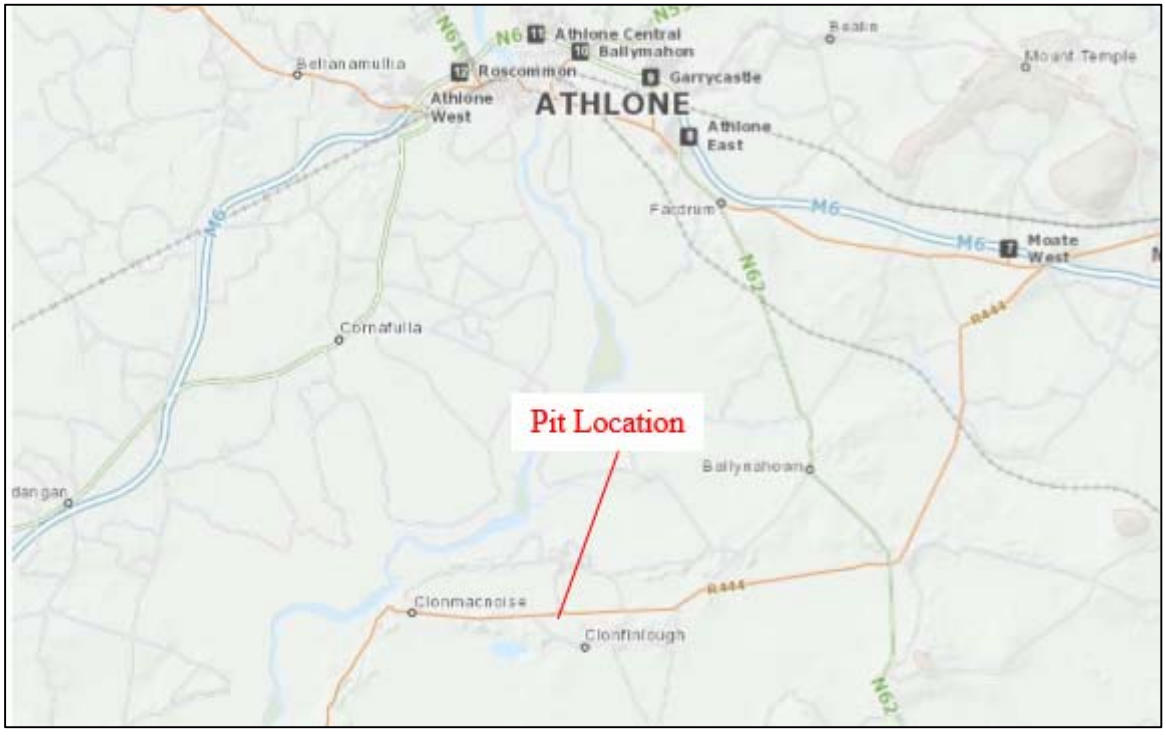
**Corncrake is now likely extinct in this region.*

With the exception of Eurasian curlew and common frog, there are no records for species listed in Table 6.1 within tetrads N02P and N03K. However, this does not imply that these species, nor suitable habitats to support these species, do not occur in these tetrads, outside of the study site.

6.3 Receiving Environment

The application site consists of a sand and gravel pit at Clonfinlough, Co. Offaly near the border of Offaly with Roscommon and Westmeath. It is c. 11km due south of Athlone and c. 4km east of the heritage site at Clonmacnoise and the River Shannon. It is c. 7km west of the N62 road and borders the R444 road which links the N62 to Shannonbridge (Figure 6.1). There are a number of one-off houses on both sides of the R444 road and surrounding the pit. The area is generally agricultural in nature with additional peat harvesting usage. The proposed Natural Heritage Area Clonfinlough Esker (Site Code 000892) adjoins the pit to the south. Fin Lough SAC (Site Code 000575) is c. 1km to the south-west. Mongan Bog SAC (Site Code 000580) is c. 0.7km to the north-west, as is Mongan Bog SPA (Site Code 004017). Pilgrim's Road Esker SAC (Site Code 001776) is located c. 0.85km north of the site. River Shannon Callows SAC (Site Code 000216) is located c. 2km to the west, as is the Middle Shannon Callows SPA (Site Code 004096).

Figure 6.1. Pit location



6.3.1 Site description

The existing pit comprises 15.34 Ha. which was previously subject to extraction of sand and gravel and related activities. 0.97 Ha. of this total area was extracted after the expiration of planning permission and this now requires Substitute Consent in order regularise the area. The overall pit, including the 0.97 Ha area, comprises previously extracted areas, processing infrastructure and stockpiling areas, vehicle parking areas,

stockpiling areas and areas used for the storage of overburden. The R444 road runs alongside the northern boundary of the site however the pit is not visible from this road due to the undulating landscape and a large vegetated berm. Figure 6.2 below shows the whole existing pit area (15.34 Ha) and the 0.97 Ha. area.

Figure 6.2. Existing Site Layout

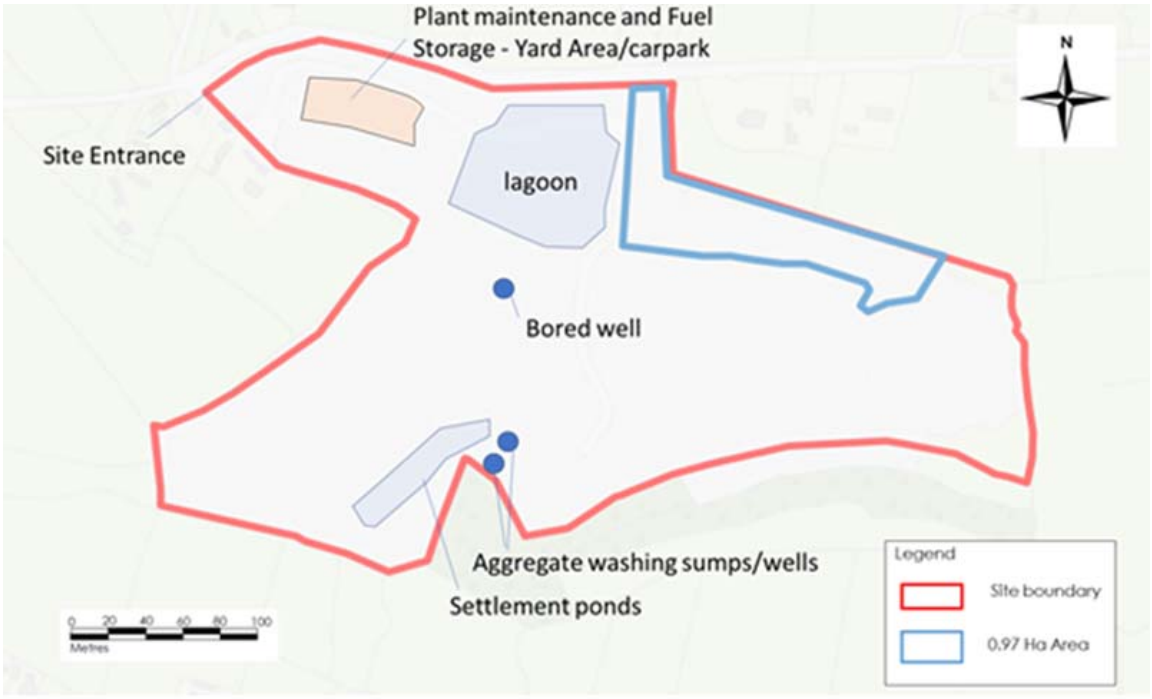


Plate 6.1 shows a view of the pit from the south east. As seen in Plate 6.1 a significant area of the pit has been landscape and restored. The applicant is proposing to continue these works in the remaining areas of the pit.

Plate 6.1 View of the site from the southern boundary

6.3.2 Internationally designated sites

Table 6.2 lists all the European sites that occur within 15 km of the application site. The accompanying rNIS identifies all Natura sites that are located within 15km of the application site and determines if these sites were impacted on as a result of the historical activity undertaken at the pit. No direct pathway between activities on the site and any European site was identified.

Table 6.2. European Sites within 15km of the application site

Natura 2000 Site	Designation	Site Code	Distance from Site
Castlesampson Esker	SAC	001625	14.5 km
Lough Ree	SAC	00440	14.1 km
Carn Park Bog	SAC	002336	12.8 km
Crosswood Bog	SAC	002337	10.3 km
Ferbane Bog	SAC	000575	6.7 km
Moyclare Bog	SAC	00075	5.8 km
River Shannon Callows	SAC	000216	1.9 km
Pilgrim's Road Easker	SAC	001776	1.0 km
Fin Lough (Offaly)	SAC	000576	0.8 km
Mongan Bog	SAC	000580	0.7 km
Lough Ree	SPA	004064	14.1 km
River Suck Callows	SPA	004097	9.5 km
Middle Shannon Callows	SPA	004096	1.9 km
Mongan Bog	SPA	004017	0.7 km

6.3.3 National Designated Sites

Article 10 of the Habitats Directive recognises the conservation importance of these sites for ecological coherence. The majority of such sites in Ireland are termed Natural Heritage Areas. The existing pit is located adjacent to the Clonfinlough Esker pNHA (NPWS site code 000892) which is located along the southern boundary of the pit. This site is a wooded esker and although immediately adjacent to the pit, the historical extraction and associated ancillary works on site did not impact upon this protected site

An inspection of the woodlands located on this esker in May 2019 found no evidence of current degradation of this pNHA and much of the southern pit slopes that run up to the woodlands are re-vegetating. No hydrological impacts upon the integrity of this pNHA were identified as a result of historical extraction. Therefore, the integrity of this pNHA is not considered to have been impacted on as a result of historical activities undertaken at the pit. The following description of Clonfinlough Esker is provided by NPWS.

SITE CODE: 000892

Clonfinlough Esker is a long ridge of glacial till which runs from Esker Hill, about 7km east of Clonmacnoise, for about 3km in a westerly direction towards Clonmacnoise. As a geomorphological feature this relict of the retreating ice is of great importance. However, the well-drained, calcium rich soils of eskers often support interesting and species-rich

vegetation, and three such areas of ecological importance have been selected as a Natural Heritage Area: Esker Hill, Tullaghmore Hill and a section between them.

Although recent agricultural practices have now diminished the ecological value of these areas, they still support vestiges of the former species-rich grassland, especially on the steeper slopes, where the rich mixture of lime loving plants such as Quakinggrass (Briza media), Parsley-piert (Aphanes arvensis), Pignut (Conopodium majus) and Cowslip (Primula veris) are most apparent. The notable Common Broomrape (Orobanche minor) also occurs. Apart from the grassland there are also areas of scrub. This is mainly composed of Gorse (Ulex europaeus) but there are also some small but interesting areas of Hawthorn (Crateagus monogyna) and Hazel (Corylus avellana). This mosaic of scrub and grassland is attractive to common birds and mammals. While the biological interest of the esker has been reduced by human impacts, old grassland on eskers is still of interest and this is one of the few such areas remaining in the district. The integrity of the geomorphological feature is being threatened by an active gravel pit to the west of Tullamore Hill.

6.3.4 Habitats

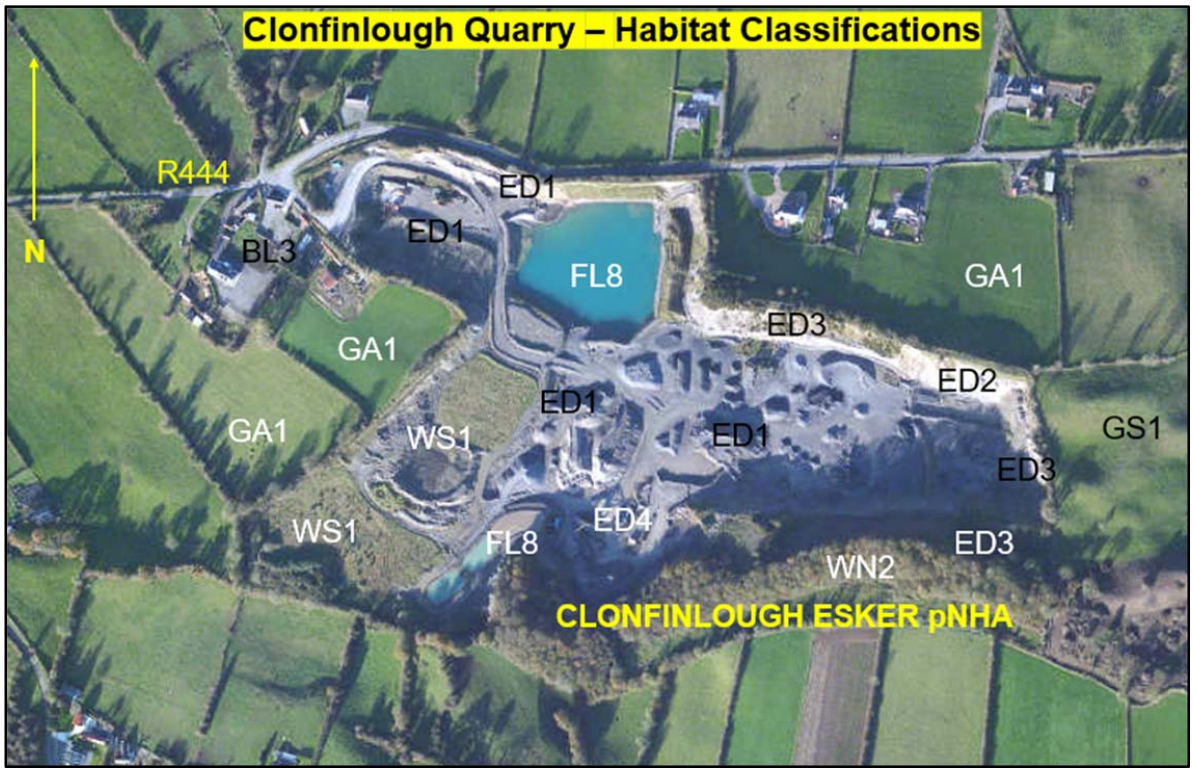
The site investigation followed the methodology of the Phase 1 Habitat Survey (JNCC, 1991) but habitats were classified according to Fossitt (2009) to a Level 3 hierarchy (Table 6.3).

A habitat survey was conducted on site on the 10th May 2019. This survey was carried out during an appropriate time of year for vegetation surveys. Searches of NPWS and NBDC databases revealed no records of any rare or protected plants (FPO 2015) within the 2km radius search area and no such flora, nor invasive species, were recorded during the habitat survey of the site. The principal habitats found on and adjacent to the site are listed in Table 6.3. A habitat map is provided in Figure 6.3.

Table 6.3. Summary of main habitat types recorded

Level 1 Habitat Hierarchy	Level 2 Habitat Hierarchy	Level 3 Habitat Hierarchy
E – Exposed rock and disturbed ground	ED – Disturbed ground	ED4 - Active quarries and mines ED3 - Recolonising bare ground ED2 – Spoil and bare ground ED1 – Exposed sand, gravel and till
F – Freshwater	FL – Lakes and ponds	FL8 – Other artificial lakes and ponds
G – Grassland and Marsh	GS – Semi-natural grassland	GS1 – Dry calcareous and neutral grassland GA1 – Improved grassland
B – Cultivated and built land	BL – Built land	BL3 – Buildings and artificial surfaces
W – Woodland and scrub	WS – Scrub/transitional woodland WN – Semi-natural woodland	WS1 – Scrub WN2 – Oak-ash-hazel woodland

Figure 6.3: Habitat classifications on and adjacent to the site



Key to habitat codes

GA1	Improved Grassland
GS1	Dry calcareous and neutral grassland
ED1	Exposed sand, gravel and till
ED2	Spoil and bare ground
ED3	Recolonising bare ground
ED4	Active quarries and mines
BL3	Buildings and artificial surfaces
FL8	Other artificial lakes and ponds
WS1	Scrub
WN2	Oak-ash-hazel woodland

The majority of the site comprises exposed sand gravel and ground type habitats. Due to the varying levels of disturbance that these habitats undergo, vegetation growth and abundance is limited. In areas of the site where works are no longer being carried out, vegetation has become established with the following species noted; graminoids that include Common Bent *Agrostis capillaris*, Crested Dog's-tail *Cynosurus cristatus*, Cock's-foot *Dactylis glomerata*, Red Fescue *Festuca rubra agg.* and Annual Meadow-grass *Poa annua*. Herbs recorded include Coltsfoot *Tussilago farfara*, Ribwort plantain *Plantago*

lanceolata, Herb Robert *Geranium robertianum*, Selfheal *Prunella vulgaris*, Common Ragwort *Senecio jacobeae* Field Horsetail *Equisetum arvense,* Oxeye Daisy *Leucanthemum vulgare,* Gorse *Ulex* sp., Foxglove *Digitalis purpurea*, Yarrow *Achillea millefolium*, Bramble *Rubus* sp., Willow *Salix* sp. and Creeping Thistle *Cirsium arvense*. Gorse and willow are forming scrub habitat in sections of the site which is providing habitat for bird and invertebrate species. Such habitat should be retained as much as possible.

During the site visit on the 10th May 2019, Clonfinlough Esker pNHA was surveyed for ground flora. The range of species present is typical of oak-ash-hazel woodland on calcareous substrate and included wood anemone *Anemone nemorosa*, bluebell *Hyacinthoides non-scripta*, sanicle *Sanicula europaea*, primrose *Primula vulgaris*, wood sorrel *Oxalis acetosella*, common dog violet *Viola riviniana*, wood sedge *Carex sylvatia* and lords and ladies *Arum maculatum*. Woodruff *Galium odoratum* is abundant in places in the woodland and is indicative of long established and undisturbed woodland in Ireland.

Plate 6.2 Clonfinlough Esker pNHA

Plate 6.3. Processing plant

6.3.5 Fauna

Bats

All bat species in Ireland are protected under the Wildlife Act 1976, as amended in 2000, and the Habitats Directive which was transposed into Irish law in the European Communities (Natural Habitats) Regulations (S.I 94 of 1997), as amended. The Irish government is also a signatory to the Bonn convention (Convention on the conservation of migratory species of wild animals, Bonn 1979) and the Bern convention, 1982 (The Convention on the Conservation of European Wildlife and Natural Habitats) and has a commitment to the "Eurobats" agreement (Agreement on the Conservation of Bats in Europe, 1991) (NRA 2005a).

No bat surveys were carried out as the site offers minimal suitable habitat for bats due to the absence of wooded areas, hedgerows and buildings which limits feeding and roosting opportunities. Whilst some level of bat activity is highly likely within the site, it is probable that this activity is limited to commuting along the periphery of the site, particularly along the southern boundary with Clonfinlough Esker pNHA. Bat Conservation Ireland's bat

landscape index[1] assigned scores of 27.11 and 21.33 to tetrads N03K and N02P respectively, indicating that the habitats and landscape in this tetrad are considered of low ecological suitability for bats (this index was obtained from the National Biodiversity Datacentre's live maps facility).

Terrestrial mammals

Badgers *Meles meles* and their setts are protected under the provisions of the Wildlife Acts. It is an offence to intentionally kill or injure a protected species or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal. Badger setts are formed by a complex group of interlinked tunnels and therefore works in proximity to setts can potentially cause considerable damage. No signs of feeding, paths, latrines or active setts were recorded during the site survey.

Other mammal species protected under the Wildlife Acts which could conceivably occur are hedgehog *Erinaceus europaeus* and Irish stoat *Mustela erminea hibernica* and pine marten *Martes martes*. Otter Lutra lutra are not likely to be present due to the absence of suitable aquatic habitats. Rabbits are present on the site in moderate numbers and a fox den was noted along the southern boundary of Clonfinlough Esker pNHA during sites surveys. Some rodent species are ubiquitous in the Irish countryside, and both brown rat and field mouse are almost certainly present within hedges and scrub.

Birds

Birds noted during the site survey include starling *Sturnus vulgaris*, blackbird *Turdus merula*, wren *Troglodytes troglodytes*, barn swallow *Hirundo rustica*, hooded crow *Corvus cornix*, magpie *Pica pica*, jackdaw *Coloeus monedula* and sand martin *Riparia riparia*. There is a sand martin colony in a cliff face along the northern boundary of the site. Despite proximity to both the pit access road and the R444, the birds have adapted to the disturbance and on the day of the site survey, numbered approximately 25 nesting birds. Sand martin burrows were evident in other sections of the site on suitably vertical cliff faces. A kestrel *Falco tinnunculus* was observed hovering over grasslands to the immediate east of the site.

[1] Lundy, M.G., Aughney, T., Montgomery, W.I., & Roche, N., (2011) Landscape conservation for Irish bats & species-specific roosting characteristics. Bat Conservation Ireland.

Plate 6.4 Sand martin colony near the site entrance onto the R444.

Amphibians and reptiles

No evidence of breeding frog or smooth newt *Lissotriton vulgaris* was noted in any of the lagoons or flooded areas on the site. It is likely that the lack of vegetation and difficult access for amphibians to these areas deters spawning. No common lizards *Zootoca vivipara* were observed during the site survey although the less disturbed rocky habitats with vegetation on the site provide potential habitat.

6.4 Ecological evaluation

6.4.1 Ecological evaluation Overview

Ecological features (designated areas, habitats and species) can be assigned a value based on their importance from a biodiversity, social/community and economic perspective. During the process of undertaking an ecological assessment, various ecological features are identified through desk top studies and field work and will require such an evaluation of which the most relevant to this process is the biodiversity evaluation. The biodiversity value that is attached to an ecological resource influences

- whether, as part of screening, potentially affected features or resources are considered sufficiently valuable that there could be a significant effect that would trigger an EIA;
- whether, as part of scoping, ecological features or resources are considered for inclusion in the EcIA - this is influenced by their value in relation to a 'threshold' level of value that should be defined during scoping;
- deciding what mitigation is appropriate; and
- consideration of the legal and policy implications.

6.4.2 Assigning biodiversity value

There are various characteristics that can be used to identify ecological resources or features likely to be important in terms of biodiversity to aid in assigning an evaluation. These include:

- Animal or plant species, subspecies or varieties that are rare or uncommon, either internationally, nationally or more locally;
- Ecosystems and their component parts, which provide the habitats required by the above species, populations and/or assemblages;
- Endemic species or locally distinct sub-populations of a species;
- Habitat diversity, connectivity and/or synergistic associations (*e.g.* networks of hedges and areas of species-poor pasture that might provide important feeding habitat for rare species such as the greater horseshoe bat);
- Notably large populations of animals or concentrations of animals considered uncommon or threatened in a wider context;
- Plant communities (and their associated animals) that are considered to be typical of valued natural / semi-natural vegetation types - these will include examples of naturally species-poor communities;
- Species on the edge of their range, particularly where their distribution is changing as a result of global trends and climate change;
- Species - rich assemblages of plants or animals; and
- Typical faunal assemblages that are characteristic of homogenous habitats.

6.4.3 Evaluation within a geographical context

IEEM guidelines suggest that the value or potential value of an ecological resource or feature should be determined within a defined geographical context. Ecological features are defined as:

- International / national designated sites (e.g. Biosphere, Ramsar, Natura 2000 sites, NHA, pNHA, National Nature Reserve, ASSI) or non-statutory locally designated sites and features;
- sites, habitats and features of recognised biodiversity value but not designated as detailed above;
- and species protected or controlled by law or of biodiversity value or significance

It is recommended that the following frame of reference be used when valuating an ecological resource in a geographical context:

- International
- National (Ireland)
- County (Offaly)
- Local (Clonfinlough) and / or
- within immediate zone of influence only or less than local (application site only)

The above categories are then applied to the features identified in baseline surveys and desk-top studies. Some identified features may already have a known ecological value and so are readily categorised e.g. a Natura 2000 site or a National Nature Reserve having an international or national value. Tables 6.4, 6.5 & 6.6 list identified ecological receptors and their level of value.

Table 6.4. Evaluation of designated sites occurring within 15 km of the site

Level of value	Feature
International	All SAC and SPA sites listed in Table 6.2.
National	All pNHA, NHA and National Nature Reserves occurring within 15km of the site. Including Clonfinlough Esker

Table 6.5. Evaluation of identified habitats

Level of value	Receptor	Reasons
National	WN2 – Oak-ash-hazel woodland	This habitat occurs in the Clonfinlough Esker pNHA, located immediately to the south of the site. This habitat does not occur on the application site.
Within immediate zone of influence only	ED2 – Spoil and bare ground ED3 – Recolonising bare ground	

	ED4 – Active quarries and mines BL3 – Buildings and artificial surfaces WS1 – Scrub FL8 – Other artificial lakes and ponds	Not considered as habitats of high or important ecological value. Minimal diversity of floral species. No rare or protected floral species recorded or likely to occur.

Table 6.6 Evaluation of identified species

Level of value	Receptor	Reasons
County	Sand martin, barn swallow, starling and kestrel	These species, formerly common throughout Ireland, are listed as amber on the BoCCI list[2]. They are considered potentially threatened following a decline in population.
Within immediate zone of influence only	All other birds recorded	Protected under the Wildlife Act 1976 as amended by the Wildlife (Amendment) Act 2000. The site offers potential breeding site for a number of common and widespread bird species but is unlikely to be important or critical for any particular individual species or population of birds.
Within immediate zone of influence only	Mammals	The site potentially supports some mammal species however it is not critical for any particular species or population. Any mammals occurring here have a widespread national distribution.

[2] Birds of Conservation Concern in Ireland 2014 – 2019". *Irish Birds 9: 523-544*

6.4.4 Overall ecological value of the site

Based on the above, the site at this current time is considered of local value ecologically although individual components, i.e. some features found on site have a higher conservation value. The site is unlikely to be important or critical for any species or population considering the small size of the site lack of habitat diversity, the disturbed nature of the site and the availability of alternative suitable habitats in the wider surrounding area.

6.5 Impact assessment

6.5.1 'Do nothing scenario'

There will be no further extraction at the pit and restoration will be completed in line with the restoration plan.

6.5.2 Identified impacts

The following impacts resulting from previous quarrying activity on the site have been identified (Table 6.7).

Table 6.7. Impacts arising from quarrying activity

Impact	Description of impact
Direct habitat loss	Habitat loss involves the direct destruction or physical take-up of vegetation or the removal of other structures of conservation interest. Habitat loss may also occur indirectly as a result of change in land-use or water management.
Habitat fragmentation	Habitat fragmentation is concerned with spatial processes, such as negative edge effects (e.g. colonisation by 'aggressive' species or successional changes) and dispersal problems that can become increasingly severe as habitat is lost and remaining habitat is divided into smaller units. Fragmented habitats are likely to be more vulnerable to external factors that may have a negative effect upon them; e.g. disturbance, and may be less resilient to change (including climate and management change) than connected habitats because colonising species may be unable to reach the habitat to re-colonise in the event of species loss.
Impact on wildlife	Habitat loss can have a direct impact on individual populations and assemblages of species resulting in the direct loss of individuals or populations of animal species, or in indirect loss through increasing levels of stress placed upon populations of some species through negative edge effects (e.g. predation pressure) and dispersal problems that can become increasingly severe as habitat is lost and the remaining habitat is divided into smaller units.

Disturbance from human activity, noise and vibration	Increases in human disturbance including noise, vibration and visual disturbance from human activity can have a range of impacts depending upon the sensitivity of the ecological receptor, the nature and duration of the disturbance and its timing. The response of individual species to increased levels of human disturbance will depend upon many factors including the sensitivity, reproductive status, previous exposure to human disturbance, behaviour during the event, species tolerance to disturbance, location in relation to the source, availability of alternative nearby habitat, and environmental factors (i.e. topography, vegetation and atmospheric conditions which can influence noise levels). It is generally accepted that for noise and visual disturbance, certain species or groups of species can be impacted upon up to up to 300m from its source.
Dust deposition	Extraction, processing, traffic movements and other associated works have the potential to generate dust. Where large amounts of dust are deposited on vegetation over a long timescale (a full growing season for example) there may be some adverse effects upon plants restricting photosynthesis, respiration and transpiration. Fugitive dust from quarry sites is typically deposited within 100 - 200m of the source; the greatest proportion of which, comprising larger particles (greater than 30 microns) is deposited within 100m[3].
Changes in air quality (traffic emissions)	The main pollutants from traffic emissions of primary concern for ecology are nitrogen oxides (NOx) and oxides of sulphur, mainly sulphur dioxide (SO2), together with the acidification and eutrophication associated with acid and nitrogen deposition upon sensitive ecosystems that can occur when these substances are deposited to land at high rates. High rates of nitrogen deposition upon sensitive ecosystems can increase the eutrophication of soils and water which can have a detrimental effect on species-rich plant communities and semi-natural habitats that are often associated with a low nutrient status. Eutrophication can decrease species diversity and the dominant plant species can change to those better to respond to increased nitrogen levels. Acid deposition, whether from SO2, NOX or ammonia formed by the reaction of SO2 and NOX, can affect habitats by changing the species composition of plants and their associated communities of fauna. Acid deposition can occur through both wet and dry deposition.
Changes in ground and	Surface water discharges and diffuse pollution from surface water run-off can contribute to a reduction in water quality through a net contribution of

[3]Department of the Environment (1995). *The Environmental Effects of Dust from Surface Mineral Workings. Volume 1: Summary Report & Best Practice Guides.* HMSO.

surface water quality	nutrients or contamination from a wide range of organic and inorganic compounds. Contamination of groundwater can occur through the direct recharge of groundwaters close to the ground surface, or of deeper aquifers through percolation and other hydrological pathways that may affect surface waters (where there is a potential ground and surface water hydraulic connectivity).
Cumulative impacts	Cumulative impacts or effects are changes in the environment that result from numerous human-induced, small-scale alterations. Cumulative impacts can be thought of as occurring through two main pathways: first; through persistent additions or losses of the same materials or resource, and second, through the compounding effects because of the coming together of two or more effects (Bowers-Marriott, 1997)[4].

6.5.3 Assessment of impacts

Direct habitat loss and fragmentation

Outside the immediate development footprint, there were no direct habitat loss, damage or fragmentation of any valued habitat in the assessment area or outside. No designated sites were impacted. No rare or protected species of plant were impacted.

Impact on wildlife

No valued species of fauna were identified as being present within the assessment area. The historical development of the pit is not assessed to have had a significant impact on any valued individual or group of species and is not likely to have impacted upon the local population status of any species that may be present at this site.

Disturbance from human activity noise and vibration

Extraction at the site originated as a Pre-1963 development. Faunal species in the area have climatized to the disturbance associated with quarrying activity, such as traffic movements, and have likely adapted.

Dust deposition

Potential fugitive dust generated from the historical operations associated with extraction processes, vehicle movements, construction of berms and restoration of the quarry is likely to be deposited within the confines of the pit. Dust deposition monitoring results show that the level of dust generated was within the limit of 350mg/m^2/day conditioned on the pit. The periphery of Clonfinlough Esker pNHA is likely to haved suffered from dust

[4] Bowers Marriott, B. (1997) *Practical Guide to Environmental Impact Assessment: A Practical Guide*. Published by McGraw-Hill Professional, 1997, 320 pp.

deposition on occasion, depending on the prevailing weather conditions and the level of quarry activity.

Changes in air quality

Historical traffic movements to and from the site and machinery operation on the site were relatively low. Any deterioration in air quality associated with the previous operation of the pit was localised to the assessment area.

Changes in ground and surface water quality

The processing plant at the pit operated on a closed water loop system with no discharge into local watercourses, negating the potential for a watercourse pollution incident. Chapter 8 of this rEIAR, Water, provides information on the hydrological regime of the site and states that there is negligible impact on the groundwater regime of the nearby SAC peatland sites, due to no dewatering being deployed on the site.

Regarding the storage of fuel and re-fuelling of machinery, the following steps were undertaken during the lifetime of the operation;

- Mobile plant was refuelled on a dedicated hardstanding area on the north-western section of the site. This hardstanding drains to an oil interceptor and therefore any leaks or spills were contained.
- Maintenance of mobile plant also occurred on this hardstanding area and potential spills were therefore contained.
- Refuelling of plant was undertaken by a trained fuel delivery operator and spill kits were on the ready in the unlikely event of an accidental spill.
- Plant was also inspected on a regular basis to ensure there was no fuel or oil leaks.
- Procedures and contingency plans were in place to deal with emergency accidents or spills, but none occurred; and,
- There was no surface water discharge from the site.

Cumulative impacts

There are two other sand and gravel pits located to the east of the pit. Both are considered sufficiently distant from the site to not create a cumulative impact. There are no other known activities or proposed activities at or within proximity to the assessment area that would have been likely to result in a significant cumulative impact on the ecology of local area(www.myplan.ie)[5]. It is therefore considered that no significant cumulative impacts occured.

[5] Accessed 17th June 2019

6.6 Mitigation measures

6.6.1 Ongoing mitigation measures

Dust deposition monitoring was undertaken and will continue to be carried out during the restoration phase. Re-fuelling of machinery will be carried out by trained personnel and spill kits will be on hand.

Additionally, as part of the application, the following ecological mitigation and restoration measures will be carried out to enhance the biodiversity value of the site.

- The use of native species will support a wider range of insects and animals and will contribute more to the ecology of the region. Suitable tree and shrub species include ash, hawthorn, hazel *Corylus avellana*, blackthorn, gorse and willow *Salix spp.*
- This added vegetation will also enhance the local wildlife corridor, connecting the site with the surrounding landscape.
- Using plants adapted to or tolerant of the existing site conditions will reduce the need for expensive remedial measures (such as replacing failed plants).
- Hedgerows and tree lines along the site perimeter will be retained.
- Planting of trees and shrubs where required to replace dead plants will take place during the dormant seasons. Bare-rooted plants transplant most successfully during their dormant season, this is usually between November and March/April. Avoiding times when the ground is actually frozen, this will mean either autumn or spring planting.
- Planting areas will be suitably fenced to exclude farm stock, rabbits, sheep and other browsing animals. It may be more economical to protect each tree individually rather than fence the whole area.
- No herbicides, pesticides or fertiliser will be applied to the berm.
- The immediate area around the sand martin colony near the site entrance will not be planted to ensure the continuation of access for the birds to their nesting burrows in the cliff face.

6.6.2 Decommissioning

The restoration plan for the pit floor involves spreading a layer of overburden on areas which were extracted. These areas will be seeded and returned to agricultural use. A layer of overburden will be spread on side slopes and will be allowed to vegetate naturally. No impacts on groundwater quality or quantity (flows or levels) are anticipated during or after these works.

The overburden used for the proposed restoration works was previously excavated at the site during the sand and gravel extraction works. There is no potential for groundwater contamination from this material. It is proposed that the site will be used for agricultural purposes after the restoration is complete. The proposed land use is consistent with the land use locally which is predominately agricultural.

6.7 Conclusion

Activity at the pit, in the past has resulted in obvious habitat loss and created habitat fragmentation at a local level. Taking the small area and the nature of the quarrying (sand and gravel extraction) into account, any environmental impacts resulting from this activity were localised to this immediate area. The pit operated a closed water recycling system, with no discharge into local watercourses thereby resulted in no hydrological impacts on nearby SAC peatland sites.

The decommissioning plan for the pit will have biodiversity enhancement to the fore and will create a landscape that will benefit many species in the site itself and the surrounding areas.

6.8 References

- EPA (2002), '*Guidelines on the information to be contained in Environmental Impact Statements*', Environmental Protection Agency,
- EPA (2003), '*Advice Notes on current practice in the preparation of Environmental Impact Statements'*, Environmental Protection Agency,
- EPA (2017), Draft Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports.
- Fossitt, J., 2000, '*A Guide to Habitats in Ireland*'. The Heritage Council, Kilkenny,
- IEEM (2006), *'Guidelines for Ecological Impact Assessment in the United Kingdom'*, Institute of Ecology and Environmental Management,
- NRA (2008) *'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*', National Roads Authority.

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Plates

Appendices

7.0 LAND, SOILS AND GEOLOGY

7.1 Introduction

The chapter details information in relation to soils, geology and land which is intended to satisfy the requirements of An Bord Pleanála in relation to an application for Substitute Consent for an existing sand and gravel pit located at Clonfinlough Co. Offaly.

An assessment is made of the potential impacts on land, soils and geology as a result of activities that were undertaken on a day to day basis at the existing development. Existing mitigating measures are reviewed and remedial measures are put forward where required in order to remove or reduce any potential impacts identified.

7.2 Methodology

The initial evaluation consisted of inspections of the site and adjacent lands by examination of aerial photography and Ordnance Survey plans, followed by site walkover surveys. Relevant geological data from the Geological Survey of Ireland (1:100,000 Sheet 15: Geology of Galway-Offaly) was reviewed together with additional data collated from data sources at Offaly County Council, Environmental Protection Agency (EPA), National Parks and Wildlife Service (NPWS), Ordnance Survey of Ireland (OSI), Teagasc and Met Eireann.

The report has been compiled primarily taking cognisance of:

- *Guidelines for the preparation of soils, geology and hydrogeology chapters of environmental impact statement.* Institute of Geologists of Ireland (2013).
- *Revised guidelines on the information to be contained in Environmental Impact Statements.* Environmental Protection Agency (2015).
- *Guidelines on the information to be contained in Environmental Impact Assessment Reports. Environmental Protection Agency (2017).*
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Department by the Department of Housing, Planning and Local Government (August, 2018).*

7.3 Existing Environment

7.3.1 Land

The existing sand and gravel pit is located in the townland of Clonfinlough, Co. Offaly which is located approximately 8.7km north west of Ferbane and 8.6km north east of Shannonbridge. The existing pit has an overall area of approximately 15.34 hectares and consists of a Pre-63 area and areas which were authorised by way of two separate planning permissions.

The existing pit is situated on a broad east – west trending ridgeline formed by fluvio-glacial sand and gravel deposits. The land to the north and south of the site slopes away from the ridgeline. Based on the Ordnance Survey 1:50,000 scale mapping contours, the ground elevation of the site prior to extraction varied between approximately 55 and 80m OD. The current elevation of the sand and gravel pit floor is between approximately 44.5 and 53m OD.

The study area is relatively flat and consists of peatlands which are subject to peat extraction and agricultural land predominantly under permanent pasture interspersed by hedgerows with livestock grazing being the predominant sector practiced. The area is populated with low density housing along the R444 Regional Road which runs along the north-western boundary of the site.

The area is generally flat lying but the thicker sand and gravel areas are characterised by elevated well drained belts of farmland which have a west to east trend, sub-parallel to the Clonmacnoise / Ballinahown road. Within these areas of sand and gravel more steeply sided narrow ridges define individual eskers.

The sand and gravel areas are mainly well drained permanent pasture, but there are some areas of scrub growing on the steeper slopes. The lower lying areas between the eskers are poorly drained and peat bogs have developed in the depressions.

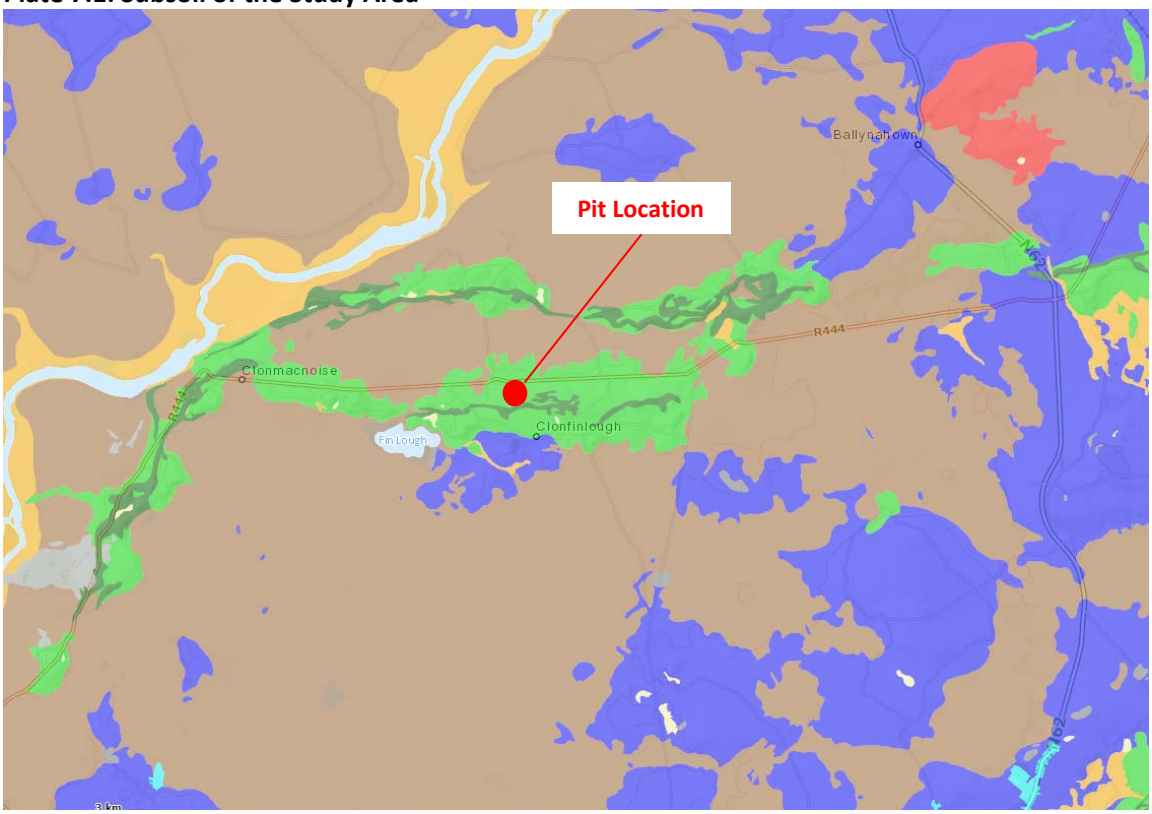
7.3.2 Soils

Soil is the top layer of the earth's crust and is formed by mineral particles, organic matter, water, air and living organisms. It is an extremely complex, variable and living medium and its characteristics are a function of parent subsoil or bedrock materials, climate, relief and the actions of living organisms over time. Together with air and water, they constitute the three natural resources on which all plant and animal life depend. Soil is a medium for plant and crop growth. It is also a natural biological filter, absorber, cation exchanger,

water purifier and degrader of hazardous materials, as well as one of the most important, yet varied, habitats in the world.

Topsoil has been removed from the majority of the sand and gravel pit and has been used for construction of berms and stored for restoration at a later stage. According to the GSI the subsoil geology of the pit and surrounding area consists of glaciofluvial sands and gravels derived from limestones (GLs) as reflected on Plate 7.1. This material has been excavated from the sand and gravel pit and processed into a saleable aggregate. An Esker located along the southern boundary of the pit and runs from east to west along the boundary. The esker consists of basic esker sands and gravels (BasEsk).

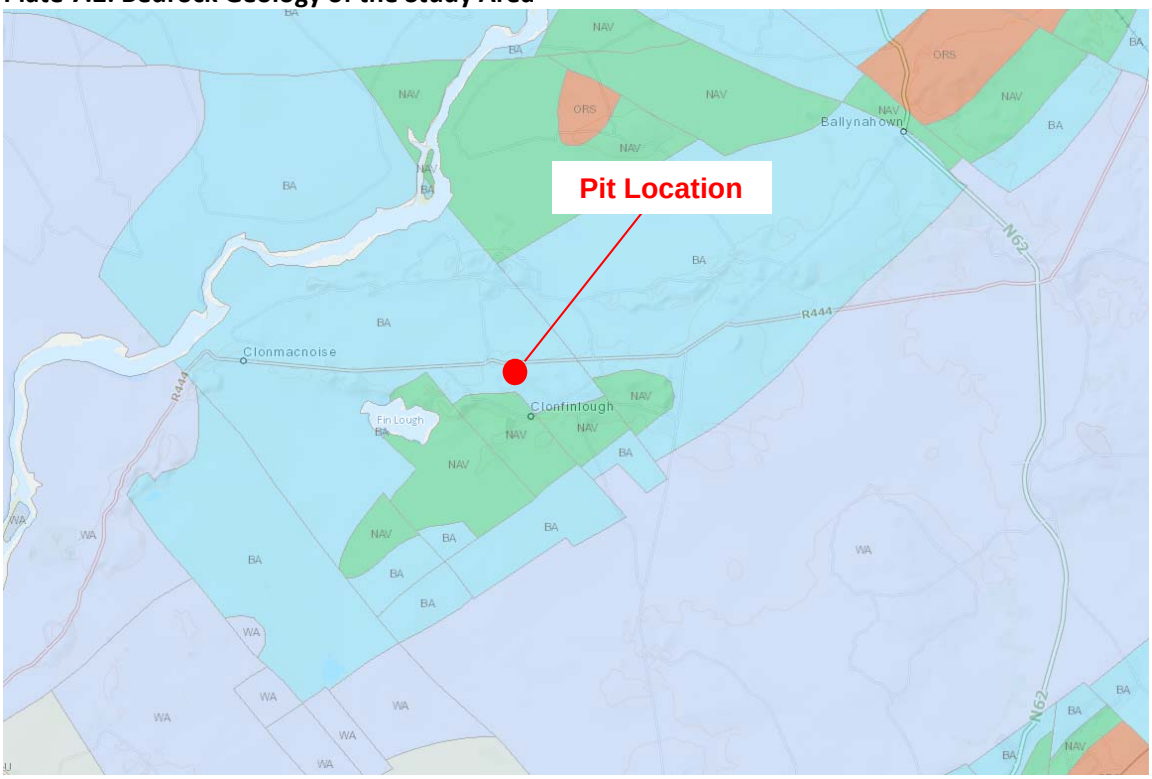
Plate 7.1: Subsoil of the Study Area



7.3.3 Bedrock Geology

An inspection of the Geological Survey of Ireland (GSI) records shows that the bedrock geology beneath the sand and gravel pit consists of dark muddy limestone shale of the Ballysteen formation (Plate 7.2). No bedrock was extracted from the site.

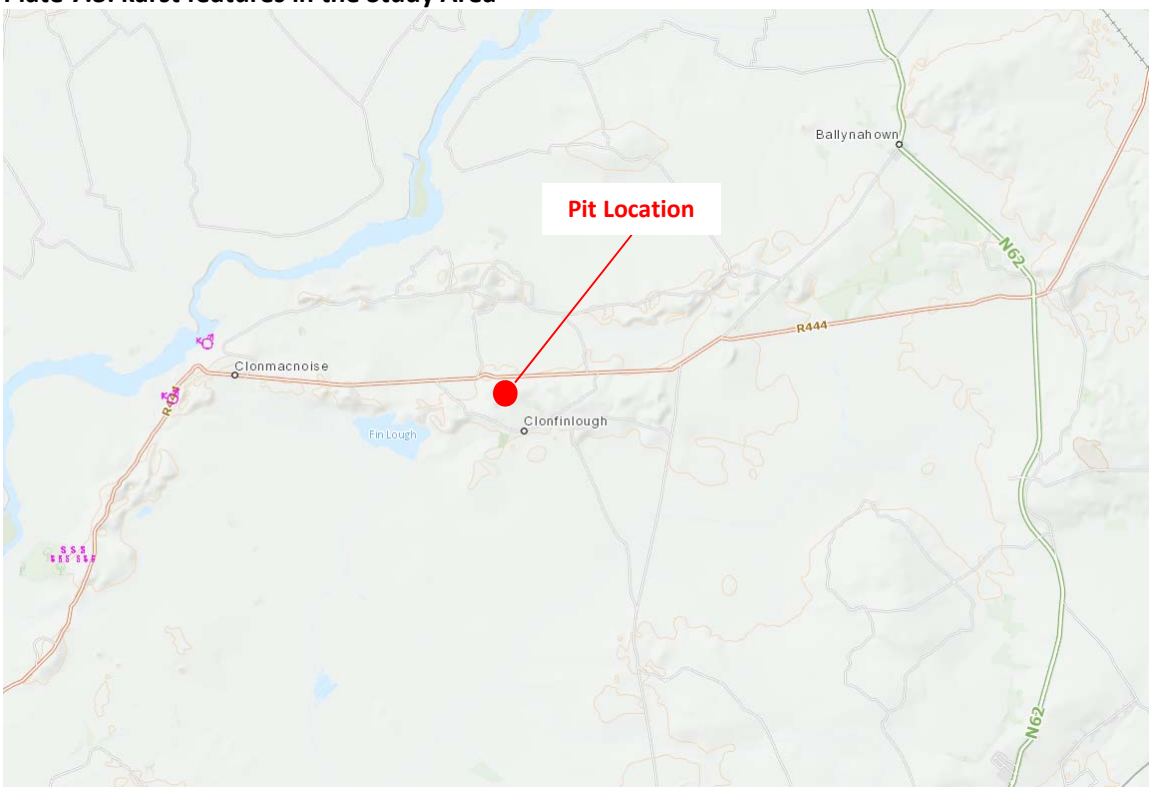
Plate 7.2: Bedrock Geology of the Study Area



7.3.4 Karst Features

There is no karst features located within the immediate vicinity of the sand and gravel pit. Toberfinneen spring is the closest feature and is located 3.5km to the west of the pit.

Plate 7.3: karst features in the Study Area



7.3.5 Geological Heritage

There are a number of geological heritage sites located in the vicinity of the sand and gravel pit which are depicted on Plate 7.4 (GSI 2016) and 7.5 (GSI 2019) below. The closest site is the Clonmacnoise Esker as depicted on Plate 7.5. The Clonmacnoise Esker and surrounding sands and gravels includes an exceptionally large accumulation of sands and gravels deposited both under the ice sheet and at its margin as the ice withdrew westwards across Offaly at the end of the last Ice Age. The esker forms part of the larger Ballinasloe-Split Hills-Clonmacnoise-Clara Esker System, which extends from Galway, through Offaly, and into Westmeath, and is the traditional route defined as the 'Eiscir Riada' in ancient Irish Folklore. The Clonmacnoise Esker Report is attached in Appendix III.

The second closest is Mongan Bog located to the west of the pit which is considered an excellent example of a midland raised bog with a well-developed system of pools. It is a valuable addition to the growing network of peatland reserves. Clara Esker and the River Shannon callows are located to the east and west of the pit respectively

Plate 7.4: Geological Heritage Sites 2016

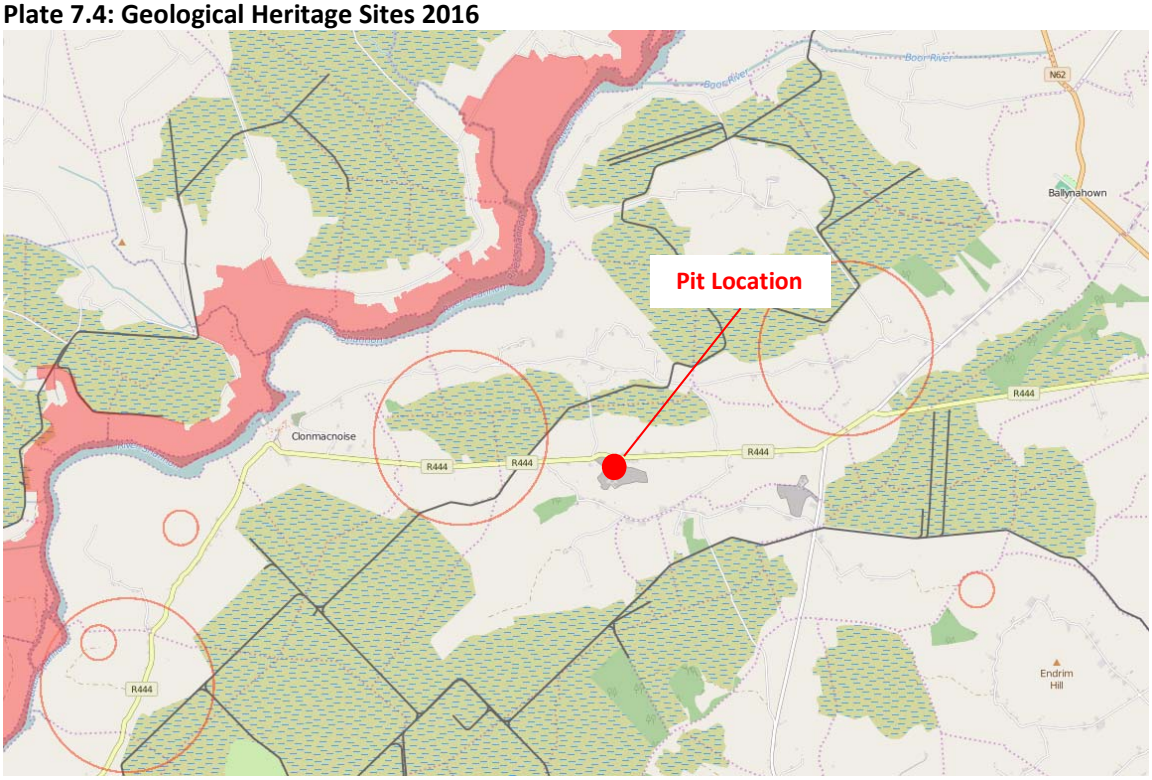
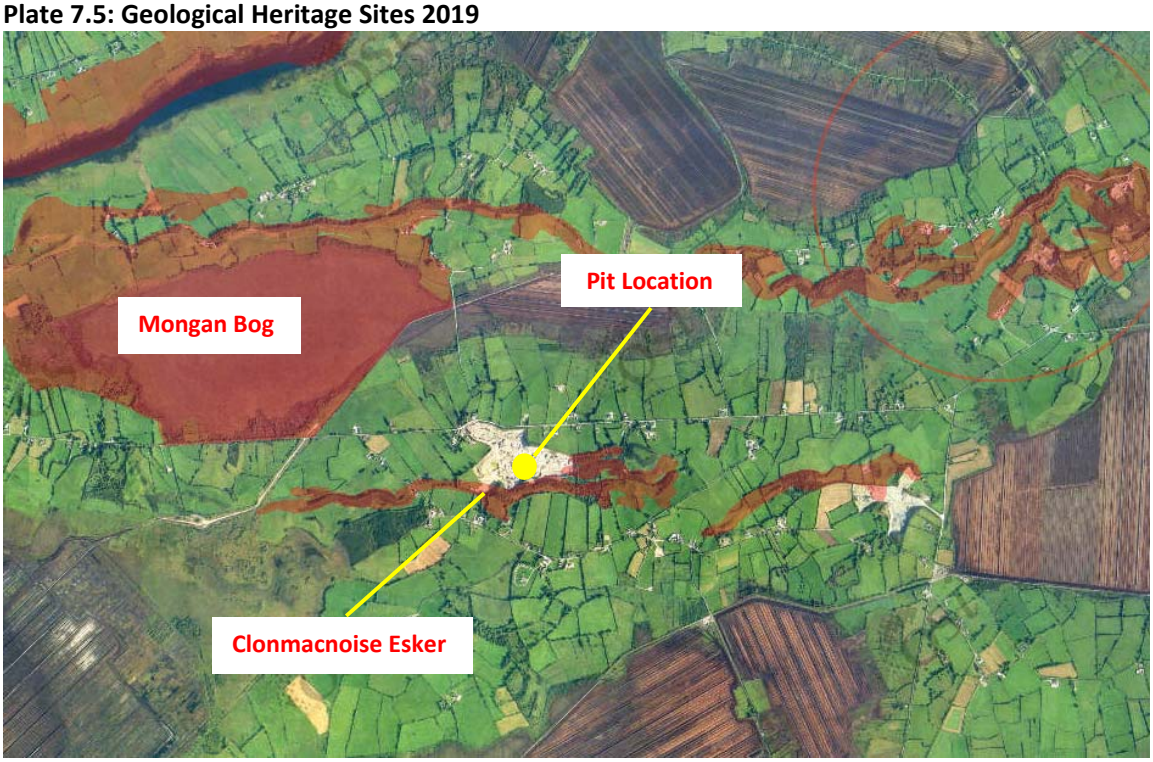


Plate 7.5: Geological Heritage Sites 2019



7.3.6 Site Geology

The site was visited by EurGeol. John Colthurst, PhD, PGeo who is a Professional Geologist registered by the Institute of Geologists of Ireland.

The geologist concluded that sands and gravels at Clonfinlough are generally very clean with little or no mud or clay present. Large boulders are not common and the largest ones present rarely exceed 50cms in diameter. In 2017 the geologist washed and examined a 7.5kg bag of -20mm aggregate. It was possible to divide the sample into its component lithologies and to calculate the % of each lithology present by weight. Dark blue-grey limestone is the dominant constituent of the aggregate. This is predominantly fine calcarenite or micrite. A small proportion of it is quite fossiliferous and it may have been sourced from the Ballysteen Limestone Formation.

Most of this dark limestone is however unfossiliferous and is probably Visean in age. The pale grey limestone is typical Waulsortian Reef. Some of the Waulsortian is pink in colour and haematised Waulsortian is widespread in the Shannonbridge and Athlone areas. Sandstone is a minor component of samples. Sandstone pebbles are yellow-orange or brown in colour. Most of the sandstones are medium grained. Sandstone is exposed in a number of small inliers around the Midlands. No sedimentary mudrock clasts were observed in the sample and cherty limestone and dolomite are very rare. No pyrite was observed and no other exotic lithologies were present in the sample.

Based on the geological review of the pit and test results, the Professional Geologist was satisfied that material from Clonfinlough Pit was suitable for use as unbound granular fill (hardcore) for use under concrete floors and footpaths and met with S.R.21: 2014 & A1:2016 guidelines and was suitable for use in concrete and met with S.R.16: 2016 guidelines.

7.4 Characteristics of the Development

The existing pit has an overall area of approximately 15.34 hectares and consists of an area of 0.97 ha. which was subject to extraction of material after expiry of planning permission on 31st day of December 2009. This extraction area is contained within the overall quarry area of 15.34 hectares consisting of areas ancillary to the extraction area (0.97 Ha.)

The ancillary areas of the pit consists of previously extracted areas, processing infrastructure and stockpiling areas, vehicle parking areas and areas used for the storage of overburden pending restoration.

Overburden material was removed prior to excavation of the underlying reserve and stored pending restoration works. The sand and gravel material was excavated, loaded onto dump trucks, transported to the fixed wet screening and crushing plant and processed into various grades depending on market demand.

Plant and machinery which operated in the application area consisted of tracked excavators, wheel loaders, dump trucks, processing plant and road trucks to haul material off site. Ancillary plant such as a water bowser for dust suppression was deployed where required.

Due to the porous nature of the underlying material, water falling as precipitation percolated to ground. The existing washing plant operated by way of a closed water management system whereby the plant removed the fine material (clays /silts) with run-off water diverted to a series of settlement lagoons. The water was then recycled for washing with water lost in the aggregate replaced with water from a groundwater well located near the plant.

A significant amount of landscaping and restoration works have been completed which have included placing a layer of overburden on side slopes and the pit floor. It is proposed to restore further areas of the pit as per the landscape and restoration plan detailed in Section 13.0.

7.5 Impact Assessment

The procedure for determination of potential impacts on the receiving soil and geological environment is to identify potential receptors within the site boundary and surrounding environment and use the information gathered during the desk study and field investigation to assess the degree to which these receptors will likely have been impacted upon. Impacts are described in terms of quality, significance, duration and type in accordance with current EIAR guidelines (EPA, 2017; DHPLG, 2018).

In accordance with the NRA Guidelines (2009) (as included in 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements' (IGI, 2013)), the site is deemed to be an attribute of Medium importance as a function of being a small existing sand and gravel pit. The geological resource removed was an attribute of value or significance on a local scale only.

7.5.1 Direct Impacts

Extraction activities to date have resulted in the change in land use from what was more than likely agricultural use to resource extraction. The change in land use has not resulted

in a significant loss of the previous land use as the area the subject of this application is minor in comparison to the availability of land which is available for agricultural use. The proposed restoration plan will result in the application site being restored to agricultural land which will offset extraction activities to date.

The application site extracted sand and gravel from the Clonfinlough Esker which is a southern spur off the main Eiscir Riada system and which is designated as an Area of High Amenity. This extraction from the pit was authorised by way of being a Pre-1963 development and by two subsequent planning applications; P91/049 and P03/191. In granting both planning permissions, Offaly Co. Co. would have taken into consideration the compatibility of the planning proposals with regards to the Area of High Amenity which traverses the site.

Only 0.064 Ha. of the 0.97 Ha. area (6.6%) is located within the AHA boundary and this area had been subject to sand and gravel extraction prior to 31st December 2009 in line with previous authorisations attached to the pit. Therefore the development undertaken post 31st December 2009 did not result in an impact on the AHA.

Extraction at the pit was undertaken close to the boundary of the Clonfinlough Esker pNHA with the majority of extraction undertaken prior to the designation of the site. The 0.97 hectare extraction area is located along the northern boundary and the pNHA is located along the southern boundary therefore was not impacted on by extraction from the 0.97 hectare area. The proposed landscape and restoration plan will ensure that remaining areas are preserved.

There are a number of designated Natura 2000 sites in the vicinity of the pit. The past development has not impacted on the integrity of these sites as concluded in the rNIS which accompanies this application.

The sand and gravel previously extracted was used as a raw aggregate for the construction and agricultural sectors. This activity has had a beneficial impact to the local and regional economy in this regard.

7.5.2 Indirect Impacts

The historical extraction of sands and gravels on the application site will have had the following adverse indirect impact to the land, soil and geological environment:

- Extraction activities to date has temporarily removed the capacity of these lands to provide agricultural production until future restoration. The change in land use has

not resulted in a significant loss of the previous land use. The resulting impact on the soils may be considered to be of a medium term nature in that they will be reused or re-integrated as a fundamental part of future site rehabilitation. The proposed restoration plan will result in the application site being restored to agricultural land which will offset extraction activities to date.

- Historically there has been the potential for contamination of exposed subsoils as a result of spillages or leakages from stationary and mobile plant. Laboratory analysis of groundwater samples has shown that groundwater quality at the site has not been adversely impacted by previous operations and as such contamination from previous activities is deemed to be undetectable.

The historical extraction of sands and gravels has had the following positive indirect impact to the land, soil and geological environment:

- stored soils are available for reuse in the rehabilitation of the site to a condition suitable for agricultural production.
- The use of the geological resource, i.e. sand and gravel, as a raw material had benefits in the production of aggregates and products for use in construction and agriculture. These aggregates and products cannot be reasonably be manufactured by other means.

Previous extraction has not had any indirect impact on the soil and geological environment outside the site.

7.5.3 Cumulative Impacts

There are two other sand and gravel pits located to the west of the pit. Peat extraction is also undertaken in the study area which results in areas of exposed peat and a change in landform. It is anticipated that the extraction of sand and gravel from both pits will be offset to a certain extent once restored which will lead to promotion of ecological diversity with the attraction of wildlife to the area. No in combination impacts of the sand and gravel pit in combination with other developments have been identified.

Quarrying is established at this site and the surrounding area due to the availability of the resource and it has been integrated into the local environment. Hence the cumulative impact to the geological resources in the area is considered to be negligible.

7.5.4 Do-Nothing Effects

No further future extraction is proposed at the pit and the applicant is submitting this application in order to regularise the pit and to restore in line with the landscape and restoration plan.

In the event that substitute consent is not granted the proposed landscape and restoration works would not go ahead leaving the existing working pit unrestored until a restoration proposal was agreed with Offaly Co. Co..

7.5.5 Unplanned Events

The 2014 EIA directive requires the development be assessed in terms of vulnerability to the risks of major accidents and/or disasters which are relevant to the project. It is highly unlikely that any unplanned events occurred or should occur that could lead to an impact on Land, Soils & Geology. Extracted side slopes are stable and it is proposed to vegetate these to ensure that they remain stable on completion of restoration works.

7.6 Mitigation Measures

Previous operations were undertaken in accordance with “best practice” and appropriate guidelines for example EPA’s Environmental Management in the Extractive Industry guidelines and Irish Concrete Federation (ICF) Environmental Code. The following measures were practiced when the pit was operational.

- Fuelling and lubrication were undertaken in a designated area and where possible off-site, and not within 30m of groundwater wells or water features.
- Only a limited volume of fuel was stored on-site.
- An adequate supply of spill kits and hydrocarbon absorbent packs were stored on-site in the event they were required.
- Soils retained on site were used in rehabilitation and this shall be the case going forward. The site will be capped with a layer of topsoil in order to restore back to agricultural use.
- Restoration works were not carried out during excessively dry or wet weather.

7.7 Remedial Measure

No remedial measures are required.

7.8 Residual Impacts

The implementation of the proposed landscape and restoration plan will aid in mitigating extraction activities to date.

7.9 References

Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR) (EPA, August 2017)

Draft Advice Notes for Preparing Environmental Impact Statements (EPA, September 2015)

Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (Institute of Geologists of Ireland (IGI), 2013)

Environmental impact assessment of national road schemes – a practical guide. National Roads Authority (NRA, 2009)

Geology in Environmental Impact Statements - A Guide (The Institute of Geologists in Ireland, 2002)

EPA Soils and Subsoils Mapping – www.epa.ie

GSI Online Mapping – www.gsi.ie

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8.0 WATER

8.1 Background and Objectives

Hydro-Environmental Services (HES) were requested by Earth Science Partnership (ESP), acting on behalf of Dermot Nally Stone Ltd. (Applicant) to complete a remedial hydrological/hydrogeological EIAR assessment in relation to a sand and gravel pit at Clonfinlough, Co. Offaly.

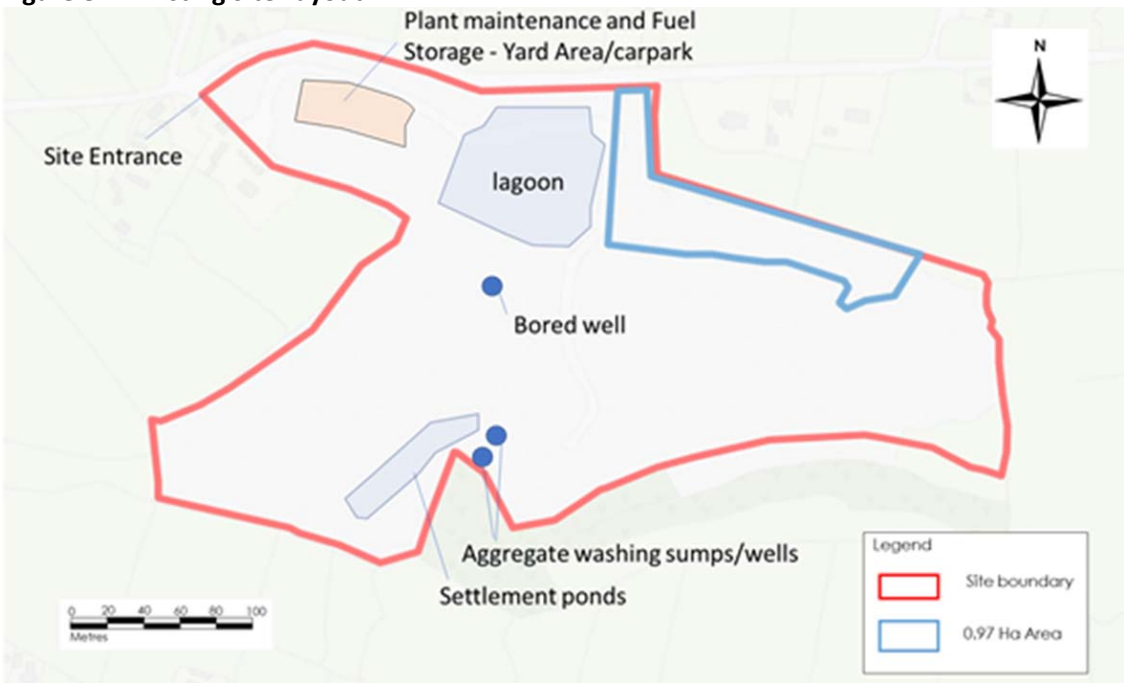
The objectives of the assessment are:

- Produce a baseline study of the existing water environment (surface water and groundwater) in the area of the development;
- Identify any likely significant effects on surface water and groundwater due to the past operation of the development;
- Identify mitigation measures to avoid, remediate or reduce significant negative effects and,
- Assess whether there are any likely significant residual effects and cumulative effects of the past operation of the development and other local developments.

8.2 Development Overview

The existing pit comprises 15.34 Ha. which was previously subject to extraction of sand and gravel and related activities. 0.97 Ha. of this total area was extracted after the expiration of planning permission and this now requires Substitute Consent in order regularise the area. The overall pit, including the 0.97 Ha area, comprises previously extracted areas, processing infrastructure, stockpiling areas, vehicle parking areas and areas used for the storage of overburden. Refer to Figure 8.1 below which shows the existing pit area (15.34 Ha) including the extraction area (0.97 Ha).

Figure 8-1: Existing Site Layout



8.3 Relevant Legislation

- The Water Chapter of the rEIAR is prepared in accordance with the requirements of European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive') as amended by Directive 2014/52/EU. Regard has also been taken of the requirements of the following legislation.

- S.I. No. 349 of 1989: European Communities (Environmental Impact Assessment) Regulations, and subsequent Amendments (S.I. No. 84 of 1995, S.I. No. 352 of 1998, S.I. No. 93 of 1999, S.I. No. 450 of 2000 and S.I. No. 538 of 2001), S.I. No. 30 of 2000, the Planning and Development Act, and S.I. 600 of 2001 Planning and Development Regulations and subsequent Amendments. These instruments implement EU Directive 85/337/EEC (EIA Directive) and subsequent amendments, on the assessment of the effects of certain public and private projects on the environment;
- Planning and Development Acts 2000-2015;
- Planning and Development Regulations, 2001-2015;
- Section 177F of the Planning and Development Act, 2000 (as amended), and Section 261A of the Planning and Development Act, 2000 (as amended) and

related provisions - Supplementary Guidelines for Planning Authorities (DELG, 2012).

- S.I. No. 94 of 1997: European Communities (Natural Habitats) Regulations, resulting from EU Directives 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) and 79/409/EEC on the conservation of wild birds (the Birds Directive);
- S.I. No. 293 of 1988: Quality of Salmon Water Regulations, resulting from EU Directive 78/659/EEC on the Quality of Fresh Waters Needing Protection or Improvement in order to Support Fish Life;
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009;
- S.I. No. 722 of 2003 European Communities (Water Policy) Regulations;
- S.I. No. 41 of 1999: Protection of Groundwater Regulations, resulting from EU Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (the Groundwater Directive);
- S.I. No. 249 of 1989: Quality of Surface Water Intended for Abstraction (Drinking Water), resulting from EU Directive 75/440/EEC concerning the quality required of surface water intended for the abstraction of drinking water in the Member States (repealed by 2000/60/EC in 2007);
- S.I. No. 439 of 2000: Quality of Water intended for Human Consumption Regulations and S.I. No. 278 of 2007 European Communities (Drinking Water No. 2) Regulations, arising from EU Directive 98/83/EC on the quality of water intended for human consumption (the Drinking Water Directive) and WFD 2000/60/EC (the Water Framework Directive);
- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009;
- S.I. No. 9 of 2010: European Communities Environmental Objectives (Groundwater) Regulations 2010;
- S.I. No. 296 of 2009: European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009; and,
- S.I. No. 122 of 2014: European Communities Environmental Objectives (Drinking Water) Regulations 2014.

8.4 Relevant Guidance

The Water Chapter of the rEIAR is carried out in accordance with guidance contained in the following:

- Section 261A of the Planning and Development Act, 2000 (as amended) and related provisions - Supplementary Guidelines for Planning Authorities (DELG, 2012);
- Environmental Protection Agency (May 2017): Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Environmental Protection Agency (September 2015): Draft - Advice Notes on Current Practice (in the preparation on Environmental Impact Statements);
- Environmental Protection Agency (2003): Advice Notes on Current Practice (in the preparation on Environmental Impact Statements);
- Environmental Protection Agency (2002): Guidelines on the Information to be Contained in Environmental Impact Statements;
- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2006;
- Department of the Environment, Heritage and Local Government; Quarries and Ancillary Activities – Guidance for Authorities (April 2004); and,
- Environmental Protection Agency (2006): Environmental Management in the Extractive Industry (Non-Scheduled Minerals).

8.5 Schedule of Works

8.5.1 Desk Study

A desk study of the sand and gravel pit and surrounding area was completed prior to the undertaking of field mapping, walkover assessments and hydrogeological data collection. The desk study involved collecting all relevant geological, hydrological,

hydrogeological and meteorological data for the study area. This included consultation with the following:

- Environmental Protection Agency database (www.epa.ie);
- Geological Survey of Ireland (GSI) - Groundwater Database (www.gsi.ie);
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- Water Framework Directive "Catchments" Map Viewer (www.catchments.ie);
- Bedrock Geology 1:100,000 Scale Map Series, Sheet 16 (Geology of Kildare - Wicklow); Geological Survey of Ireland (GSI, 1994);
- Geological Survey of Ireland (GSI) - Groundwater Body Characterisation Reports;
- OPW Indicative Flood Maps (www.floodmaps.ie);
- Environmental Protection Agency – "Hydrotool" Map Viewer (www.epa.ie);
- CFRAM Preliminary Flood Risk Assessment (PFRA) maps (www.cfram.ie); and,
- Department of Environment, Community and Local Government on-line mapping viewer (www.myplan.ie).

8.5.2 Baseline Surveys and Investigations

To complete the Water Chapter of the rEIAR, the following surveys and investigations were carried out:

- Desk study of the site area and review of available geological, meteorological, hydrological / hydrogeological and ecological data for the area;
- A review of existing pit data was undertaken which included daily water usage volumes and existing groundwater and surface water quality data;
- Completed a detailed site walkover survey, water features survey, geological mapping of exposures of bedrock and subsoils, including inspection and mapping of all relevant hydrological features, such as on-site lagoons, local streams and drains etc (where present);

- A survey of wells within the pit and in the local area (off-site to the north, and also the GWS well to the southwest) was undertaken whereby groundwater levels were measured and surveyed to a common datum (m OD) using a differential GPS. Contemporary water levels were also recorded in May and June 2019; and,
- Review of surface water and groundwater flowpaths in the area of the pit in respect of the two Natura 2000 sites (Mongan Bog SAC & SPA and Fin Lough SAC).

8.5.3 Impact Assessment Methodology

Please refer to Section 1.0 of the rEIAR for details on the impact assessment methodology (EPA, 2002, 2003, 2015 and 2017). In addition to the above methodology, the importance of the water environment receptors was assessed on completion of the desk study and baseline study.

Using the National Roads Authority (2008) guidance, an estimation of the importance of the hydrological and hydrogeological environments within the study area are quantified, using the criteria set out in Table 8.1 and Table 8.2.

Table 8.1: Estimation of Importance of Hydrology Attributes (NRA, 2008)

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

Table 8.2: Estimation of Importance of Hydrogeology Attributes (NRA, 2008)

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

8.6 Existing Environment

8.6.1 Site Description and Topography

The existing site, which has a total area of 15.34 Ha, is located at Clonfinlough, which exists approximately 8km northwest of Ferbane, Co. Offaly. The existing pit is situated on a broad east – west trending ridgeline formed by fluvio-glacial sand and gravel deposits. The land to the north and south of the site slopes away from the ridgeline.

The site is a sand and gravel pit with an extraction area of 15.34ha. Based on the Ordnance Survey 1:50,000 scale mapping contours, the ground elevation of the site prior to extraction varied between approximately 55 and 80m OD. The current elevation of the sand and gravel pit floor is between approximately 44.5 and 53m OD.

The north-western section of the site, which is where the site entrance is located, is at an elevation of approximately 53m OD. The central and eastern section of the site, which is the main existing pit ground level, has a ground elevation of between approximately 45.7 and 46.3m OD. The lowest part of the site is in the area of the washing and processing plant which exists on the southern section of the site and has a ground elevation of approximately 44.5m OD. The ground elevation around the boundary of the site (which represents the original ground level) varies between approximately 55 and 70m OD.

There is a large lagoon (~1ha) on the northern section of the site where extraction of sand and gravel was undertaken below the groundwater table in the past.

There is an existing aggregate washing and processing facility which includes settlement ponds for removal of fines and sediment from the washing process. The washing and processing area along with the silt ponds are located on the south of the site. A closed water management system was used in the washing process and therefore there is no discharge of water from the site to local surface watercourses. There are 2 no. shallow wells / sumps on-site that were used to top up the washing plant with water and a third well (bored well) was used for washing the inside of trucks prior to loading. The wash water percolated back into underlying sand and gravels.

There is a parking area, canteen and plant maintenance area located close to the site entrance which exists on the northwest of the site. Fuel storage and plant refuelling is undertaken in the plant maintenance area.

The site is bordered mainly by agricultural land with low density housing along the R444 Regional Road which runs along the north-western boundary of the site.

A site layout map is attached above as Figure 8.1.

A walkover survey of the pit was undertaken by HES on 1st July 2016 and the key observations in respect of the operations were observed.

There is a large lagoon (~1ha in area) on the northern section of the site where extraction below the groundwater was undertaken in the past (no pumping completed, just dredging). The water level in the lagoon represents the elevation of the groundwater table below the site and is approximately 44.3m OD (site groundwater levels are discussed in more detail further below). A photograph of the main northern lagoon is shown as Figure 8.2 below.

The pit was surrounded by steeply sloping faces of poorly sorted sand and gravel that rise up to elevations of between 55 and 70m OD. These faces are shown on Figure 8.2 below.

Figure 8-2: Photograph of the main lagoon from the west

The aggregate processing and washing plant was located on the lower lying southern section of the site and comprises a standard sorting and grading system. Water for topping up the closed loop washing system was sourced from two shallow wells (sumps) which are located immediately to the west of the processing facility. The sumps are constructed of 1000 – 1,300mm diameter concrete pipes and extend approximately 3m below the local ground level (to ~44.3m OD).

Both wells extracted groundwater from the underlying saturated sand and gravels. The wells were being pumped at the time of the site visit and the groundwater levels in both wells were at approximately 44m OD. The water marks on the inside of the sump walls would suggest that the drawdown depth is between 0.1 – 0.2m which is small. A photograph of the washing plant wells/sumps is shown as Figure 8.3 below.

Three in-line settlement ponds are located to the southwest of the washing and processing plant and they were used to remove sediment and fines from the wash water before it was re-circulated back to the washing/processing plant for re-use. The washing system is a closed system and therefore there was no discharge of water from the settlement ponds to any local watercourse. Silt and sediment that was removed from the settlement ponds were stored on the pit floor on the northwest of the site and will

be used for restoration. There was no runoff or discharge from this area as all water seeps into the pit floor.

In addition to the washing plant wells there is a bored well located approximately 30m south of the main lagoon which was used for washing sand and gravel out of truck bodies where required before reloading.

Figure 8-3: Photograph of washing plant wells / sumps

On the north-western section of the site (close to the site entrance) there was plant maintenance area along with a refuelling area (refer to Figure 8.4 below).

At this location there are 2 no. over ground fuel storage tanks on the west of the maintenance area, but according to the site operators these tanks were rarely used to hold fuel as fuel delivery trucks from a local fuel depot were mainly used to refuel pit plant and machinery. There is also a large concrete hardstanding below the refuelling area which drains to an oil interceptor.

There was a portacabin located to the north of the plant maintenance area (just off the site entrance road descending into the sand and gravel pit) that was used as a canteen. There is no wastewater treatment system or septic tank located within the site and a portaloo was used to serve the canteen. This was no discharge of wastewater at the operational pit.

There was no surface water runoff or outfall from the pit. All rainfall landing on the pit either evaporated or percolated into the sand and gravel deposits beneath the site.

Figure 8-4: Above Ground Fuel storage and Refuelling Area

8.6.2 Local Water Balance

The SAAR (Standard Average Annual Rainfall 1981 - 2010) recorded at Ferbane 8km southeast of the site, the closest rainfall station to the site with long term SAAR data, is ~901mm (www.met.ie).

The average potential evapotranspiration (PE) at Mullingar, Co. Westmeath is taken to be 562mm (www.met.ie). The actual evapotranspiration (AE) is calculated to be 534mm (95% PE). Using the above figures the effective rainfall (ER) for the area is calculated to be (ER = SAAR – AE) ~367mm. The effective rainfall is the excess rainfall after evaporation which produces overland flow and recharge to groundwater.

8.6.3 Regional and Local Hydrology

The site is located in the River Shannon surface catchment within Hydrometric Area 26 of Shannon International River Basin District (SHIRBD). The Shannon River flows in a south-westerly direction approximately 2km northwest of the site. A regional hydrology map is shown below as Figure 8.5.

In terms of local hydrology, the majority of the pit is mapped to exist within the Gowlan River surface water catchment which drains into the River Shannon (via the River Blackwater) approximately 9km southwest of the site. Fin Lough, which exists

approximately 850m to the southwest of the site is also located within the Gowlan River surface water catchment. A small section on the east of the pit is mapped to be located in the Curraghboy River surface water catchment. The Curraghboy River drains into the River Shannon approximately 2.5km north of the site.

The closest mapped surface water feature to the site is an unnamed stream which flows in a westerly direction approximately 650m to the south of the site. This stream flows into Fin Lough.

A local hydrology map is shown as Figure 8.6.

Figure 8-5: Regional Hydrology Map

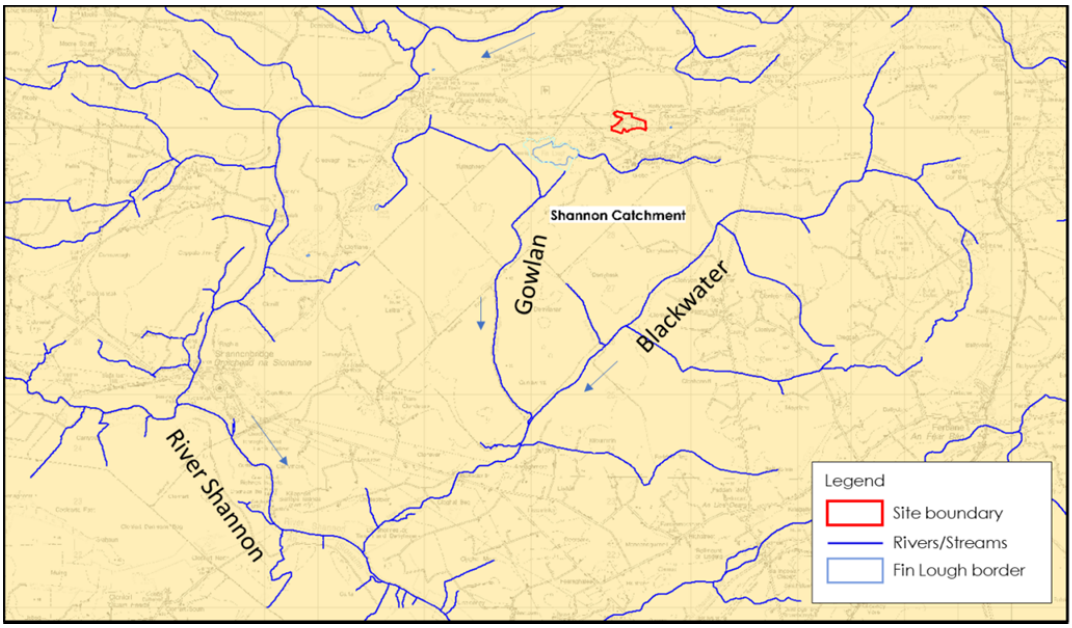
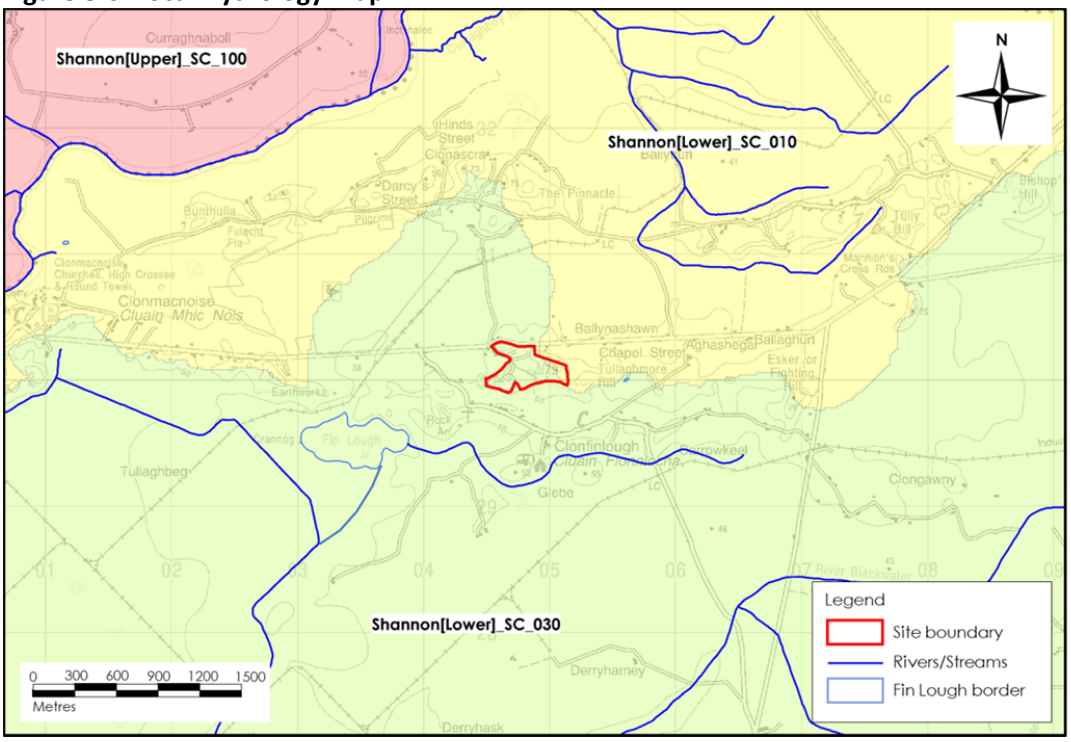


Figure 8-6: Local Hydrology Map



8.6.4 Flood Risk Identification

OPW's indicative river and coastal flood map (**www.floodmaps.ie**), Preliminary Flood Risk Assessment (PFRA) maps[1] (**www.cfram.ie**), Department of Environment, Community and Local Government on-line planning mapping (**www.myplan.ie**) and historical mapping (*i.e.* 6" & 25" base maps) were consulted to identify those local areas as being at risk of flooding.

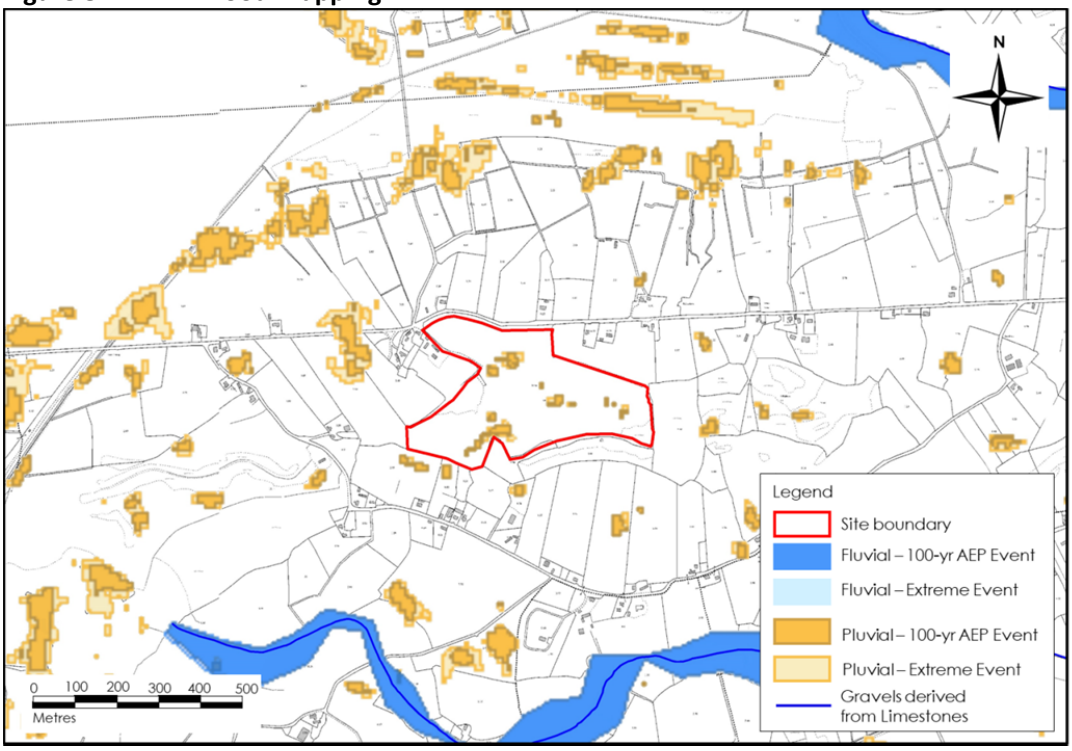
The PFRA mapping shows the extents of the indicative 100-year flood zone which relates to fluvial (*i.e.* river) and pluvial (*i.e.* rainfall) flood events. Fluvial flood zones are mapped locally along the unnamed stream to the south of the pit (that's flows west towards Fin Lough). The PFRA mapping for the area is shown as Figure 8.7.

OPW's Flood Hazard map was consulted to identify those areas as being at risk of flooding. There were no reports of flooding at the pit or in any stream immediately downstream of site. Pluvial flood zones shown within the site boundary are low points and correspond with open existing ponds. There is no text on local available historical 6" or 25" mapping for the site that identify areas that are "prone to flooding" within the site boundary, or downstream of the site.

Based on the above there was no potential risk of fluvial flooding at the pit, and there was no apparent flood risk in downstream watercourses. Exposed groundwater occurs on the pit floor as the extraction in this area went below the water table. This is not a flooding issue and is fully contained within the site.

[1] Where complete the Catchment Flood Risk Assessment and Management (CFRAM) OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland and supersede the Preliminary Flood Risk Assessment Maps (PFRA) maps. CFRAM mapping are not currently available for the area of the proposed site and therefore the PFRA mapping was consulted.

Figure 8-7: PFRA Flood Mapping



8.6.5 Surface Water Quality

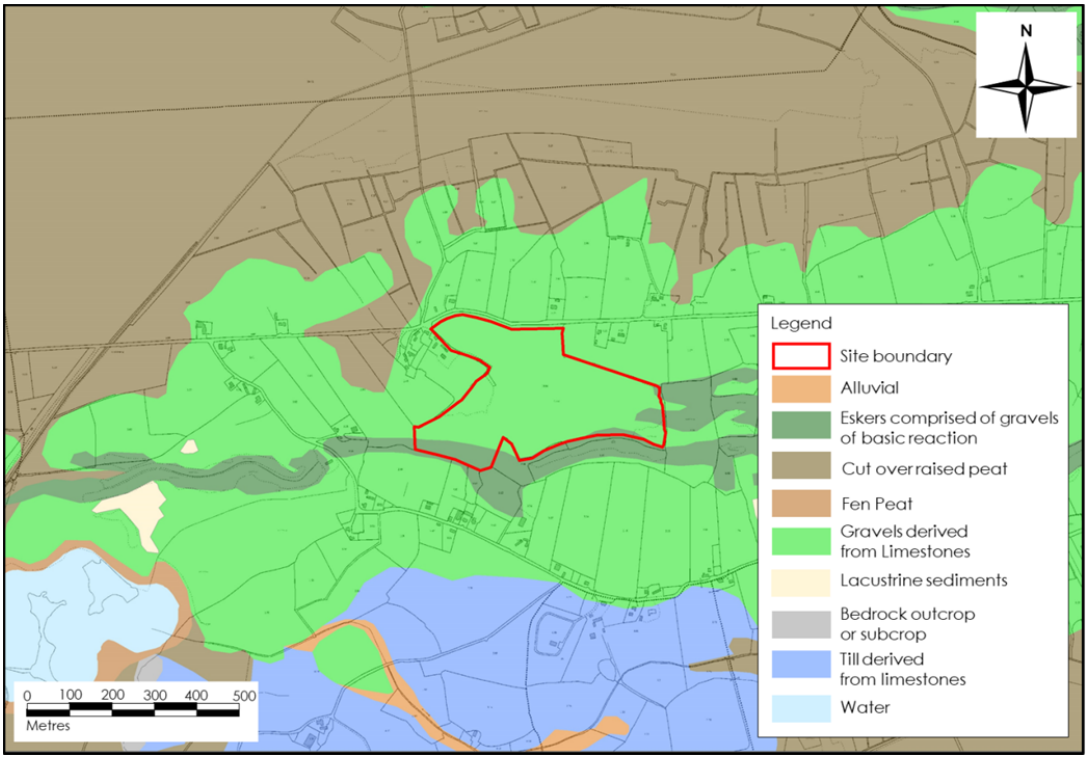
EPA Q-rating data are available for the Blackwater River (downstream of the Gowlan) at station RS25B270200. Long term water quality data records (1971 - 2017) show that this EPA monitoring point was typically given a Q rating of 3 or 3/4. No Q-rating data are available for the Gowlan River catchment.

8.6.6 Overview of Local Geology

The published soils map (www.epa.ie) for the area indicate that prior to extraction the site was mostly overlain by basic, well-draining shallow mineral soil (BminSW).

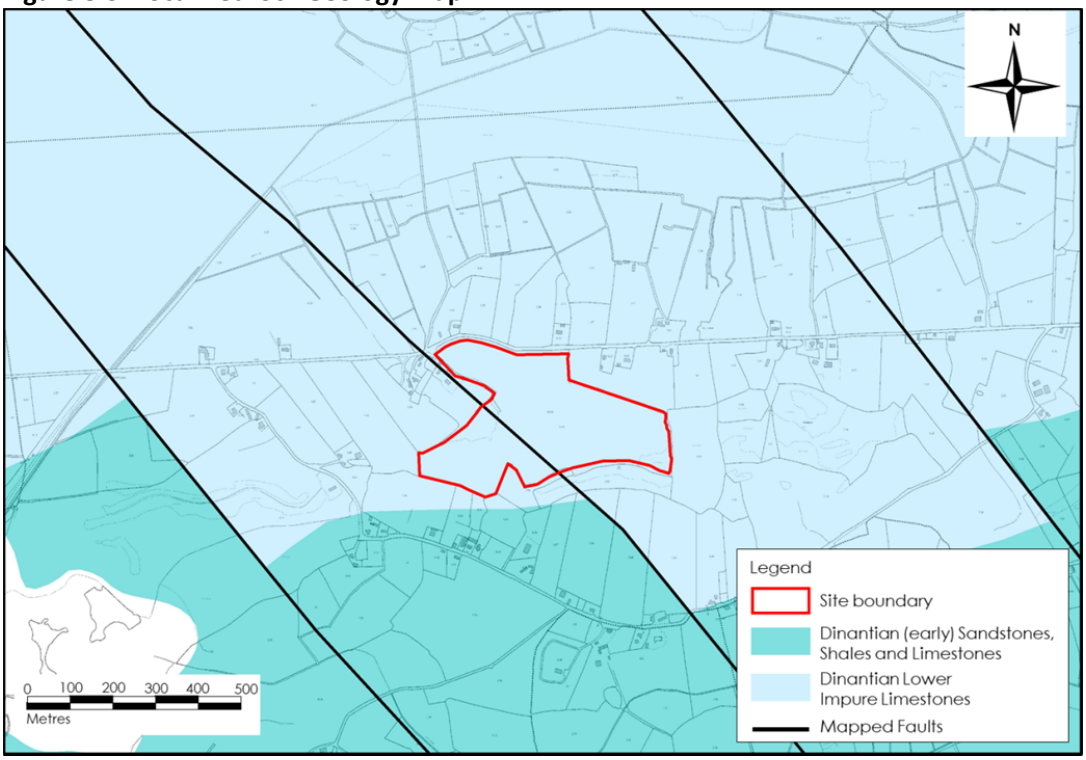
The GSI subsoils map for the area (www.gsi.ie) shows that the pit and surrounding area are mapped to be predominately underlain with by limestone derived sand and gravels of fluvio-glacial origin. An Esker (sand and gravel) is mapped along the eastern and southern boundaries of the site. The sands and gravels are mapped to taper out approximately 400m to the north and south of the site where cutover bog and limestone tills are mapped respectively. The sand and gravel deposits are also mapped immediately to the north and northeast of Fin Lough. A local subsoils map is shown below as Figure 8.8.

Figure 8-8: Local Subsoil Map



The GSI bedrock geology map of the area shows that the proposed site is underlain by Dinantian Lower Impure Limestone (DLIL). A mapped fault runs through the south-western section of the site in a north-west to south-east trend. This fault appears to be part of a more extensive system of normal faulting, located ~5km to the south of the site, where older Dinantian strata, consisting of sandstones, shales and limestones, have been up thrust above younger Dinantion Limestones. A local bedrock geology map is shown as Figure 8.9 below.

Figure 8-9: Local Bedrock Geology Map



8.6.7 Local Hydrogeology

The Dinantian Limestones which are mapped to underlie the site and surrounding area are classified by the GSI as being a Locally Important Aquifer (LI), an aquifer which is moderately productive in local zones only. See Figure 8.10 below.

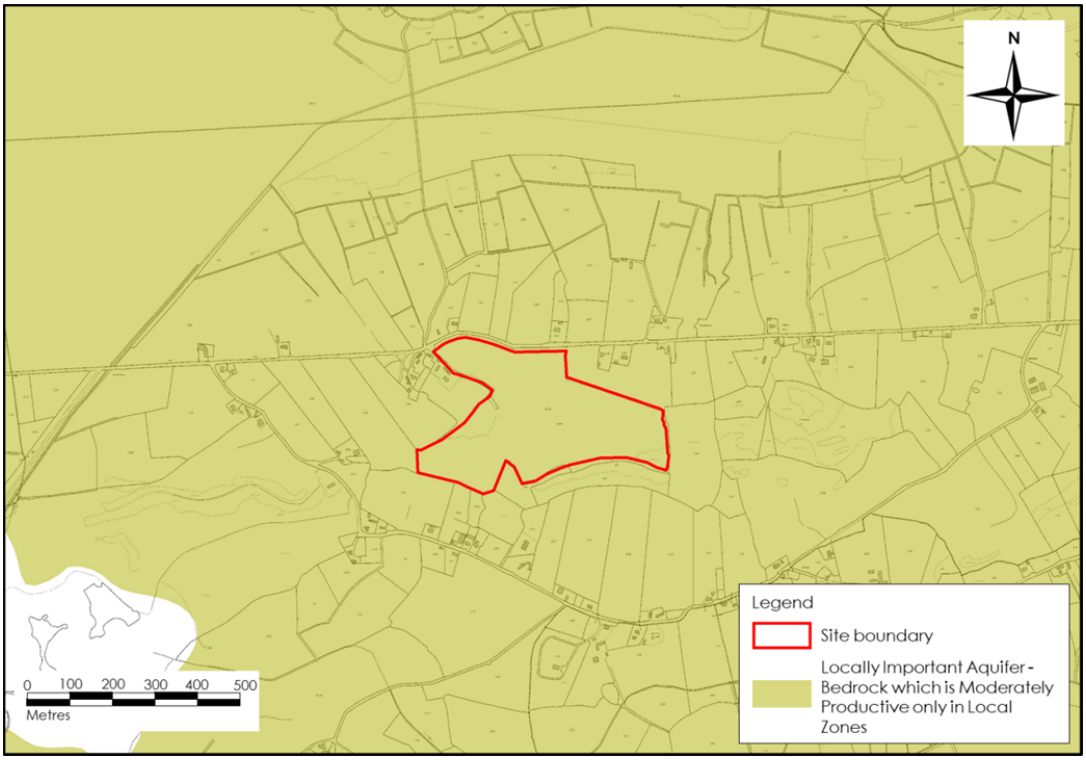
The fluvial glacial sands and gravels which are mapped to directly underlie the pit are not classified as an aquifer by the GSI as they are not laterally extensive enough to meet the criteria. However, the sands and gravels in this area are likely to be saturated to some extent and typically will have moderate to high permeabilities (depending on clay and silt content) along with the capacity to store significant amounts of groundwater.

As stated above the fluvial sand and gravel deposits in the area of Clonfinlough form an east – west oriented ridgeline where the local land slopes away both to the north and south of the sand and gravel deposits. Therefore, based on the topography, any recharge that occurs along the sand and gravel deposit ridgeline is expected to flow in both a northerly and southerly direction away from the deposits depending on which aspect the rainfall lands (i.e. northern or southern slopes). The groundwater flow direction on the northern slopes of the sand and gravel deposits is expected to be in a north-westerly direction towards the Shannon River, while on the southern slopes flow is either expected to be in a south-westerly direction towards the Gowlan River or

south-easterly towards the River Blackwater. In relation to the area of the pit, the southern slopes of sand and gravel deposits are expected to flow in a south-westerly direction towards the Gowlan River.

The groundwater recharge coefficient for the sand and gravel deposits in this area, is reported to be 85% by the GSI (www.gsi.ie). This recharge coefficient assumes that the sand and gravels are overlain by mineral soil. Therefore, within the pit itself where the majority of the mineral soil cover has been removed, a recharge coefficient of 90 – 95% is likely to prevail.

Figure 8-10: Bedrock Aquifer Map



8.6.8 Site Hydrogeology

8.6.8.1 Pit Groundwater levels

A survey of on-site groundwater levels was undertaken on 1st July 2016 and these data are summarised in 8.3 below. The groundwater levels in the wells were measured using a handheld dip meter and the level was then reduced to m OD (metres above Ordnance Datum Malin Head). Very similar water levels were recorded in May 2019. These data are presented on Figure 8.11 below.

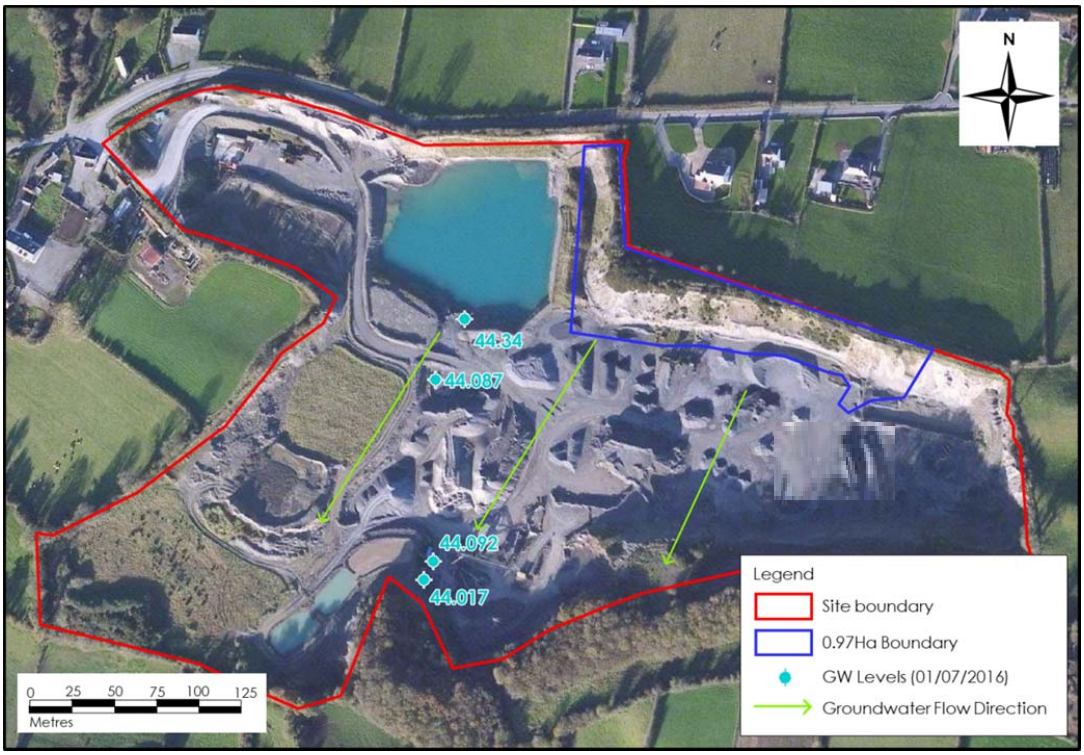
Table 8.3: Pit Groundwater Levels

Location	Easting	Northing	Groundwater Level (m OD)
Main Lagoon	204773	230153	44.340
Bored Well	204754	230114	44.087
Washing well/sump 1	204747	229983	44.017
Washing wells/sump 2	204754	229995	44.092

As shown in 8.3 above the groundwater levels within the existing sand and gravel pit vary between 44.017 and 44.34m OD. The lowest groundwater level was measured in washing well/sump 1 and the highest groundwater level was measured in main lagoon.

These water levels would suggest that the overall groundwater flow direction below the pit has generally been in a south / southwesterly direction. This is also consistent with the overall topography of the pit floor where the lowest lying area is at the southwestern section of the site in the area of the washing and processing plant. The abstraction of groundwater was also possibly having an influence on pit groundwater levels, but given the relatively small volumes being pumped and the low observed drawdown levels (0.1 – 0.2m) this is unlikely to be significant on a broader scale. The groundwater flow direction is also consistent with the local surface water catchment mapping which shows that the majority of the site exists within the Gowlan River surface water catchment which exits to the southwest of the site.

Figure 8-11: Local Groundwater Flow Direction Map



8.6.8.2 Local (off-site) groundwater levels

In order to establish groundwater levels and the groundwater flow regime in the local area of the pit, a private well survey was undertaken. The wells were surveyed to a common datum (m OD, using a dGPS) and the groundwater levels were measured using a handheld dip meter. These data are presented in Table 8.4 below. The locations of each of the wells is shown on Figure 8.12.

The well survey was focused in the area to the west, southwest and northwest of the pit as Fin Lough (cSAC) and Mongan Bog (cSAC) are both located in a westerly direction from the pit.

A water level was also measured in Fin Lough (refer to Table 8.4) as the water level in the lake is expected to reflect the elevation of the local groundwater table given that the lake is reported to have a significant groundwater input.

It was not possible to obtain a groundwater level at Mongan Bog, however a number of local wells were surveyed to the southeast of the bog (between the pit and the bog) and

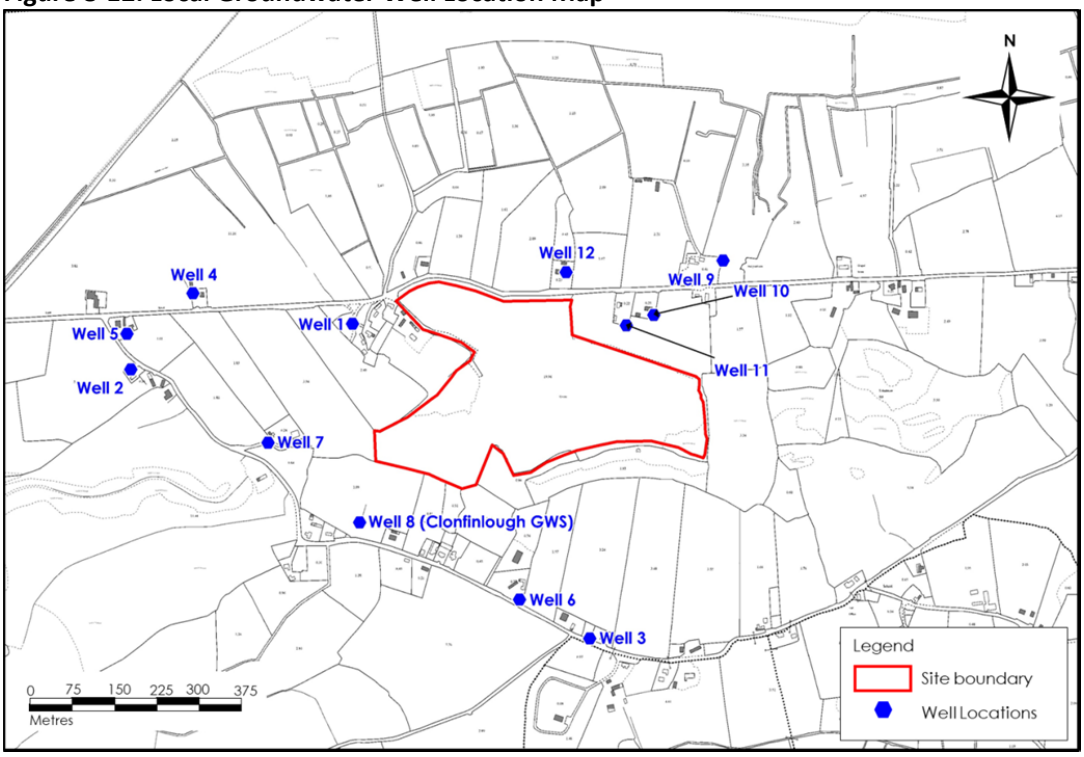
these provide a good indication of the likely groundwater levels in the southeastern section of the bog.

Table 8.4: Local (off-site) Groundwater Levels

Name	Type	Easting	Northing	01/07/16 WL (mbdl)	14/05/19 WL (mbdl)	01/07/16 WL (mOD)	14/15/19 WL (mOD)
Well 1	Dug Well	204450	230224	2.02	2.7	43.434	42.754
Well 2	Bored Well	204015	230135	5.05	4.4	40.301	40.951
Well 3	Bored Well	204916	229608	6.52	7.12	43.093	42.493
Well 4	Bored Well	204136	230284	3.05	3.2	41.350	41.2
Well 5	Bored Well	204007	230205	2.78	2.9	40.770	40.65
Well 6	Bored Well	204778	229684	9.6	9.6	43.727	43.727
Well 7	Dug Well	204284	229992	5.3	4.15	41.774	42.924
Well 8	GWS			10.7**	10.42	41.928	42.208
Well 9	Dug Well			3.2**	-	41.928	-
Well 10	Bored Well			10.81**	-	43.847	-
Well 11	Bored Well			n/a	-	-	-
Well 12	Bored Well			10.0**	-	43.322	-
FinLough	Lake*	203202	229745		-	38.127	-

*Groundwater fed lake
** water level recorded on 16/11/16 for these wells, n/a – not accessible

Figure 8-12: Local Groundwater Well Location Map

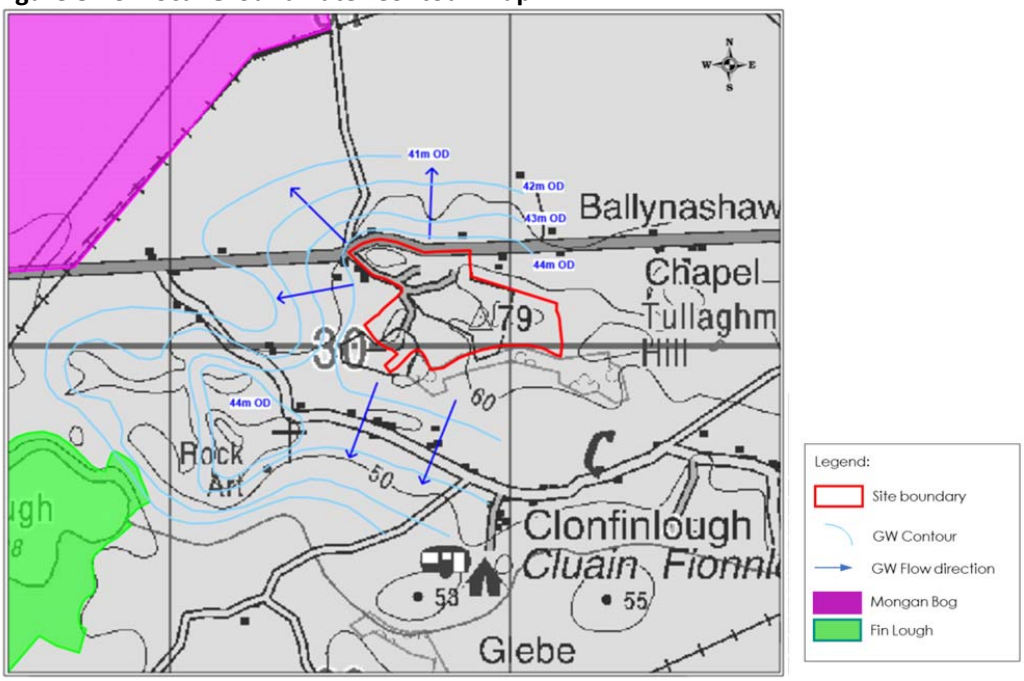


Based on the collected data, all the pit groundwater levels are higher than the groundwater levels in the local wells. This demonstrates that the pit is having no impact on local groundwater levels (outside the pit) as there is no significant reduction in the groundwater levels at the site as a result of the previous operations. This is what would be expected as there was no dewatering occurring at the pit at any point. Also, the groundwater volumes extracted for the purpose of washing were very small.

The water level recorded in Fin Lough on the day of the survey was at 38.127m OD. Therefore, the level in the lake is 5.89m lower than the lowest recorded pit groundwater level of 44.017m OD (Sump/well 1). The closest surveyed local private well to Mongan Bog (*i.e.* 350m southeast of the bog) had a groundwater elevation of 40.77m OD which is 3.25m lower than the lowest pit site groundwater level.

A groundwater contour map for the area is shown below as Figure 8.13.

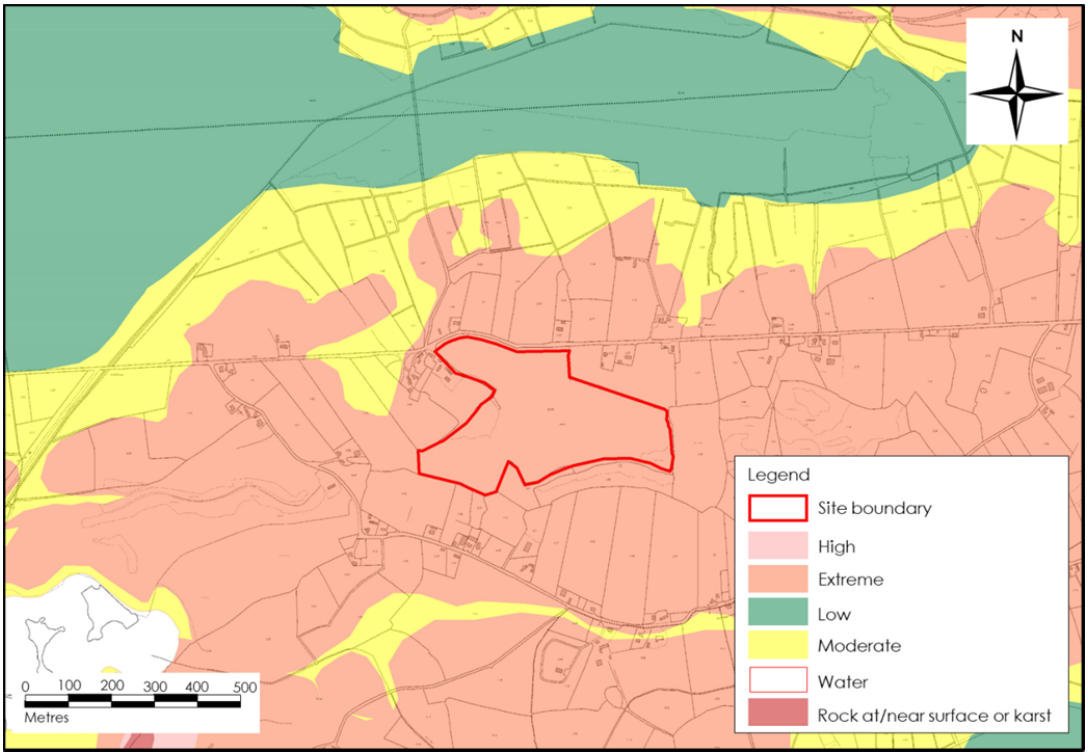
Figure 8-13: Local Groundwater Contour Map



8.6.9 Groundwater Vulnerability

The vulnerability of the aquifer underlying the site is classified as predominately “High” by the GSI (**www.gsi.ie**). Local groundwater vulnerability mapping is shown as Figure 8.14.

Figure 8-14: Local Groundwater Vulnerability Map



8.6.10 Groundwater Quality

Groundwater quality data for samples taken from the main northern lagoon are shown in Table 8.5 below. The sampling was undertaken by BHP who are commissioned directly by Nally Stone. The lagoon is an open water feature at the site but the water level within the lagoon reflects the local groundwater table.

BOD and COD, which are good indicators of organic contamination (*i.e.* wastewater/slurry etc) are low and give no reason for concern. Suspended solids, which is typically a surface water parameter, is also low. The pH range is typical of groundwater in limestone derived sand and gravels. Hydrocarbons, which is one of the most common potential pollutants on a pit site, were below the laboratory detection limit in both samples.

Table 8.5: Groundwater Quality Data

Parameter	29/10/2015	25/01/2016	26/03/2019
BOD (mg/L)	<2	3.0	1.8
COD (mg/L)	17	10	<15
Total Suspended Solids (mg/L)	<5	<5	<5
pH (pH Units)	7.64	7.89	8.02
Petrol range organics (mg/L)	<0.01	<0.01	<0.0001
Diesel range organics (mg/L)	<0.01	<0.01	<0.0001
Mineral Oil (mg/L)	<0.01	<0.01	<0.01
Total hydrocarbons (mg/L)	<0.01	<0.01	<0.01

8.6.11 Site Operations and Water Management

Water used for washing and processing of the aggregate was sourced from 2 no. shallow wells (sumps). A bored well was used for washing of trucks.

The maximum output of the crushing and screening plant was ~300 tonnes of aggregate/day when operational which is based on a 6-hour operating period. Approximately 0.4m^3 of water was required to wash 1 tonne of material, therefore the total volume of water required for washing on a daily basis was 120m^3. The washing plant operated as a closed loop system with all water recycled for reuse. Process wash water was directed to a series of settlement ponds located adjacent to the processing plant. Water was then abstracted from the final settlement pond and pumped back to the washing plant and re-used for washing aggregate.

Approximately 10% of wash water was lost during the process which is associated with water being held by the aggregate particles and as a result of evaporation. Therefore, the settlement ponds were topped up using water from the 2 no. shallow wells. A loss of 10% from the total daily volume used (120m^3) equates to 12m^3/day which was abstracted from the wells as required over the course of the day. Abstraction was not always required as precipitation also topped up the settlement pond.

In addition, the insides of trucks were washed to remove sand and gravel before re-loading. The sand and gravel pit had in the region of 5 deliveries a day and the total daily volume of water used for truck washing was 0.23m^3/day. This water was sourced from the on-site bored well.

8.6.11.1 Site Water Balance

A water balance for the site using long term rainfall data (SAAR) and estimated groundwater recharge values is shown below for the development. The water balance shows that the annual pit water usage only accounted for 10% of the annual site groundwater recharge. Therefore, all groundwater extracted by the pit was recharged by rainfall landing within the site area. This demonstrates that the groundwater zone of contribution to the pit wells did not ever extend outside the site boundary.

It should be noted that the water balance is also very conservative as the majority of the water used for aggregate washing and truck washing actually percolated back into the ground and recharged the sand and gravel deposits. Therefore, the only net loss of groundwater from the site (as a result of the washing process) was through evaporation from the stockpiles during summer and this was negligible.

Table 8.5: Site Water Balance

Parameter	Value	Unit
SAAR	0.901	m/year
Potential Evapotranspiration (PE)	0.562	m/year
Actual evapotranspiration (95% PE)	0.534	m/year
Effective Rainfall	0.367	m/year
Estimated Site Recharge Coefficient	90	%
Pit area	15.34	ha
Pit recharge	50,668	m^3/year
Pit groundwater usage	4,464	m^3/year
Usage as percentage of recharge	8.8	%
Surplus Recharge	46,204	m^3/year

8.6.11.2 Surface Water Discharges

There was no surface water discharge from the pit, so surrounding surface water quality was not affected in any way (quantity or quality) by operations at the site.

8.6.12 Water Framework Directive Status and Risk Result

Local Groundwater Body (GWB) and Surface water Body (SWB) status and risk (current) result information is available for view from (www.catchments.ie).

The WFD Status and Risk Result for the Gowlan River/Blackwater River (Blackwater (Shannonbridge)_020) downstream of the site is reported to be “Good Status” and “Not at Risk” respectively.

The Inny GWB (GWB: IE_EA_G_076) underlies the site. It is assigned 'Good Status'[2], (www.catchments.ie), this applies to both quantitative status and chemical status. The GWDTE associated with Fin Lough SAC is also assigned 'Good Status'.

8.6.13 Designated Sites

The two closest Natura 2000 sites to the development and which were reviewed as part of this assessment are Fin Lough (cSAC) and Mongan Bog (cSAC and SPA). The following site descriptions are taken from their respective Site Synopsis reports:

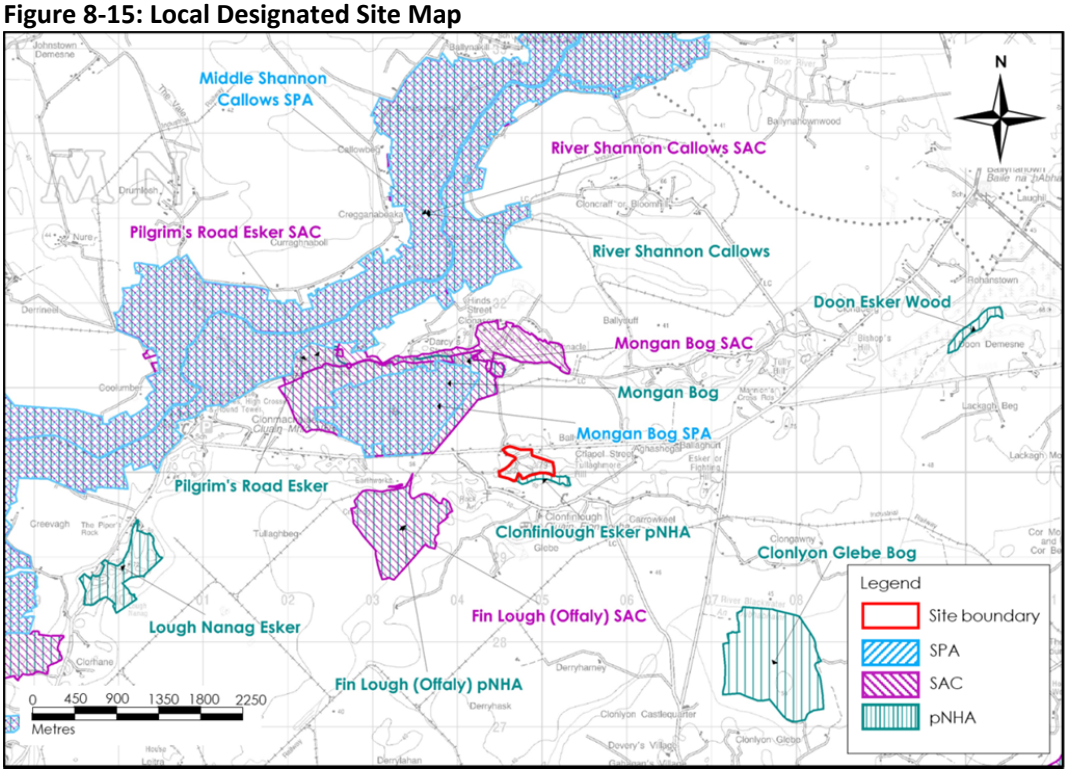
> *"Mongan Bog is a midland raised bog of medium size situated immediately east of the monastic site of Clonmacnoise, Co. Offaly, and 12 km south of Athlone. It is situated in a basin, surrounded on 95% of its perimeter by high ground on mineral soil. At two points in the north it shares a common boundary with Pilgrim's Road Esker SAC. Most of the bog is a Statutory Nature Reserve, established in 1987. The bog has been the subject of ongoing intensive research since 1972. The priority habitat at the site is active raised bog".*

> *"Fin Lough is a shallow limestone lake surrounded by a complex of wetland habitats, 7km north-east of Shannonbridge in Co. Offaly. The name Fionn Loch, "White Lake", probably derives from the white colour of the lake bottom caused by marl deposits. It is a shallow lake, about 16ha in extent (in winter) and bounded to the north and east by the Clonfinlough esker ridge, and to the south and west by Blackwater Bog, which is now largely cut-over. The site is designated for the presence of alkaline fen and Geyer's Whorl Snail (Vertigo geyeri)".*

A designated site map for the area of the development is shown as Figure 8.15.

[2] 'Status' means the condition of the water in the waterbody. It is defined by its chemical status and its ecological status, whichever is worse. Waters are ranked in one of 5 classes: High, Good, Moderate, Poor and Bad (WFD, 2010).

Figure 8-15: Local Designated Site Map



8.6.14 Receptor Sensitivity/Importance

Based on criteria set out in Table 8.1 above, groundwater at the site is classed as Extremely important because it potentially supports the hydrogeology underpinning local SAC GWDTE sites. However, as outlined above the past operations at the site did not affect local groundwater quality or quantity.

Surface waters, which has High Importance, but is not impacted as there is no surface water discharge from the site.

The majority of third-party wells in the area are domestic supplies, with one local GWS supply well present also to the southwest of the pit. Wells in general area are sensitive to groundwater quality impacts, but all local wells in the area of the quarry are located up-gradient of the site and therefore the potential for impact does not exist.

All potential contamination sources were carefully managed at the site during the operational phase of the development and controls were used to limit any potential discharges.

8.7 Potential Impacts of the Development

8.7.1 Characteristics of the Development

The existing pit has an overall area of approximately 15.34 hectares and consists of an area of 0.97 ha. which was subject to extraction of material after expiry of planning permission on 31st day of December 2009. This extraction area is contained within the overall quarry area of 15.34 hectares consisting of areas ancillary to the extraction area (0.97 Ha.)

The ancillary areas of the pit consists of previously extracted areas, processing infrastructure and stockpiling areas, vehicle parking areas and areas used for the storage of overburden pending restoration.

Overburden material was removed prior to excavation of the underlying reserve and stored pending restoration works. The sand and gravel material was excavated, loaded onto dump trucks, transported to the fixed wet screening and crushing plant and processed into various grades depending on market demand.

Plant and machinery which operated in the application area consisted of tracked excavators, wheel loaders, dump trucks, processing plant and road trucks to haul material off site. Ancillary plant such as a water bowser for dust suppression was deployed where required.

Due to the porous nature of the underlying material, water falling as precipitation percolated to ground. The existing washing plant operated by way of a closed water management system whereby the plant removed the fine material (clays /silts) with run-off water diverted to a series of settlement lagoons. The water was then recycled for washing with water lost in the aggregate replaced with water from a groundwater well located near the plant.

A significant amount of landscaping and restoration works have been completed which have included placing a layer of overburden on side slopes and the pit floor. It is proposed to restore further areas of the pit as per the landscape and restoration plan detailed in Section 13.0.

8.7.2 “Do Nothing” Scenario

There will be no further extraction and restoration will be completed in line with the restoration plan.

8.7.3 Potential Operational Phase Impacts

8.7.3.1 Groundwater Level Impacts

The sand and gravel pit was operated as a dry pit except where dredging below the groundwater table was completed. No significant dewatering ever occurred. Therefore, there was no potential to impact on local groundwater levels in the area of the site (Note: small volumes of groundwater were abstracted from on-site wells for washing purposes and this is discussed further below).

No impacts on groundwater levels in any of the local wells has or will occur as the water use within the site was small and our water balance demonstrates there was sufficient recharge within the site to supply all pumping needs. As such there was no water level (water quantity) impact on any local well, local designated site, or the local GWS well.

Receptor: Downstream groundwater, groundwater wells including GWS well, and downstream GWDTE habitats.

Pathway; Dewatering, pumping within the pit.

Pre-mitigation Impact: Neutral, reversible, imperceptible, indirect, likely, brief effect on water levels.

Mitigation Measures:

No mitigation. Pumping volumes were very small and had no effect on groundwater levels locally. The water balance presented in Table 8.5 demonstrates an excess of recharge over abstraction within the site boundary. As such, there was no impacts on water levels outside of the site boundary.

Residual Effect: Neutral, reversible, imperceptible, indirect, likely, brief effect on water levels.

Significance of Effects: No significant effects on groundwater levels, wells, or downstream GWTDE.

8.7.3.2 Groundwater Contamination from Oil / Fuel Spills and Leaks

The primary potential on-site pollutant will be fuels, oils and greases.

Receptor: groundwater

Pathway: Runoff and groundwater flowpaths

Pre-mitigation Impact: Negative, reversible, slight, indirect, likely, long term effect on groundwater quality.

Mitigation Measures:

The following mitigation was practiced during the operation of the pit:

- As stated above in the report fuels were rarely stored on-site as fuel delivery trucks were used to refuel plant and machinery.
- Mobile plant was refuelled on a dedicated hardstanding area on the north-western section of the site. This hardstanding drains to an oil interceptor and therefore any leaks or spills were contained.
- Maintenance of mobile plant also occurred on this hardstanding area and potential spills were therefore contained.
- Refuelling of plant was undertaken by a trained fuel delivery operator and spill kits were on the ready in the unlikely event of an accidental spill.
- Plant was also inspected on a regular basis to ensure there was no fuel or oil leaks.
- Procedures and contingency plans were in place to deal with emergency accidents or spills, but none occurred; and,
- There was no surface water discharge from the site.

Residual Effect: Negative, reversible, imperceptible, indirect, unlikely, long term effect on groundwater quality.

Significance of Effects: No significant effects on groundwater quality.

8.7.3.3 Groundwater Contamination from On Site Wastewater Systems

There was no discharge of wastewater to ground at the site therefore, there was no impact on groundwater quality. Wastewater at the site was contained within a portaloo and this was emptied by a licensed contractor and discharged at an authorised off-site wastewater facility.

Receptor: groundwater

Pathway: groundwater flowpaths

Pre-mitigation Impact: None.

Mitigation Measures:

The following mitigation is proposed for:

- Portaloo used at site;
- No discharges to ground;

- portaloo emptied by licenced contractor and discharged at an authorised off-site wastewater facility.

Residual Effect: None

Significance of Effects: No significant effects on groundwater quality.

8.7.3.4 Groundwater Quantity and Quality Impacts on Designated Sites (Mongan Bog SAC and Fin Lough SAC)

There was no requirement to dewater the pit and therefore there was no potential to impact on the hydrology of either Fin Lough or Mongan Bog in terms of lowering of local groundwater levels towards these designated sites.

As stated above the maximum groundwater abstraction rate for the purpose of aggregate and truck washing was only 12.23m^3/day (4,464m^3/year).

A water balance carried out in Table 8.5 above demonstrates that this demand only accounted for 10% of the annual recharge that occurs within the site itself. The water balance is also very conservative as some of the water that remains on the stone after washing actually percolated back down into the underlying natural sand and gravel deposits (recharge) and therefore the only groundwater that was actually lost is the volume lost via evaporation from the stockpiled stone which is likely only to be 3 – 4%. The water balance shows that there was no potential to impact on off-site groundwater levels.

A survey of the pit and local groundwater levels demonstrate that the lowest recorded groundwater level within the pit is 5.89m higher than the water level in Fin Lough and at least 3.25m higher than the groundwater in the southeastern section of Mongan Bog. The lowest recorded pit groundwater level (44.017m OD) is also reflective of the pumping water level in washing well/sump 1 and therefore this also demonstrates that there was no potential to impact on either Fin Lough or Mongan Bog from groundwater abstraction for washing purposes.

The primary potential on-site pollutant was fuels, oils and greases. As stated above in the report fuels were rarely stored on-site as fuel delivery trucks were used to refuel plant and machinery. Other onsite controls (Section 8.7.3.2) were used to manage these pollutant risks as outlined above.

Receptor: Local GWDTE (Mongan Bog SAC and Fin Lough SAC)

Pathway: Groundwater flowpath

Impact: No impacts on local GWTDEs has occurred as a result of the development.

8.7.4 Restoration Phase and Post Restoration Phase

The restoration plan involves spreading a layer of overburden on areas where extraction has occured. These areas will be seeded and returned to agricultural use. A layer of overburden will be spread on side slopes and will be allowed to vegetate naturally. No impacts on groundwater quality or quantity (flows or levels) are anticipated during or after these works.

The overburden used for the proposed restoration works was previously excavated at the site during the sand and gravel extraction works. There was and is no potential for groundwater contamination from this material. It is proposed that the site will be used for agricultural purposes after the restoration is complete. The proposed landuse is consistent with the landuse locally which is predominately agricultural.

8.7.5 Human Health Effects

Potential health effects arise mainly through the potential for groundwater contamination and impacts on local wells. Hydrocarbons, in the form of fuels and oils, were used on-site during operational phase.

There is no visual or olfactory evidence of contamination within the site, nor is any effects on local groundwater reported by local groundwater users. Regardless, in terms of groundwater quality protection measures as stated in Section 8.7.3.2 above, there was best practice controls in place to ensure any potential sources of contamination on the site were managed appropriately and in line with industry standards and best practice. The potential residual impacts associated with groundwater contamination and subsequent health effects are negligible.

8.7.6 Cumulative hydrological Effects

There was no discharge from the pit and no use of groundwater that created a dewatering impact outside the site boundary, therefore all potential impacts occurred within the boundaries of the site. Therefore, there was no potential for cumulative impacts with other local projects (agriculture, peat extraction etc).

In terms of hydrogeology, there was imperceptible effects on localised groundwater levels. The potential for cumulative hydrogeological effects in terms of flows/levels and quality did not or does not exist.

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9.0 CLIMATE

9.1 Introduction

This section of the remedial EIAR assesses the development in terms of climate and climate change and assesses potential impacts that the historical development may have had with regards to climate. Climate can be thought of as the 'average weather' over an extended period of time and so refers to temperature, precipitation and wind.

The topic of 'Climate' is more often discussed with reference to 'Climate Change' which is any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among others, that occur over several decades or longer.

9.2 Methodology

The methodology for the description of the climate in the region of the historical development at the time of its operation included a desk study review of the data available from Met Éireann, the Environmental Protection Agency and other bodies which have responsibility for the Climate of Ireland. Data from the closest synoptic station Birr was used to assess the climate in the region of the sand and gravel pit.

9.3 Climate Change

Climate change is a significant change in the average weather or climate that a region experiences. Climate change can be caused by natural factors such as variations in solar intensity or volcanic eruptions. The term climate change is now generally used to refer to changes in our climate due to the build-up of Greenhouse Gases (GHGs) in the atmosphere. This build-up of GHGs is caused by excess emissions due to certain human activities, like burning fossil fuels for energy, transport and heating.

9.3.1 Kyoto Protocol

The Kyoto Protocol was adopted in Kyoto, Japan on the 11th December, 1997, but not enacted or enforced until the 16th February, 2005. The protocol was adopted to help combat the adverse effects of climate change, or global warming.

Recognizing that developed countries were principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol placed a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

Under the Kyoto Protocol, Ireland is required to limit total national greenhouse gas emissions to 314.2 Mtonnes of CO_2eq over the five year period 2008 – 2012 which is equivalent to 62.8 Mtonnes of CO_2eq per annum. The Kyoto Protocol limit was calculated being as 13% above Ireland's 1990 baseline value which was established and fixed at 55.61 Mtonnes of CO_2eq following an in-depth review of Ireland's 2006 greenhouse gas inventory submission to the UNFCCC (United Nations Framework Convention on Climate Change).

In December 2009, efforts were made to negotiate a successor to the Kyoto Protocol. Whilst the conference was not as successful as many countries had hoped it did result in the Copenhagen Accord which many countries signed up to. The Copenhagen Accord endorsed the continuation of the Kyoto Protocol. The Copenhagen Accord, while only a political agreement, reflected significant progress on several fronts.

The following year in Cancun, parties adopted the Cancun Agreements, effectively formalising the essential elements of the Copenhagen Accord under the UNFCCC. The Cancun Agreements were regarded as an interim arrangement through 2020, and parties left the door open to further negotiations toward a legally binding successor to the Kyoto Protocol.

In December 2012, the Kyoto Protocol was amended by the parties to the Kyoto Protocol. This amendment was referred to the "Doha Amendment to the Kyoto Protocol" which included the following amendments:

- New commitments for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment period from 1st January 2013 to 31st December 2020;
- A revised list of greenhouse gases (GHG) to be reported on by Parties in the second commitment period; and
- Amendments to several articles of the Kyoto Protocol which specifically referenced issues pertaining to the first commitment period and which needed to be updated for the second commitment period.

During the second commitment period, parties committed to reduce GHG emissions by at least 18 percent below 1990 levels in the eight-year period from 2013 to 2020; however, the composition of parties in the second commitment period differed from the first. This placed binding targets on Ireland in climate change, with penalties for non-compliance.

9.3.2 Paris Agreement 2015

A legally binding, global agreement on climate change was agreed in Paris on 12th December 2015. The Paris Agreement puts in place the necessary framework for all countries to take ambitious mitigation action. It sets out a long-term goal to put the world on track to limit global warming to well below 2 degrees centigrade above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 degrees. It aims to tackle 95% of global emissions through 188 Nationally Determined Contributions (NDCs). The agreement also places significant importance on actions needed, both nationally and globally, to help people adapt to climate change.

Ireland will contribute to the Paris Agreement via the NDC tabled by the EU in March 2015 on behalf of Member States, which commits to at least a 40% reduction in EU-wide emissions by 2030 (compared to 1990 levels); this is based on reductions in the Emissions Trading Scheme (ETS) and non-ETS sectors of 43% and 30% respectively (compared to 2005).

In July 2016, the European Commission presented a legislative proposal, the Effort Sharing Regulation (ESR), setting out binding annual greenhouse gas emission targets for Member States for the period 2021–2030. The ESR proposal suggests a 39% GHG reduction target for Ireland, based on GDP per capita, for the period 2021 to 2030. This target is adjusted downward for cost-effectiveness by 9 percentage points to give a headline target of 30%. While this target is not yet agreed, it is clear that it will present an enormous challenge for Ireland, which will require substantial investment by both the public and private sectors, as well as a broad range of non-financial policy tools, including regulations, standards, education initiatives and targeted information campaigns. Work is ongoing to cost various suites of measures that could meet the 2030 target as cost-effectively as possible.

9.3.3 Compliance with EU and International Commitments

A recent EPA publication *Ireland's Greenhouse Gas Emissions Projections 2018-2040 (EPA, June 2019)* provides an updated assessment of Ireland's total projected greenhouse gas emissions out to 2040 which includes an assessment of progress towards achieving its emission reduction targets out to 2020 and 2030 set under the EU Effort Sharing Decision (Decision No 406/2009/EU) and Effort Sharing Regulation (Regulation (EU) 2018/842). Greenhouse gas emissions are projected out to 2040 using two scenarios; With Existing Measures and With Additional Measures.

- The With Existing Measures scenario assumes that no additional policies and measures, beyond those already in place by the end of 2017 (latest national greenhouse gas emission inventory), are implemented.
- The With Additional Measures scenario assumes implementation of the With Existing Measures scenario in addition to, based on current progress, further implementation of Government renewable and energy efficiency policies and measures including those set out in the National Renewable Energy Action Plan (NREAP) and the National Energy Efficiency Action Plan (NEEAP) and more recently Ireland's National Development Plan 2018-2027.

An executive summary of the report is detailed below:

- The EPA has produced two scenarios in preparing greenhouse gas emission projections; a With Existing Measures scenario and a With Additional Measures scenario.
- Total emissions are projected to increase from current levels by 1% and 6% by 2020 and 2030 respectively under the With Existing Measures scenario. Under the With Additional Measures scenario emissions are estimated to decrease by 0.4% and 10% by 2020 and 2030 respectively.
- In 2020 the sectors with the largest contribution of emissions are Agriculture, Transport and Energy Industries with 34%, 21% and 20% share in total emissions respectively under the With Additional Measures scenario. In 2030 this is projected to change to 38%, 22% and 16% for these sectors respectively which reflects the growth in emissions from agriculture and reduction of emissions from power generation.
- In terms of compliance with the EU's Effort Sharing Decision (Decision No 406/2009/EC) 2020 targets, Ireland's non-Emissions Trading Scheme emissions are projected to be 5% and 6% below 2005 levels in 2020 under the With Existing Measures and With Additional Measures scenarios, respectively. This compares to the target of 20% below 2005 levels by 2020.
- Ireland has exceeded its annual binding limits in 2016 and 2017. Over the period 2013-2020 Ireland is projected to cumulatively exceed its compliance obligations by approximately 10 Mt CO2 equivalent under the With Existing Measures scenario and 9 Mt CO2 equivalent under the With Additional Measures scenario.
- Agriculture and transport dominate non-ETS sector emissions accounting for 75% and 80% of emissions in 2020 and 2030 respectively.
- In terms of 2030 reduction targets the EU Effort Sharing Regulation (ESR) requires that Ireland reduce its non-ETS emissions by 30% on 2005 levels by 2030. The

latest projections indicate that Ireland will exceed the carbon budget over the period 2021-2030 by 52 - 67 Mt CO2 equivalent with the gap potentially narrowing to 7 - 22 Mt CO2 equivalent if both the ETS and Land use, land-use change, and forestry (LULUCF) flexibilities described in the Regulation are fully utilised.

- The projected gap to the 2021-2030 ESR target is strongly affected by the choice of fuel price projections used. A sensitivity analysis using lower fuel price projections from the UK Department for Business, Energy and Industrial Strategy (BEIS) was performed to investigate this impact. The results show that in a low fuel price scenario, Ireland will exceed the carbon budget over the period 2021-2030 by 86 – 101 Mt CO2 equivalent or by 40 - 56 Mt CO2 with full use of the ETS and LULUCF flexibilities.

Plate 9.1 shows the expected trend in total greenhouse gas emissions under both scenarios. The fluctuating trend, particularly after the end of 2025 in the With Additional Measures scenario is largely influenced by the changing profile of the energy industries sector and associated changes in fuel type used for power generation.

Plate 9.1: Total Greenhouse Gas Emissions under the With Existing Measures (WEM) and With Additional Measures (WAM) scenario out to the year 2030

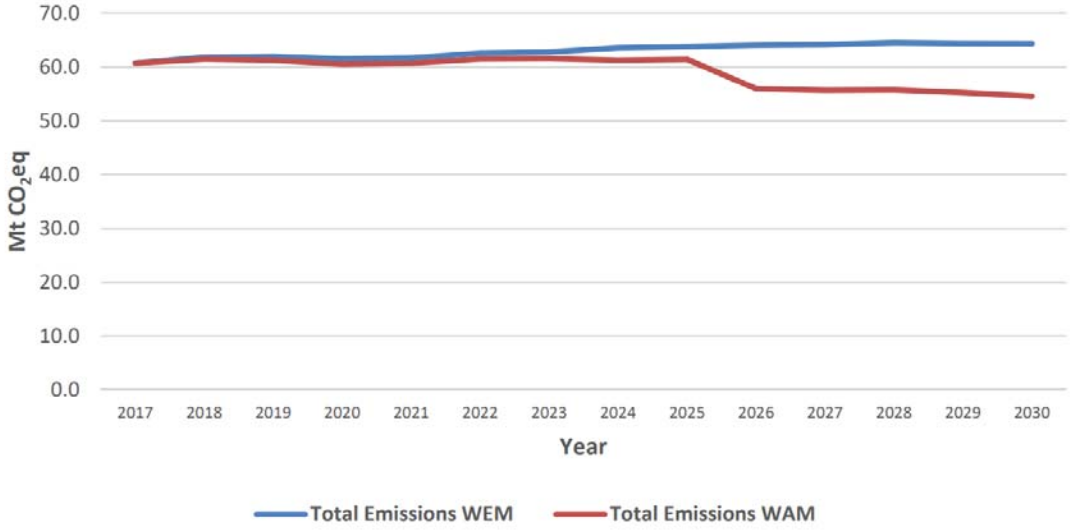


Plate 9.2 shows the sectoral percentage share throughout the projected time period under the With Additional Measures scenario. In 2020 the sectors with the largest contribution of emissions are Agriculture, Transport and Energy Industries with 34%, 21% and 20% share in total emissions respectively. In 2030 this is projected to change to 38%, 22% and 16% for these sectors respectively as shown in Plate 9.3.

Plate 9.2: Total Greenhouse Gas Emissions Projections by sector out to the year 2030 under With Additional Measures scenario

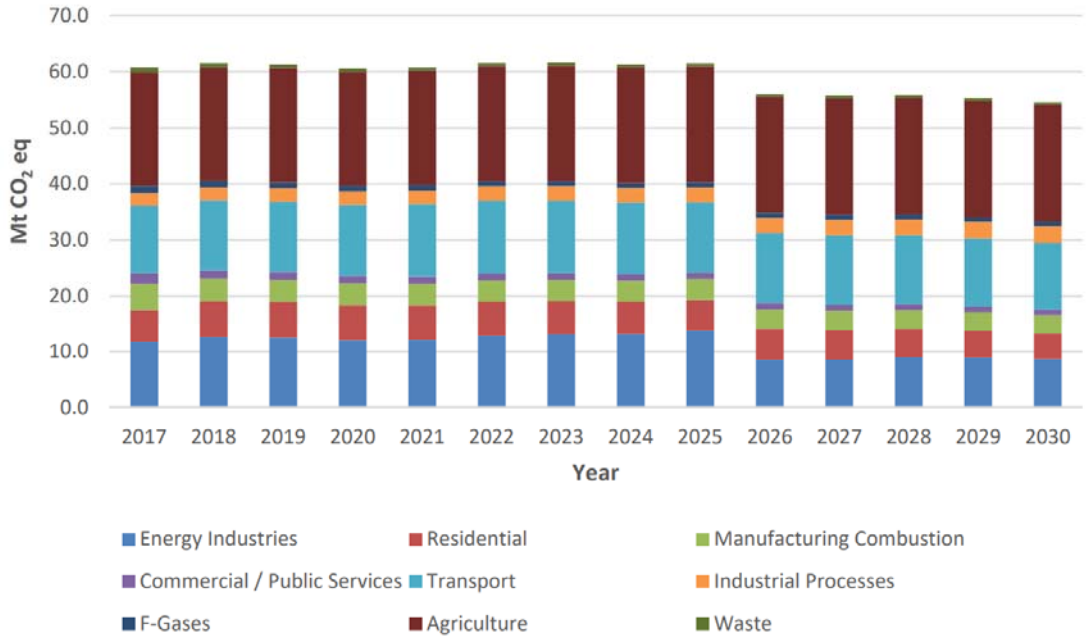
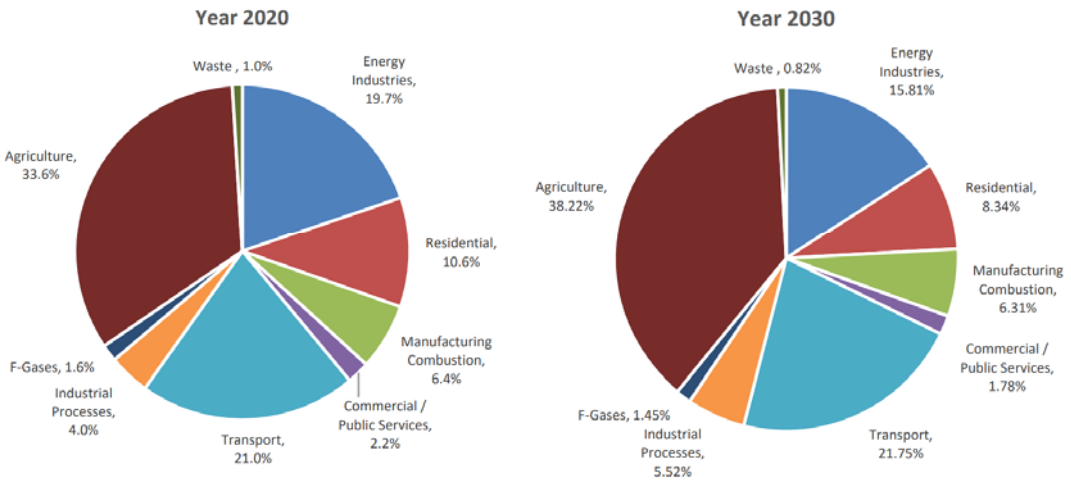


Plate 9.3: Total Greenhouse Gas Emissions Projections by sector share under the With Additional Measures scenario in in the year 2020 and 2030



9.3.4 Regional and Local Climate

9.3.4.1 Regional Climate

The Irish climate is subject to strong maritime influences, the effects decreasing with increasing distance from the Atlantic coast. The climate in the area of the site is typical of the Irish climate, which is temperate maritime.

Over the summer months the influence of anti-cyclonic weather conditions on the western and north-western region 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. 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.

The closest Met Éireann Synoptic Station is at Birr which is situated approximately 25km south of the sand & gravel pit. The climate average for the period of 1979 – 2008 for Birr is tabulated in Table 9.1 below. Parameters recorded at the station include temperature, relative humidity, sunshine and wind speed and direction.

Mean meteorological data for the station shows that the mean daily minimum temperature was experienced in January and February with temperatures of 2.0°C with the highest mean daily max of 19.6°C experienced in July. The mean annual average rainfall for the period was 845.7mm with most rainfall experienced in the month of October with the least amount in April.

Table 9.1: Monthly, annual mean and extreme values at Birr Station

Birr													
1979-2008													
Temperature *(°C)*	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Jun***	***Jul***	***Aug***	***Sep***	***Oct***	***Nov***	***Dec***	***Year***
mean daily max.	8.1	8.6	10.3	12.6	15.5	17.8	19.6	19.3	17.1	13.6	10.4	8.6	13.5
mean daily min.	2.0	2.0	3.3	4.3	6.6	9.5	11.6	11.3	9.3	6.6	4.0	2.7	6.1
Mean temperature	5.1	5.3	6.8	8.4	11.0	13.6	15.6	15.3	13.2	10.1	7.2	5.6	9.8
absolute max.	14.3	15.5	18.6	23.2	25.7	29.7	30.8	29.4	25.6	20.4	17.5	15.3	30.8
absolute min.	-3.5	-0.5	2.0	4.3	6.3	10.5	12.5	11.6	9.7	5.9	2.7	-1.0	-3.5
mean no. of days with air frost	11.6	12.1	12.2	13.0	15.2	16.6	18.9	18.1	17.9	15.7	12.8	13.0	18.9
mean no. of days with ground frost	-14.6	-7.1	-7.8	-4.7	-2.3	0.2	3.7	2.0	-1.1	-5.2	-6.9	-8.6	-14.6
Rainfall *(mm)*													
mean monthly total	78.8	58.6	67.4	55	59.5	66.5	59.4	81.6	66.4	94.2	74.7	83.8	845.7
greatest daily total	39.2	28	22	26.3	19.7	41.1	44.5	59.1	35.7	32.3	29.7	37.5	59.1
mean no. of days with >= 0.2mm	19	15	19	15	16	16	16	18	17	19	18	18	206
mean no. of days with >= 1.0mm	14	11	14	11	12	11	11	12	11	14	13	13	147
mean no. of days with >= 5.0mm	5	4	4	3	4	4	3	5	4	6	5	6	53
Wind *(knots)*													
mean monthly speed	7.9	8	7.8	6.5	6.2	5.8	5.6	5.6	6	6.8	7	7.5	6.7
max. gust	75	77	64	58	55	49	49	46	51	64	54	69	59.2
max. mean 10-minute speed	40	38	33	29	29	27	24	27	30	37	32	38	32
mean no. of days with gales	0.2	0.2	0	0	0	0	0	0	0	0	0	0.1	0.5
Weather *(mean no. of days with...)*													
snow or sleet	3.5	2.6	2.5	0.8	0.2	0	0	0	0	0	0.2	1.9	11.7
snow lying at 0900UTC	2	0.6	0.7	0	0	0	0	0	0	0	0	0.3	3.7
hail	0.6	0.8	1.8	2	0.9	0.1	0	0.2	0.1	0.2	0.3	0.3	7.3
thunder	0.1	0.1	0.2	0.3	0.4	0.8	0.9	0.5	0.3	0.1	0.2	0.1	3.9
fog	2.1	1.3	1.1	1.5	1.1	0.8	1.1	1.8	2.5	2.1	1.9	2.9	20.4

9.3.4.2 Local Climate

Long-term rainfall and evaporation data was sourced from Met Éireann. The 30-year (1979–2008) average monthly rainfall recorded at Birr, Co. Offaly is presented in Table 9.2 with the Average Annual Rainfall (AAR) calculated as the sum of all monthly averages across the 30 years.

Table 9.2: Long term mean monthly rainfall data (mm) (Met Éireann)

J	F	M	A	M	J	J	A	S	O	N	D	Annual
78.8	58.6	67.4	55	59.5	66.5	59.4	81.6	66.4	94.2	74.7	83.8	845.7

Average potential evapotranspiration (**PE**) from the closest operating station (Gurteen) for the year 2018 was 558.1 mm yr^{-1}. This value is used as a best estimate of the site PE.

Actual Evapotranspiration (**AE**) is the amount of water removed from the land surface through the combination of evaporation and transpiration. It is a function of solar radiation, wind speeds, air pressure and nature of plant cover. AE is estimated by multiplying PE by 0.95, to allow for the reduction in evapotranspiration during periods when a soil moisture deficit is present (Water Framework Directive, 2004). Actual evapotranspiration is therefore 530.2 mm yr^{-1} (0.95 PE).

Effective rainfall (**ER**) is the proportion of rainfall which is available to recharge groundwater. Using the following equation, the effective rainfall **(ER)** is therefore taken to be an average of 315.5 mm/yr^{-1}:

ER = AAR – AE

= 845.7 mm yr^{-1} – 530.2 mm yr^{-1}

ER = 315.5 mm yr^{-1}

9.4 Characteristics of the Development

The existing pit has an overall area of approximately 15.34 hectares and consists of an area of 0.97 ha. which was subject to extraction of material after expiry of planning permission on 31st day of December 2009. This extraction area is contained within the overall quarry area of 15.34 hectares consisting of areas ancillary to the extraction area (0.97 Ha.)

The ancillary areas of the pit consists of previously extracted areas, processing infrastructure and stockpiling areas, vehicle parking areas and areas used for the storage of overburden pending restoration.

Overburden material was removed prior to excavation of the underlying reserve and stored pending restoration works. The sand and gravel material was excavated, loaded onto dump trucks, transported to the fixed wet screening and crushing plant and processed into various grades depending on market demand.

Plant and machinery which operated in the application area consisted of tracked excavators, wheel loaders, dump trucks, processing plant and road trucks to haul material off site. Ancillary plant such as a water bowser for dust suppression was deployed where required.

Due to the porous nature of the underlying material, water falling as precipitation percolated to ground. The existing washing plant operated by way of a closed water management system whereby the plant removed the fine material (clays /silts) with run-off water diverted to a series of settlement lagoons. The water was then recycled for washing with water lost in the aggregate replaced with water from a groundwater well located near the plant.

A significant amount of landscaping and restoration works have been completed which have included placing a layer of overburden on side slopes and the pit floor. It is proposed to restore further areas of the pit as per the landscape and restoration plan detailed in Section 13.0.

9.5 Impact Assessment

Day to day activities associated with the historical operation of the pit are evaluated under the various headings below.

9.5.1.1 Plant and Vehicle Emissions

The movement of vehicles and particularly heavy commercial vehicles and operation of plant such as excavators and processing plant would have generated exhaust emissions (e.g. $C0_2$ and N_20) which could not be eliminated as, in order for material to be extracted and processed, plant and vehicles need to operate. Due to the low level of activity and traffic movements, emissions associated with the development when operational are assessed as having a slight impact over a long term period.

9.5.1.2 Cumulative Impact

The Substitute Consent application area must also be considered in association with other developments located within or close to the application site. Other contributors of CO_2 emissions within the study area would have been associated with road traffic using national, regional and local roads in the vicinity. Another main contributor of emissions to

the atmosphere in the region would have been likely to have been associated with the agricultural sector with livestock farming being practiced.

It is unlikely that there was a cumulative impact on the local climate as a result of activities associated with the subject development and other activities of the study area due to the low level of activity in the area which is unlikely to have generated significant emissions.

9.5.2 Unplanned Events

The development must also be assessed in relation to unplanned events in terms of vulnerability to the risks of major accidents and/or disasters which are relevant to the development. The unplanned events in relation to climate which the development could have potentially been vulnerable to include flooding, extreme temperatures, storms and high wind events

Flooding - Extreme rainfall events can potentially lead to flooding of low lying areas where discharges or high run-off rates occur. The pit extracted material from above the water table therefore there was no requirement to discharge water off-site. All surface water generated as a result of precipitation percolated to ground. Therefore historical development of the pit would not have led to flooding.

Storm Events - Extreme windy conditions could potentially lead to damage to buildings and infrastructure if not structurally sound. Infrastructure located at the pit which could potentially been damaged during storm events is minimal. Buildings and infrastructure were inspected on a regular basis to ensure that they were structurally safe and that no loose items were located on infrastructure or stored in areas around the pit that could be carried by wind.

Extreme Temperatures – Extreme temperatures particularly freezing temperatures increase the potential for accidental collisions or slips by employees working at the quarry. Extreme weather events were reviewed and decision made as to whether to operate during these events.

9.6 Mitigation Measures

The following measures were practiced at the existing development during the operational phase of the development in order to limit the effects of the development on the local and regional climate:

- Strict adherence to 'good site/engineering practices' (e.g. all vehicles and plant were be switched off when not in use) which would have minimised the generation of any unnecessary air emissions.
- Plant was serviced regularly to ensure efficient fuel consumption.
- Energy audits were undertaken at the pit in order to reduce energy requirements.
- When purchasing plant, preference was given to plant which have low emissions.

The above measures will be practiced during any future works undertaken at the pit associated with landscaping and restoration.

9.7 Remedial Measures

No remedial measures are required.

9.8 Residual Impacts

No residual impacts are predicted.

9.9 Technical Difficulties

No technical difficulties were encountered.

9.10 References

Ireland's Greenhouse Gas Emissions Projections 2018-2040, (EPA, 2019)

Ireland's Final Greenhouse Gas Emissions 1990 – 2016. (EPA, April 2018)

Climate Change Advisory Council Annual Review November 2017, (Climate Change Advisory Council, 2017)

McElwain, L. and Sweeney, J. (2007) Key Meteorological Indicators of Climate Change in Ireland. Prepared for the Environmental Protection Agency by Irish Climate Analysis and Research Units (ICARUS) Department of Geography, National University of Ireland, Maynooth

The EPA and Climate Change Responsibilities, Challenges and Opportunities 2011 Update, (EPA, 2011)

Framework Convention on Climate Change (1997) Kyoto Protocol to The United Nations Framework Convention On Climate Change.

Framework Convention on Climate Change (1999) Ireland - Report on the In-Depth Review of the Second National Communication of Ireland

Met Eireann (2018) https://www.met.ie/climate/available-data/historical-data

Teagasc (2011) - Irish Agriculture, Greenhouse Gas Emissions and Climate Change: Opportunities, Obstacles and Proposed Solutions

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10.0 AIR

10.1 Introduction

This chapter of the remedial EIAR assesses the air quality of the application site and surrounding area associated with historical activiites undertaken to date. Sensitive receptors, such as residential areas and ecologically sensitive areas were reviewed as part of the assessment.

10.2 Methodology

The methodology used as part of this assessment included undertaking a desk based study to examine all relevant information relating to air quality conditions in the vicinity of the existing pit including environmental monitoring results. From these results, estimations could be made of the impact of the development on the existing air quality of the area.

Met Éireann was consulted with in relation to weather data related to the study area. Site related studies included numerous visits to the pit to assess activities undertaken. Furthermore, a survey of existing residential housing in the area of the application site was undertaken.

It is noted that the extraction related activities have ceased and no further extraction is proposed at the pit. The applicant proposes to restore the pit in line with the landscape and restoration plan proposed as part of the application.

10.2.1 Assessment Methodology

The rating of potential environmental effects of the proposed project on air quality is based on the criteria presented in Table 10.1 below. These criteria consider the quality, significance, duration and types of effect characteristics identified and are based on Table 3.3 presented in the EPA (2017) *"Guidelines on the Information to Be Contained in Environmental Impact Assessment Reports".*

Table 10.1: Criteria Used in the Assessment of Impacts on Air Quality (EPA, 2017)

Characteristic	Level	Description
Quality	Positive	A change which improves the quality of the environment.
	Neutral	No effects/effects which are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative	A change which reduces the quality of the environment.
Significance	Imperceptible	An effect capable of measurement but without significant consequences.
	Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends.
	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound	An effect which obliterates sensitive characteristics.
Magnitude	Extent	Describe the size of the area, number of sites and the proportion of a population affected by an effect.
	Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions.
Probability	Likely	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Duration and Frequency	Momentary	Effects lasting from seconds to minutes.
	Brief	Effects lasting less than a day.
	Temporary	Effects lasting less than a year.
	Short-term	Effects lasting one to seven years.
	Medium-term	Effects lasting seven to fifteen years.
	Long-term	Effects lasting fifteen to sixty years.
	Permanent	Effects lasting over sixty years.
	Reversible	Effects that can be undone, for example through remediation or restoration.
	Frequency	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).
Types of	Indirect	Impacts on the environment, which are not a direct result of

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

10.3 Legislation

10.3.1 Air Quality

A number of international initiatives, protocols and Directives exist to limit and reduce emissions at a national level. The following criteria were considered in the assessment of potential impacts on air quality:

- Air Quality Standards Regulations (S.I. No. 180 of 2011).
- Directive 2001/81/EC on National Emission Ceilings for certain pollutants (NECs) (S.I. No. 10 of 2004).
- There are no statutory limits for deposition of dusts and industry guidelines are typically employed to determine any impact. The TA Luft (German Government 'Technical Instructions on Air Quality') states a guideline of 350 mg/m^2/day for the deposition of non-hazardous dusts. This value was used to determine the impact of residual dust as an environmental nuisance.
- The National Roads Authority (NRA) has published guidance for assessing dust impacts from road construction ('Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes'). This has been used to determine the potential impacts from the proposed construction site operations.

The relevant Irish ambient air standards have been adopted from the European Commission (EC) Directives 1996/62/EC, 1999/30/EC and 2000/69/EC and are cited as the Air Quality Standards Regulations, which came into force on 17th June 2002 (Irish Legislation S.I. No. 271 of 2002). In May 2008, these EC Directives on air quality were replaced with a new Directive on ambient air quality and cleaner air for Europe (2008/50/EC), which has been transposed into Irish Legislation through the revised Air Quality Standards Regulations (S.I. 180 of 2011). These regulations are presented in Table 10.2. The new legislation specifies limit values in ambient air for sulphur dioxide (SO_2), lead (Pb), benzene (C_6H_6), particulate matter (PM_{10} and $PM_{2.5}$), carbon monoxide (CO), nitrogen dioxide (NO_2) and oxides of nitrogen (NO_x). These limits are mainly for the protection of human health and are largely based on review of epidemiological studies on the health impacts of these pollutants. These limits are presented in Table 10.2.

Table 10.2: Revised Air Quality Standard Regulations S.I. 180 of 2011

Pollutant Criteria Value	Criteria	Value
Nitrogen Dioxide (NO_2)	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3 NO_2
	Annual limit for protection of human health	40 µg/m^3 NO_2
	Annual limit for protection of vegetation	30 µg/m^3 NO + NO_2
Benzene (C_6H_6)	Annual limit for protection of human health	5 µg/m^3
Carbon Monoxide (CO)	Maximum daily 8-hour running mean	10 mg/m^3
Lead (Pb)	Annual limit for protection of human health	0.5 µg/m^3
Sulphur Dioxide (SO_2)	Hourly limit for protection of human health - not to be exceeded more than 24 times/year	350 µg/m^3
	Daily limit for protection of human health - not to be exceeded more than 3 times/year	125 µg/m^3
	Annual limit for protection of vegetation	20 µg/m^3
Particulate Matter (PM_{10})	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3 PM_{10}
	Annual limit for protection of human health	40 µg/m^3 PM_{10}
Particulate Matter ($PM_{2.5}$)	Annual target value for the protection of human health (Stage 1 to be achieved by 2015)	25 µg/m^3 $PM_{2.5}$
	Indicative limit for the protection of human health (Stage 2 to be achieved by 2020)	20 µg/m^3 $PM_{2.5}$

10.3.2 Dust Deposition

There are no statutory limits on dust deposition and the focus is on the prevention of nuisance and minimising air borne dust emissions where practicable. Although coarse dust is not regarded as a threat to health, it can create a nuisance by depositing on surfaces.

No statutory or official air quality criterion for dust annoyance has been set in Ireland, UK, Europe or at World Health Organisation level.

The most commonly applied guideline is the German (TA Luft) guideline of 350mg/m^2/day as measured using Bergerhoff type dust deposit gauges as per the German Standard Method for determination of dust deposition rate (VDI 2119). This is commonly applied to ensure that no nuisance effects will result from specified industrial activities. Below these thresholds dust problems are considered less likely. Dust Deposition is normally measured by gravimetrically determining the mass of particulates and dust deposited over a specified surface area over a period of one month (30 days +/- 2 days).

The EPA Document *Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006)* recommends that the following TA Luft dust deposition limit value be adopted at site boundaries associated with quarry developments – total dust deposition (soluble and insoluble): 350 mg/m^2/day (when averaged over a 30-day period).

Condition No.6 attached as part of the registration of the pit under Section 261 related to dust depsotion and stated the following:

Total dust deposition at the site boundaries shall not exceed 350mg/m2/day averaged over a 30-day period.
Reason: In the interest of public health and the proper planning and sustainable development of the area.

10.3.3 Environmental Management and Guidance Documents

A number of publications were referred to during the compilation of this chapter which are detailed below. All offer guidance in relation to assessing air quality.

- **Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (NRA, 2011)** – This document provides updated guidance for the assessment of air quality impacts during the planning and design of national road schemes.

- **Air Emissions Monitoring Guidance Note #2 (AG2) (EPA, 2007)** – This guidance note was commissioned by the EPA to provide information on the subject of air emission monitoring in the Irish context with an emphasis on stack monitoring.

- **Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006)** – These guidelines were compiled to contribute to a more environmentally sustainable extractive industry, greater protection for the environment and human health, and thereby a greater public confidence in such operations.

- **Environmental Code 2nd Edition, (Irish Concrete Federation, 2005)** – This document was compiled to ensure that quarrying activity is undertaken in a manner which minimises adverse effects upon the environment and the local community to conserve resources by the efficient use of energy supplies and raw materials.

- **Quarries and Ancillary Activities - Guidelines for Planning Authorities – (DEHLG, 2004)** – This document offers guidance to planning authorities on planning for the quarrying industry through the development plan and determining applications for planning permission for quarrying and ancillary activities.

10.4 Existing Environment

The existing sand and gravel pit is located in the townland of Clonfinlough, Co. Offaly which is located approximately 6.3km south west of Ballinahown village, 8.7km north west of Ferbane and 8.6km north east of Shannonbridge. The existing pit has an overall area of approximately 15.34 hectares and consists of a Pre-63 area and areas which were authorised by way of two separate planning permissions.

Based on the Ordnance Survey 1:50,000 scale mapping contours, the ground elevation of the site prior to extraction varied between approximately 55 and 80m OD. The current elevation of the sand and gravel pit floor is between approximately 44 and 53m OD.

The study area is relatively flat and consists of peatlands which are subject to peat extraction and agricultural land predominantly under permanent pasture interspersed by hedgerows with livestock grazing being the predominant sector practiced. The area is populated with low density housing along the R444 Regional Road which runs along the north-western boundary of the site.

The sand and gravel areas are mainly well drained permanent pasture, but there are some areas of scrub growing on the steeper slopes. The lower lying areas between the eskers are poorly drained and peat bogs have developed in the depressions.

10.4.1 Meteorological Conditions

Meteorological conditions significantly affect the level of emissions to air particularly dust. The main meteorological elements which affect dust deposition are rainfall, wind speed and wind direction. Wind can pick up and carry dust downwind from the source which typically occurs during periods of dry weather which usually coincides with the summer months. Rainfall can also aid in suppressing dust due to the cohesive nature of water between dust particles.

Long-term rainfall was sourced from Met Éireann. The 30-year (1979–2008) average monthly rainfall recorded at Birr, Co. Offaly which is situated approximately 25km south of the sand & gravel pit is presented in Table 10.3 with the Average Annual Rainfall (AAR) calculated as the sum of all monthly averages across the 30 years.

Table 10.3: Long term mean monthly rainfall data (mm) (Met Éireann)

J	F	M	A	M	J	J	A	S	O	N	D	Annual
78.8	58.6	67.4	55	59.5	66.5	59.4	81.6	66.4	94.2	74.7	83.8	845.7

The mean monthly rainfall recorded at Birr was 70.5 mm/month (total/year = 845.7mm). A total mean monthly precipitation rate of approximately 457mm across all years fell during the winter months (October to March). The monthly total during the winter months (October-March) accounts for approximately 54% of the annual total for these years.

Wind frequency is important as dust can only be dispersed by winds, and deposition of dust is a simple function of particle size, wind speed and distance. The closer the source of dust is to a receptor; the higher the potential risk of impact of dust blow. The prevailing winds in the area, in common with most of Ireland, are south-westerly, thereby predominantly dispersing any potential dust emissions to the north-east of the site.

10.4.2 EPA Air Quality Index for Health

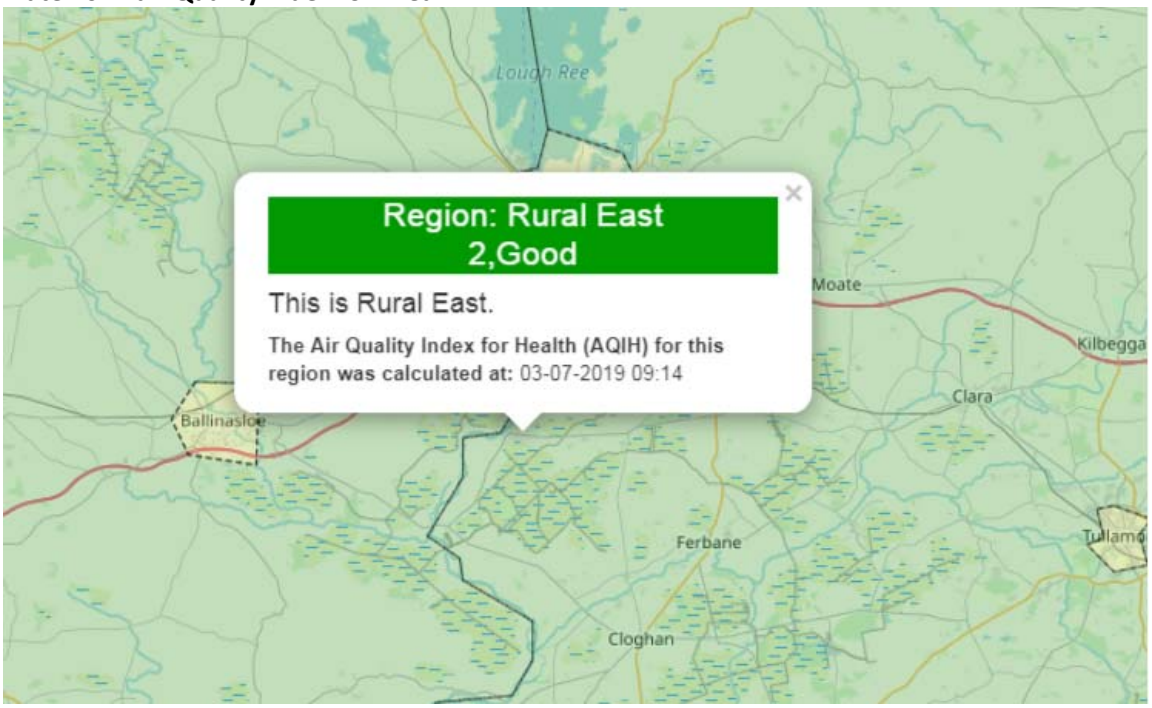
The Air Quality Health Information Working Group was formed in 2011. One of the objectives of the group was to agree an index appropriate for Ireland including health information which resulted in the formation of the Air Quality Index for Health. The Air Quality Index for Health (AQIH) is presented on a scale of 1 to 10, divided into four bands – good, fair, poor and very poor.

The AQIH is based on measurements of five air pollutants, all of which can harm health. The five are ozone, nitrogen dioxide, sulphur dioxide, $PM_{2.5}$ (particles with a diameter < 2.5 µm) and PM_{10} (particles with a diameter <10 µm). The index for each pollutant is

calculated separately. The overall AQIH is the worst index of the five pollutant indices. Air pollution has a range of effects on health. The index is based on data collected by the EPA from monitoring instruments at representative locations in the region and may not reflect local incidents of air pollution.

At the time of writing (July 2019), the air quality in the vicinity of the pit was classified as 2 – Good as reflected on Plate 10.1.

Plate 10.1: air Quality Index for Area



Beyond the sand and gravel pit site, the primary source of atmospheric emissions is from domestic heating associated with residential dwellings, as well as road traffic travelling on local and regional roads in the vicinity of the pit.

There are no significant air emissions from industrial or commercial properties in the area, with the surrounding land-use mainly agricultural. Atmospheric emissions from agricultural activities, such as farm machinery operating on lands bordering the application site will have a minor impact on air quality in the area.

10.4.3 Dust Sensitive Receptors

Potentially dust sensitive activities, which can be categorised in relation to their dust sensitivity as potential increases in ambient dust levels, will have varying degrees of

effects. This is dependent on the type and sensitivity of the receptor. Dust deposition on agricultural land, for example, is likely to have a lesser effect than similar levels of dust falling on a paint spraying or food processing facility, where very small amounts of dust can affect activities. Although this principle does not always apply, Table 10.4 categorises dust sensitive receptors and highlights their risk in relation to potential sources of dust.

Table 10.4: Levels of Sensitivity per Receptor Type

High Sensitivity	Medium Sensitivity	Low Sensitivity
Hospitals and clinics	Schools	Farms
Retirement homes	Residential areas	Light and heavy industry
Hi-tech industries	Food retailers	Outdoor storage
Painting and furnishing	Greenhouses and nurseries	
Food processing	Horticultural land	
	Biodiversity	

The receptor types in the study area consist of medium and low sensitivity receptors consisting mainly of residential areas and farms. There are a limited number of human receptors in the vicinity of the application site in the form of occupied dwellings which are detailed on Plate 10.2.

Plate 10.2: Dwellings in the Vicnity of the Pit

The natural topography, vegetated berms and treelines provide natural screening and breaks between source and the receptor and can also act as an efficient dust filter and can be a useful dust control safeguard.

10.4.4 Dust Deposition Monitoring

A number of rounds of dust deposition monitoring were undertaken at the pit using Bergerhoff type dust deposit gauges as per the German Standard Method for determination of dust deposition rate (VDI 2119).

Results of dust deposition monitoring are located in Table 10.5 below and are compared to the recommended guideline value of 350mg/m^2/day for the Bergerhoff type method. Report for dust deposition monitoring are located in Appendix V.

10.4.4.1 Dust Deposition Monitoring 2008

Dust monitoring was conducted on two occasions between the 14th July 2008 and 30th October 2008 using the the Bergerhoff method. Locations of monitoring are detailed on Plate 10.3 and tabulate in Table 10.5.

Plate 10.3: Dust Deposition Monitoring Locations

Table 10.5: Dust Deposition Monitoring Results

Date Out	Date In	Limit	D1	D2	D3	D4
14/7/08	22/8/08	350	32	190	NR	64.7
22/8/08	30/10/08	350	74	28.6	NR	37.3

Results of dust deposition monitoring were all below the recommended guideline value of 350 mg/m^2/day during the monitoring period. The report states that due to health and safety concerns there was no result from monitoring station D3 duing the 2008 monitoring.

10.4.4.2 Dust Deposition Monitoring 2015 & 2016

Two further rounds of monitoring were undertaken in 2015 and 2016 at three locations as shown on Plate 10.4 below with results of monitoring are detailed on Table 10.6. Results of dust deposition monitoring were all below the recommended guideline value of 350 mg/m^2/day during both monitoring periods.

Plate 10.4: Dust Deposition Monitoring Locations

Table 10.6: Dust Deposition Monitoring Results

Date Out	Date In	Days	Limit	D1	D2	D3
29/10/15	26/11/15	28	350	150.4	71.2	175.1
26/01/16	24/02/16	29	350	128.4	102.4	92.3

10.4.4.3 Dust Deposition Monitoring 2019

A round of monitoring was undertaken in 2019 at two locations as shown on Plate 10.5 below with results of monitoring detailed on Table 10.7. Results of dust deposition monitoring were all below the recommended guideline value of 350 mg/m^2/day during the monitoring period.

Plate 10.5: Dust Deposition Monitoring Locations

Table 10.7: Dust Deposition Monitoring Results

Date Out	Date In	Days	Limit	D1	D2
26/03/19	24/04/19	29	350	309	34

10.5 Characteristics of the Development

The existing pit has an overall area of approximately 15.34 hectares and consists of an area of 0.97 ha. which was subject to extraction of material after expiry of planning permission on 31st day of December 2009. This extraction area is contained within the overall quarry area of 15.34 hectares consisting of areas ancillary to the extraction area (0.97 Ha.)

The ancillary areas of the pit consists of previously extracted areas, processing infrastructure and stockpiling areas, vehicle parking areas and areas used for the storage of overburden pending restoration.

Overburden material was removed prior to excavation of the underlying reserve and stored pending restoration works. The sand and gravel material was excavated, loaded onto dump trucks, transported to the fixed wet screening and crushing plant and processed into various grades depending on market demand.

Plant and machinery which operated in the application area consisted of tracked excavators, wheel loaders, dump trucks, processing plant and road trucks to haul material off site. Ancillary plant such as a water bowser for dust suppression was deployed where required.

Due to the porous nature of the underlying material, water falling as precipitation percolated to ground. The existing washing plant operated by way of a closed water management system whereby the plant removed the fine material (clays /silts) with run-off water diverted to a series of settlement lagoons. The water was then recycled for washing with water lost in the aggregate replaced with water from a groundwater well located near the plant.

A significant amount of landscaping and restoration works have been completed which have included placing a layer of overburden on side slopes and the pit floor. It is proposed to restore further areas of the pit as per the landscape and restoration plan detailed in Section 13.0.

10.6 Impact Assessment

Day to day activities associated with historical activity had the potential to give rise to elevated dust levels if activities associated with overburden stripping, extraction, processing and transportation of material were not managed correctly. Potential impacts associated with the past day to day activities have been separated into dust deposition and vehicle and plant emissions. It should be noted that activities referred to below were been undertaken during dust deposition monitoring events and levels were below the recommended guideline value for dust deposition duing all monitoring events.

10.6.1 Dust Deposition

Day to day activities that were undertaken at the application site would have had the potential to generate wind-blown dust if not managed correctly. These activities are detailed below:

- Overburden stripping
- Excavation of in-situ material

- Processing of material
- Transportation of material

10.6.1.1 Overburden Stripping

This involved the stripping of overburden prior to excavating the underlying sand/gravel and transporting to areas for storage pending restoration or for construction of berms. The material was stripped using an excavator and loaded onto dump trucks which transported the material to storage areas where the material was unloaded and shaped or graded using an excavator. This activity would have resulted in an imperceptible impact which would have been temporary in duration.

10.6.1.2 Excavation of In-situ Material

Once the overburden was removed, the sand and gravel material was excavated and loaded directly into a dump truck and transported to the processing plant for washing and grading. Dust emissions from excavation of material would have generally been relatively low and would not have travelled far from the source. This activity would have been undertaken on a daily basis and would have resulted in an imperceptible impact.

10.6.1.3 Processing of Material

Material was washed and graded on site into a number of grades depending on the market requirements. Feed areas and aggregate stockpiled at the end of each conveyor would have also been a potential source of dust blow during dry windy conditions.

Fugitive dust emissions generated during the aggregate processing, screening and stockpiling of material would have been confined to the zone close to the plant. The elevated ridges to the south and south east would have provided shelter from wind. It is unlikely that this activity would have led to an impact on air quality within the surrounding environment in the past with the impact assessed as been a slight affect within the confines of the pit when operational.

10.6.1.4 Transportation of Material

Vehicle movements on the internal access/haul road would have been a source of dust blow as emissions can increase rapidly in proportion to vehicle speed and traffic volume. The majority of dust particles, typically produced from un-surfaced roads, deposit rapidly within the immediate vicinity of the source. This activity is assessed to have been a slight, localised impact; however, given that mitigation measures, such as dust suppression were implemented, the impact would have been imperceptible.

10.6.2 Vehicle and Plant Emissions

Exhaust and engine emissions such as carbon dioxide (CO_2) and nitrous oxide (N_2O) from plant and vehicles would have contributed to greenhouse gas emissions. Emissions associated with this area of the pit are assessed as having a slight localised impact over a long term period when the pit was operational.

10.6.3 Cumulative Impacts

The application area must also be considered in association with other developments located within or close to the application site. Other contributors of CO_2 emissions within the study area would be associated with road traffic using road infrastructure in the vicinity of the pit. Another main contributor of emissions to the atmosphere in the region is likely to be associated with the agricultural sector with livestock farming being practiced.

It is unlikely that there would have been a cumulative impact on the local climate as a result of activities associated with the historical development within the Substitute Consent area and other activities of the study area due to the low level of activity in the area.

10.6.4 Unplanned Events

No unplanned events occured duing the operation of the pit. In the event of an unplanned event occuring resulting in emissions to air, the activity would be suspended and the relative emergency services would be contacted should they be required.

10.7 Mitigation Measures

The following mitigation measures were implemented as part of the operation of the pit:

- The duration of soil handling activities such as overburden removal were restricted to periods of dry weather with little or no wind.
- The access road was inspected regularly and kept in good condition.
- Imposition and enforcement of an appropriate speed limit on haul roads to prevent unnecessary generation of fugitive dust emissions.
- During very dry periods, dust emissions from heavily trafficked locations were controlled by spraying surfaces with water.
- Stockpiles were sprayed with water to reduce dust blow where required.

It is recommended that the above measures are practices during the landscaping and restoration phase of the development.

10.8 Remedial Measures

No remedial measures are requried.

10.9 Monitoring

To ensure that the existing development is not impacting on air quality, dust deposition monitoring will be undertaken during the landscape and restoration phase of the development at the locations shown on Plate 10.6.

Plate 10.6: Proposed Dust Deposition Monitoring Locations

10.10 Residual Impacts

It is not anticipated that there was an adverse impact on air quality in the vicinity of the application site associated with the development and this is anticipated to be the case going during restoration works and post restoration works.

10.11 Technical Difficulties

No technical difficulties were encountered during the compilation of this chapter.

10.11 References

DoEHLG (2004) Quarries and Ancillary Activities - Guidelines for Planning Authorities

EPA (2002) Guidelines on Information to be Contained in Environmental Impact Statements

EPA (2006) Environmental Management in the Extractive Industry (Non-Scheduled Minerals)

EPA (2007) Air Emissions Monitoring Guidance Note #2 (AG2)

EPA (2012) - Air Quality in Ireland 2011

EPA (2017) Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR) (EPA, August 2017)

EPA (2018) Air Quality Index for Health http://www.epa.ie/air/quality/index/

Irish Concrete Federation (2005) Environmental Code 2nd Edition

NRA (2011) Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes

UK Air Quality Monitoring Archive Website (2004) http://www.airauality.co.uk

Walsh, S. 2012. A summary of climate averages 1981-2010 for Ireland. Climatological Note No. 14, Met Éireann, Dublin

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Appendices

11.0 NOISE

11.1 Introduction

This chapter of the rEIS assesses the noise levels associated with the day to day quarrying activities that were undertaken at the development and the potential impacts if any on the environs surrounding the pit.

11.2 Methodology

11.2.1 Reference Material

The following relevant guidance and legislation were consulted during the process:

- Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (Jan 2016).
- ISO 1996-1-2016: Acoustics: Description and Measurement of Environmental Noise-Basic Quantities and Assessment Procedures.
- Integrated Pollution Control Licensing – Guidance Note for Noise in Relation to Scheduled Activities, EPA 1995.
- ISO 9613-2, First Edition 1996-12-15. Acoustics-Attenuation of sound during propagation outdoors-Part 2: General method of calculations
- Draft Guidelines for the Treatment of Noise and Vibration in National Road Schemes
- BS5228, 2009 Code of Practice for Noise Control on Construction and Open Sites: Part 1: Noise.
- EPA, 2006, Environmental Management Guidelines-Environmental Management in Extractive Industry (Non Scheduled Minerals).
- EPA, 2003, Environmental Quality Objectives-Noise in Quiet Areas
- HMSO, Welsh Office, 1988. Calculation of Road Traffic Noise

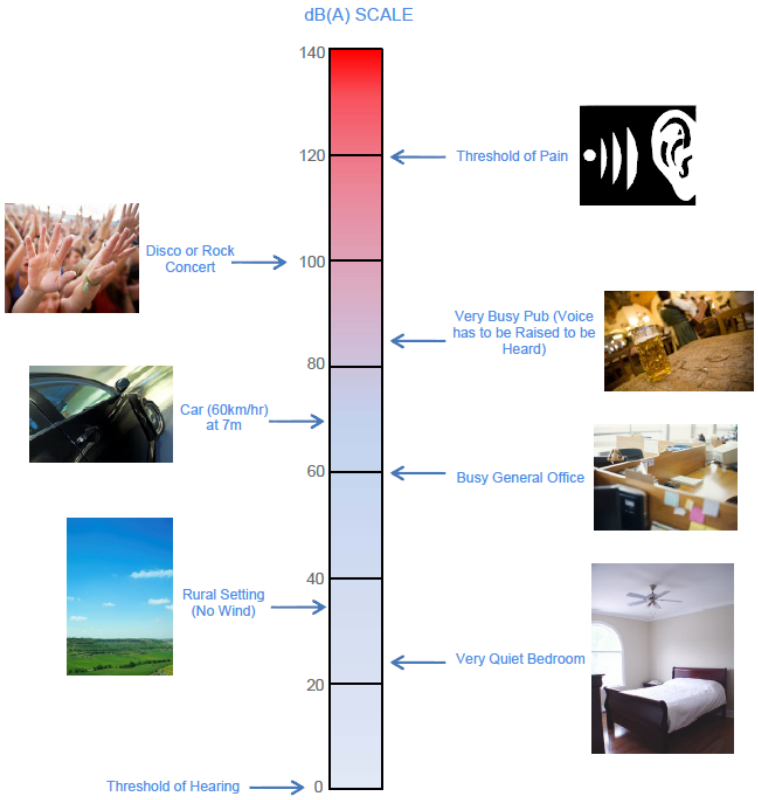
11.2.2 Acoustic Terminology

Noise is regarded as a form of manmade pollution and under the Environmental Protection Agency Act of 1992, the definition of 'environmental pollution' includes noise which is a nuisance or would endanger human health or damage property or harm the environment. The Protection of the Environment Act (2003) likewise includes noise in the definition of environmental pollution which encompasses 'the introduction to an environmental medium … noise which might be harmful to human health or the quality of the environment…'. In a modern post-industrial society, some form of noise is an almost ubiquitous by-product of many normal everyday activities. Whether the noise is considered as impacting upon health or quality of life, or indeed gives rise to annoyance,

depends not just upon the level of noise but also the human reaction to it, whether this be sub-conscious physiological reactions or conscious reactions such as annoyance. Conscious reactions, such as annoyance, most often occur when the noise could be considered unwanted, due to the level, the location, the time of day, or interference with other activities.

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). The criteria for environmental noise control are of annoyance or nuisance rather than damage. An indication of the level of some common sounds on the dB(A) scale is presented in Plate 11.1.

Plate 11.1: Noise Level Comparison Table



11.2.2.1 Measurement Parameters

L_{Aeq} is the A-weighted equivalent continuous sound level measured during the sample period. It is an average of the fluctuating noise level over the sample period. It can also be described as a notional steady level that has

the same sound energy as the real fluctuating noise over a specified time interval- it is a type of average represented by a single number over a specified time interval.

L_{AFMax} is the maximum A-weighted sound level during a stated time period (Fast Time weighting).

L_{A10} is the A-weighted sound level, which is exceeded for 10% of the sample period.

L_{A90} is the A-weighted sound level, which is exceeded for 90% of the sample period and is defined as the background noise level within BS 4142.

L_{A5} is the A-weighted sound level, which is exceeded for 5% of the sample period.

11.3 Relevant Guidance and Legislation

The EPA has produced Environmental Management Guidelines 2006[2]. This document references 'A Guidance Note for Noise in Relation to Scheduled Activities (EPA, 1996[1])'. It deals with the approach to be taken in the measurement and control of noise, and provided advice in relation to the setting of emission limits values and compliance monitoring.

In relation to quarry developments and ancillary activities, it recommended that noise from the activities on site shall not exceed the following noise limits at the nearest noise-sensitive receptor:

Daytime	08.00-20.00 hrs	LAeq (1h) = 55dBA
Night-time	20.00-08.00 hrs	LAeq (1h) = 45dBA

95% of all noise levels shall comply with the specified limits values(s). No noise level shall exceed the limit value by more than 2dBA.

The guidelines also recommend that where existing background noise levels are very low, lower noise levels ELV's may be appropriate. It is also appropriate to permit higher ELV's for short term temporary activities such as construction of screening bunds etc. where such activities will result in considerable environmental benefit.

In relation to noise, the pit operated in line with Condition No.8 of the Section 261 determination which states the following:

[2] 'Environmental Management in the Extractive Industry (Non-Scheduled Minerals),2006

[1] Ref. EPA's Guidance Note For Noise In Relation to Scheduled Activities, 1996

The facility shall be operated so that it shall not cause noise levels at the nearest residence to exceed LEQ 55 dB(A) between 0800 hours and 2000 hours and LEQ 45 dB(A) between 2000 hours and 0800 hours.
Reason: In the interest of public health and the proper planning and sustainable development of the area.

11.4 Existing Environment

The existing sand and gravel pit is located in the townland of Clonfinlough, Co. Offaly which is located approximately 6km south west of the village of Ballinahown, 8.7km north west of Ferbane and 8.6km north east of Shannonbridge. The existing pit has an overall area of approximately 15.34 hectares and consists of a Pre-63 area and areas which were authorised by way of two separate planning permissions.

The study area is relatively flat and consists of peatlands which are subject to peat extraction and agricultural land predominantly under permanent pasture interspersed by hedgerows with livestock grazing being the predominant sector practiced. The topography of the sand and gravel pit varies as a result of extraction undertaken to date. The area immediately around the site is sparsely populated, with individual farmsteads and scattered houses along the road network particularly the R444 Regional Road which runs along the north-western boundary of the site. Existing berms and hedgerows in place around the boundary of the pit screen the pit from public view at the majority of locations.

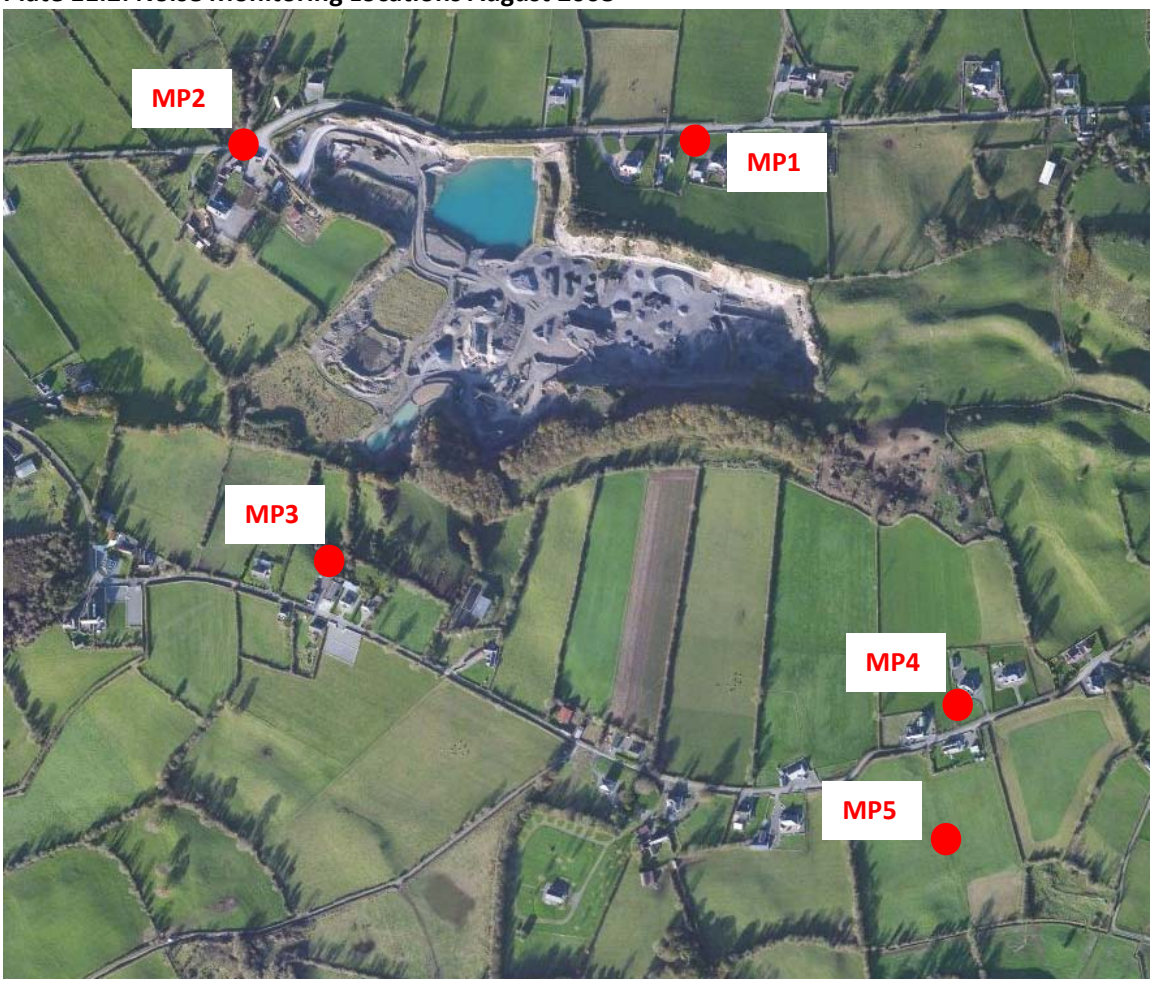
11.4.1 Noise Monitoring Surveys

Two noise monitoring surveys were undertaken in recent years at various locations around the pit. These are discussed below under their respective headings. Copies of the noise monitoring reports are attached in Appendix VI.

11.4.1.1 Noise Monitoring August 2008

Noise monitoring was undertaken at five locations by EMS Consulting Ltd. on 22nd August 2008. The results of noise monitoring are detailed in Table 11.1 with locations of monitoring illustrated on Plate 11.2. Noise monitoring was recorded in 10 minute intervals with 3 intervals (1, 2 & 3) recorded at each location.

Plate 11.2: Noise Monitoring Locations August 2008



Results of monitoring show that the 10 min LAeq was exceeded at a number of locations. According to the monitoring report compiled by EMS Consulting Ltd. the reason for exceedances at MP2 was due to traffic on the local road infrastructure. The reason for exceedances at MP3 was due to construction activity not related to the pit being undertaken close to the monitoring point. Exceedances at MP4 were due to traffic passing during monitoring. A detailed breakdown of monitoring results is included in the report attached in Appendix VI.

Table 11.1: Noise Monitoring Results at 10 Minute Intervals

Location	Reading	Parameter				
		$L_{Aeq\ (10\ min)}$	L_{max}	L_{10}	L_{90}	L_{min}
MP1	1	43	72	45	31	29
	2	41	60	44	31	28
	3	54	78	40	29	27
MP2	1	45	76	46	32	29
	2	46	64	49	36	33
	3	63	84	65	37	33
MP3	1	62	72	69	29	26
	2	53	78	52	31	28
	3	51	70	50	29	26
MP4	1	51	65	53	45	42
	2	51	69	52	46	43
	3	57	79	53	44	41
MP5	1	48	72	49	41	39
	2	41	52	43	37	34
	3	45	59	49	37	34

11.4.1.2 Noise Monitoring October 2015

Noise monitoring was undertaken at three locations at 60 minute intervals on 29th October 2015 by BHP Laboratories Ltd. The results of noise monitoring are detailed in Table 11.2 with locations of monitoring illustrated on Plate 11.3.

Results of noise monitoring were all below the recommended noise level of 55 dB(A). As detailed in Table 11.2, activities being undertaken at the sand and gravel pit were slightly audible at noise monitoring locations. However, noise levels associated with pit activity were well below the LAeq level of 55dB as conditioned on the pit.

Plate 11.3: Noise Monitoring Locations October 2015

Table 11.2: Noise Monitoring Results October 2015

	Time	L_{AEQ} dB	L_{A10} dB	L_{A90} dB	Wind m/s	Notes
NSL 1	08.08-09.08hrs	46	49	36	0	The quarry is audible at 32-40dB and occasionally up to 43dB (a track machine is working nearby). The screener came on about 20 minutes into the run and was operating at 45-51dB. Occasional cars on the entrance road are at 43dB and one tractor coming in to load went by on the entrance road at 55-59dB. Cattle and birdsong are occasionally up to 44dB. Occasional traffic on the regional road is at 47-48dB.
NSL 2	09.17-10.17hrs	44	45	37	0	The quarry (screener) is audible at 39-42dB, occasionally down to 36dB and up to 45dB depending on the rock load. Traffic on the regional road adjacent is occasional and up to 55-59dB.
NSL 3	07:24 – 07:39 hrs	40	44	27	0	The quarry is just audible at 34-36dB as machinery starting up at 7.30am. Occasional traffic on the regional road is up to 51-55dB. Birdsong is frequently up to 45dB.

11.5 Characteristics of the Development

The existing pit has an overall area of approximately 15.34 hectares and consists of an area of 0.97 ha. which was subject to extraction of material after expiry of planning permission on 31st day of December 2009. This extraction area is contained within the overall quarry area of 15.34 hectares consisting of areas ancillary to the extraction area (0.97 Ha.)

The ancillary areas of the pit consists of previously extracted areas, processing infrastructure and stockpiling areas, vehicle parking areas and areas used for the storage of overburden pending restoration.

Overburden material was removed prior to excavation of the underlying reserve and stored pending restoration works. The sand and gravel material was excavated, loaded onto dump trucks, transported to the fixed wet screening and crushing plant and processed into various grades depending on market demand.

Plant and machinery which operated in the application area consisted of tracked excavators, wheel loaders, dump trucks, processing plant and road trucks to haul material off site. Ancillary plant such as a water bowser for dust suppression was deployed where required.

Due to the porous nature of the underlying material, water falling as precipitation percolated to ground. The existing washing plant operated by way of a closed water management system whereby the plant removed the fine material (clays /silts) with run-off water diverted to a series of settlement lagoons. The water was then recycled for washing with water lost in the aggregate replaced with water from a groundwater well located near the plant.

A significant amount of landscaping and restoration works have been completed which have included placing a layer of overburden on side slopes and the pit floor. It is proposed to restore further areas of the pit as per the landscape and restoration plan detailed in Section 13.0.

11.6 Impact Assessment

Day to day activities that were undertaken at the application site associated with overburden stripping, excavation, processing and transportation of material would have had the potential to contribute to background noise levels in the area. The following list of

plant and machinery is typical of plant which operated at the application site when operational:

- Excavators
- Fixed wet screening and crushing plant
- Mobile crusher
- Dump trucks
- Wheel loaders
- Tractor and bowser
- Road trucks

The plant listed above would have operated on an intermittent basis depending on the activity undertaken. The activities assessed below were undertaken during noise monitoring surveys which were below the LAeq level of 55dB conditioned on the pit

11.6.1.1 Overburden Stripping

Overburden was removed and stockpiled on site for restoration purposes or used for berm construction. This activity would have been short term in duration and led to an imperceptible impact.

11.6.1.2 Excavation of In-situ Material

Once the overburden was removed, the sand and gravel material was excavated and loaded directly onto a dump truck and transported to the processing plant for washing and grading. This activity would have been undertaken on a daily basis and would have resulted in an imperceptible impact. This activity would have been undertaken during noise monitoring and noise levels were below the levels recommended by the EPAs Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) and the conditioned noise level (LAeq 55dB).

11.6.1.3 Processing of Material

Material was washed and graded on site into a number of grades depending on the market requirements. The loading of material into the plant and crushing of rock would have the potential to increase noise levels resulting in a slight impact when being undertaken. This activity would have been undertaken during noise monitoring and noise levels were below the levels recommended by the EPAs Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) and the conditioned noise level (LAeq 55dB).

11.6.1.4 Transportation of Material

Vehicle movement on internal roads and off-site associated with the transport of material to market was also a source of noise as emissions which can increase rapidly in proportion to vehicle speed and traffic volume. Vehicle movement within the application site would have led to an imperceptible impact with vehicle movement on public roads having the potential to lead to slight momentary impact on sensitive receptors.

11.6.2 Cumulative Impacts

There are no other developments in the vicinity that would have lead to a cumulative impact in relation to noise. The R444 regional road is located to the north of the pit, however, levels of traffic on the road are relatively low.

There are two other sand and gravel pits located to the west of the pit. Peat extraction is also undertaken in the study area. It is unlikely that activities associated with these developments and the subject development would have lead to a cumulative impact due to the distances between each development. No in combination impacts of the sand and gravel pit in combination with other developments have been identified.

11.6.3 Unplanned Events

No unplanned events occurred during the previous operation of the pit.

11.7 Mitigation Measures

The following mitigation measures were implemented at the pit during the operational phase.

- Haul roads were maintained to a good standard in order to reduce the noise level associated with vehicles transporting material
- Regular maintenance and lubrication of plant and machinery.
- The enclosure and cladding of plant and machinery where possible.
- Minimising drop heights of material from plant and machinery.
- Avoidance of over revving where possible.
- Machinery were throttled down or turned off when not in use.

The above measures will continue to be practiced as part of the landscape and restoration phase of the pit.

11.8 Remedial Measures Proposed

No remedial measures are proposed.

11.9 Monitoring

Monitoring of noise levels will continue at 3 locations as shown on Plate 11.5 on an annual basis during landscape and restoration to ensure that noise levels are below the recommended guideline values.

Plate 11.4: Noise Monitoring Locations

11.10 Residual Impacts

It is not anticipated that there will be an adverse impact on noise quality in the vicinity of the application site provided that various measures and best practice is applied during landscaping and restoration of the pit.

11.11 Technical Difficulties

No technical difficulties were encountered during the assessment.

11.12 References

Department of Communities and Local Government (1993) Minerals Planning Guidance 11 – The Control of Noise at Surface Mineral Workings (MPG-11)

Department of the Environment, Heritage and Local Government (2004) Quarries and Ancillary Activities: Guidelines for Planning Authorities

DEFRA (2005) Update of Noise Database for Prediction of Noise on Construction and Open Sites

EPA (2006) Environmental Management Guidelines Environmental Management in the Extractive Industry (Non-Scheduled Minerals)

EPA (2012) Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)

EPA (2016) Updated Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)

BS5228 (2009) Code of Practice for Noise Control on Construction and Open Sites. Part 1: Noise

Safety Health and Welfare at Work (Control of Noise at Work) Regulations 2006 (S.I. No. 371 of 2006)

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12.0 Traffic

The purpose of this chapter is to assess the traffic levels associated with the historical operation of a sand and gravel pit located at Clonfinlough, Co. Offaly.

12.1 Methods

Traffic levels associated with the development were reviewed as part of the assessment. Various documents were also reviewed in relation to the development including existing planning permissions attached to the site. Reference was made to the following documents as part of the compilation of this section.

- National Roads Authority (NRA) Traffic and Transport Assessment Guidelines, May 2014.
- Offaly County Development Plan 2014-2020
- Department of Transport Traffic Signs Manual, 2010.
- NRA Traffic Counter Data.
- Road Safety Authority (RSA) Ireland Road Collision Interactive Map (http://www.rsa.ie/RSA/Road-Safety/Our-Research/Ireland-Road-Collisions/).
- Site related traffic counts.

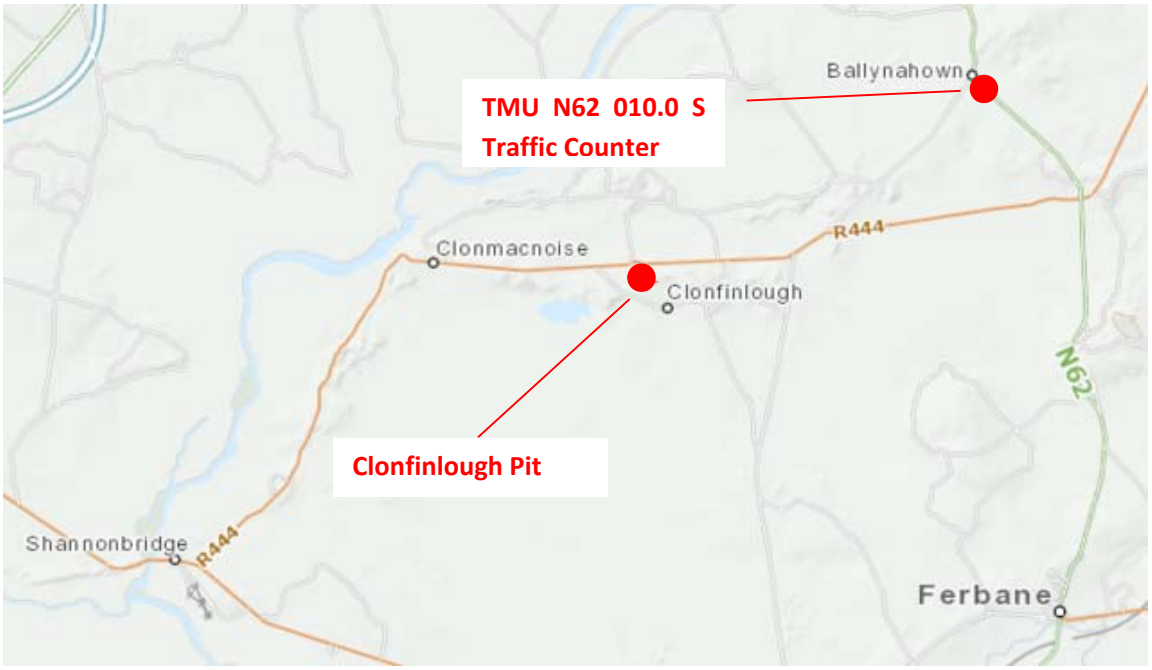
A traffic count was undertaken on the 25th February 2016 as part of a previous assessment to establish traffic levels associated with the R444 regional road and the traffic associated with the sand and gravel pit. NRA Traffic Count Data figures were examined to establish traffic on the road network in the vicinity.

12.2 Existing Environment

12.2.1 Site Location and Network Summary

The sand and gravel pit is located in the townland of Clonfinlough, Co. Offaly which is located approximately 8.7km north west of Ferbane and 8.6km north east of Shannonbridge. Plate 12.1 below details the location of the sand and gravel pit in the context of the national and local road network. Access to the pit is gained via an existing entrance off the R444 Regional Road which links Shannonbridge to the N62 south of Ballinahown village.

Plate 12.1: Location of Sand and Gravel Pit



12.2.2 Site Access

The pit is accessed is via a simple direct access off the R444 regional road. The access consists of a gated entrance which was closed and locked outside operation hours. Plate 12.2 details a photo of the pit entrance.

Plate 12.2: Site Entrance

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12.2.1 Traffic Survey

Data from the nearest NRA traffic recording station located on the N62 south of Ballinahown Village (Plate 12.1) was reviewed as part of the assessment and is detailed in Table 12.1 below.

Table 12.1: AADT for Station TMU N62 010.0 S

	2019	2018	2017	2016	2015	2014
AADT	4,558	4,456	4,702	4,561	4,376	4,194
%HGV	5.6%	5.5%	5.5%	5.3%	5.3%	5.7%
Coverage	47.6%	99.7%	98.7%	99.7%	99.7%	99.7%

12.2.2 Traffic Generation

Vehicles used to transport product to market predominantly consisted of articulated and 8/10 wheel road trucks owned by the operator and contract hauliers.

Vehicles exiting the site and transporting material to market would have used the R444 Regional Road which the pit gains access from. According to the applicant, the majority of vehicles would have turned right at the entrance and travelled towards the N62 which is the main transport route to Athlone the main market for material.

A previous planning application submitted in 2003 (P03192) for an area to the south of the pit was accompanied by an Environmental Impact Statement (EIS). The traffic section of the EIS which accompanied the application stated that the traffic generated by the development was anticipated to be approximately 125 lorry loads per week or approximately 6 vehicle movements per hour (3 loads per hour) which is in the region of 22 loads/day.

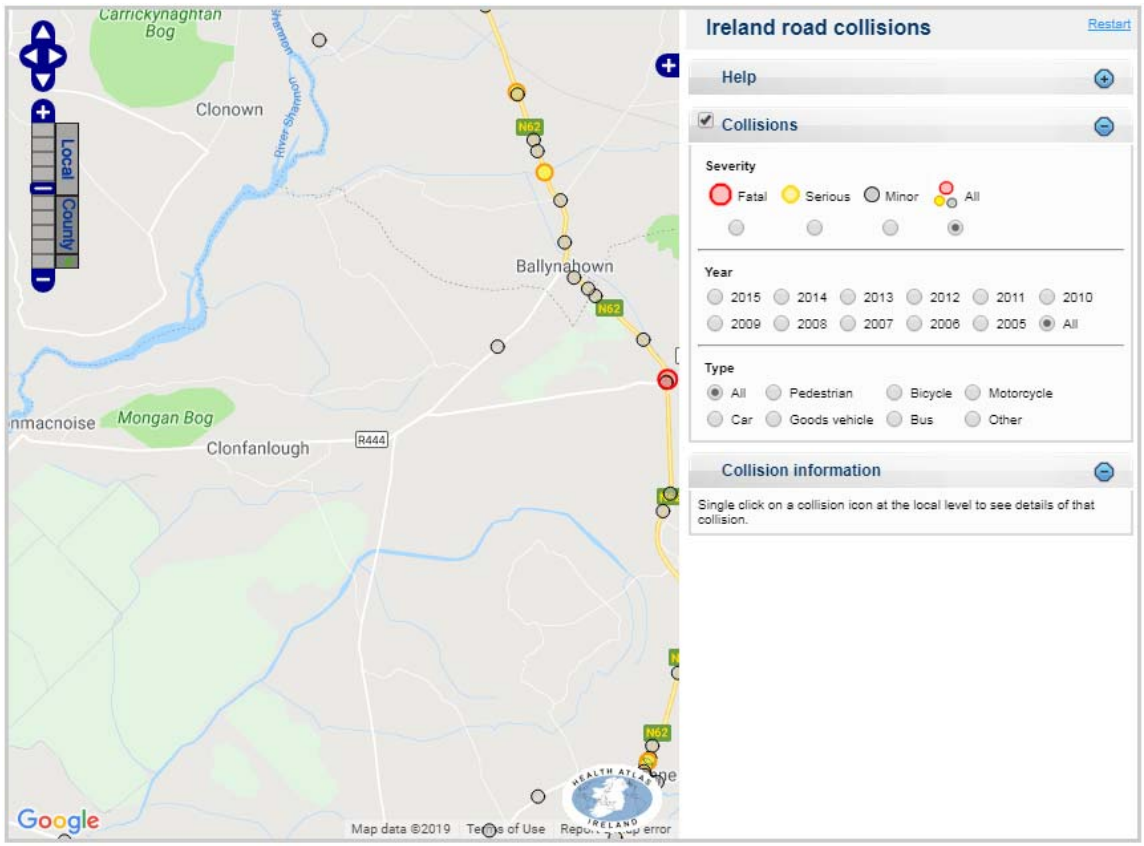
The Section 261 file and conditions state that the traffic levels at the pit at the time of registration in 2005 were 30 to 35 loads per day. This would have coincided with peak demand for construction material associated Ireland's housing boom.

Traffic levels would have reduced dramatically post 2008 due to the downturn in the construction industry and demand for quarry product with the average loads per day in the region of 5. Therefore the traffic levels post 31st December 2009 were on average 5 loads/day.

12.2.3 Road Safety

An investigation of road collision data from the Road Safety Authority website (source: http://www.rsa.ie/RSA/Road-Safety/Our-Research/Ireland-Road-Collisions/) indicates that there was no collisions in the vicinity of the pit. One fatal collision occurred at the junction of the R444 and the N82 in 2008. This was a single vehicle collision which occurred between 0300 and 0700 on a Saturday which was outside the operating hours of the pit.

Plate 12.3: RSA Collision Statistics



12.3 Characteristics of the Development

The existing pit has an overall area of approximately 15.34 hectares and consists of an area of 0.97 ha. which was subject to extraction of material after expiry of planning permission on 31st day of December 2009. This extraction area is contained within the overall quarry area of 15.34 hectares consisting of areas ancillary to the extraction area (0.97 Ha.)

The ancillary areas of the pit consists of previously extracted areas, processing infrastructure and stockpiling areas, vehicle parking areas and areas used for the storage of overburden pending restoration.

Overburden material was removed prior to excavation of the underlying reserve and stored pending restoration works. The sand and gravel material was excavated, loaded onto dump trucks, transported to the fixed wet screening and crushing plant and processed into various grades depending on market demand.

Plant and machinery which operated in the application area consisted of tracked excavators, wheel loaders, dump trucks, processing plant and road trucks to haul material off site. Ancillary plant such as a water bowser for dust suppression was deployed where required.

Due to the porous nature of the underlying material, water falling as precipitation percolated to ground. The existing washing plant operated by way of a closed water management system whereby the plant removed the fine material (clays /silts) with run-off water diverted to a series of settlement lagoons. The water was then recycled for washing with water lost in the aggregate replaced with water from a groundwater well located near the plant.

A significant amount of landscaping and restoration works have been completed which have included placing a layer of overburden on side slopes and the pit floor. It is proposed to restore further areas of the pit as per the landscape and restoration plan detailed in Section 13.0.

12.4 Impact Assessment

12.4.1 Carrying Capacity

The development would have generated a number of traffic movements based on the transport of material to market and staff travelling to and from work. As stated above, the average loads/day at peak production would have been in region of 30 to 35 loads/day as conditioned under Section 261. This would have dramatically reduced in response to the economic downturn and the knock on impact on the construction industry.

The traffic levels post 31st December 2009 associated with the development were in the region of 5 loads/day which was significantly lower than that associated with peak production. At this low level, it is not anticipated that traffic associated with the

development would have impacted on the carry capacity of the local road infrastructure. Staff to travelling to and from site would have also generated a minor source of traffic.

12.4.2 Road Safety

The road collision data from the Road Safety Authority website shows that there were a number of collisions on the N62 road and one on the local road to the north east of the site. The applicant has informed us that none of the collisions registered on the RSA website related to vehicles associated with the pit.

12.4.3 Do-nothing Scenario

The applicant is submitting this application in order to regularise the pit and to restore in line with the landscape and restoration plan. No further extraction is proposed at the pit and there will be no further traffic movements associated with the transport of material from the pit to market. In the event that Substitute Consent is not granted, the outcome will be the same in that there will be no further extraction of material and transport of material to market leading to pit related traffic. The pit will be restored as per a restoration proposal was agreed with Offaly Co. Co

12.5 Mitigation Measures

The following measures were practiced in order to reduce the impact on local road infrastructure and users.

- Vehicles adhered to the legal weight restrictions.
- All vehicles leaving the site were clean and free of dirt and grit.
- Regular inspections of the access road and roads used by quarry traffic were undertaken to ensure that they are maintained in tidy manner.

12.6 Remedial Measures

No remedial measures are proposed.

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13.0 LANDSCAPE AND RESTORATION

13.1 Introduction

This chapter of the remedial EIAR assesses the landscape and visual impact associated with the historic development on the surrounding landscape in the vicinity of the sand and gravel pit. Methodologies used to assess the landscape and visual impacts are outlined and measures are proposed where required to offset any impacts identified. A landscaping and restoration plan is proposed which will be implemented subject to granting Substitute Consent.

A landscape and visual impact assessment combines the magnitude of change with the sensitivity of the landscape to the development, which provides a measure of the significance of the historical impact. The acceptability of a development is determined by the extent to which the long-term landscape and visual effects are significant. Understanding the character, quality and value of the landscape prior to the existence of the development determines the sensitivity of that landscape to accommodate change that would have occurred through development. The two principal factors determining the visual impact of a development are the sensitivity of the location or receptor and the scale or magnitude of the development.

Figures 13.1 to 13.4 presented at the end of this chapter detail existing and proposed layouts and sections of the application site.

13.2 Methodology

A detailed landscaping assessment was undertaken to assess the impact of the historical development on the surrounding landscape. This involved undertaking a visual impact assessment of the area and a desk-based study to gather information on the existing landscape, visual resource, planning context and landscape designations. Information has been gathered from the following sources:

- Ordnance Survey Ireland 1:2,500 maps and 1:50,000 maps
- Satellite imagery (1995 – latest available)
- Offaly County Development Plan 2014 – 2020

The following methodologies for the assessment of landscape character, landscape sensitivity and visual impact have also been used in the preparation of this report:

- Department of the Environment (2000) Landscape and Landscape Assessment Guidelines.

- Landscape Institute and the Institute of Environmental Management and Assessment (2002) 'Guidelines for Landscape and Visual Impact Assessment' by the (Second Edition).
- Landscape Institute and the Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Assessment (Third Edition).
- EPA (2017) Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EIAR).

Field observations were undertaken to assess the landscape character and structure of the pit and its surroundings. A visual impact assessment of the pit was undertaken from publicly accessible viewpoints in the vicinity. The Landscape Assessment contained in the County Offaly Development Plan was also consulted as part of the assessment. The county assessment is utilized during the decision making process in relation to development to ensure that protection of the environment, natural resources and heritage.

13.2.1 Landscape Assessment Criteria

When assessing the potential impacts on the landscape resulting from a development, the following criteria are considered:

- Landscape character, value and sensitivity
- Magnitude of likely impacts
- Significance of landscape effects

The sensitivity of the landscape to change is the degree to which a particular landscape receptor (Landscape Character Area (LCA) or feature) can accommodate changes or new features without unacceptable detrimental effects to its essential characteristics. Landscape Value and Sensitivity is classified following the criteria outlined in Table 13.1.

Table 13.1: Landscape Value and Sensitivity

Sensitivity	Description
High	A landscape of particularly distinctive character, susceptible to relatively small changes.
Medium	A landscape of moderately valued characteristics reasonably tolerant to change.
Low	A relatively unimportant landscape, the nature of which is potentially tolerant to substantial change.

The magnitude of a predicted landscape impact is a product of the scale, extent or degree of change that is likely to be experienced as a result of the development. The magnitude

takes into account whether there is a direct physical impact resulting from the loss of landscape components and/or a change that extends beyond the site boundary that may have an effect on the landscape character of the area (Table 13.2).

Table 13.2: Magnitude of Landscape Impacts

Magnitude of Impact	Description
High	Notable change in landscape characteristics over an extensive area and/or permanent long-term change.
Medium	Moderate changes in a localised area and/or medium-term change.
Low	Small change in any components and/or short-term/temporary change.

The significance of a landscape impact is based on a balance between the sensitivity of the landscape receptor and the magnitude of the impact. The significance of landscape impacts is arrived at using the matrix in Table 13.3.

Table 13.3: Landscape Impact Significance Matrix

Magnitude of Landscape Resource Change	Landscape Sensitivity		
	Low	Medium	High
No Change	No Change	No Change	No Change
Low	Slight	Slight/Moderate	Moderate
Medium	Slight/Moderate	Moderate	Moderate/Substantial
High	Moderate	Moderate/Substantial	Substantial

Note that potential beneficial landscape impacts are not accounted for in the tables and matrix above. This is on the basis that quarrying activities are very unlikely to generate beneficial landscape impacts. In the rare instance that this might occur, perhaps by facilitating the rehabilitation of a degraded landscape, the benefits will be discussed in the assessment and the significance of the impact would default to the lowest end of the range (Imperceptible).

13.2.2 Visual Impact Assessment Criteria

As with the landscape impact, the visual impact of the development is assessed as a function of sensitivity versus magnitude, in this instance the sensitivity of the visual receptor, weighed against the magnitude of the visual effect.

13.2.2.1 Sensitivity of Visual Receptors

Unlike landscape sensitivity, the sensitivity of visual receptors has an anthropocentric basis. It balances the visual susceptibility of the viewer against the value of the view on offer. The susceptibility of a viewer to changes in a particular view relates to the occupation or activity they are engaged in at that location and whether views of the surrounding landscape are an important aspect of that occupation or activity e.g. hill walkers verses commuters (Table 13.4). By comparison, the value of the view relates to the visual setting of the viewer and whether this is recognised through county designations and guidebooks or is likely to just have local value.

Table 13.4: Examples of Visual Receptor Sensitivity at Various Levels

Sensitivity	Examples
High	• Users of an outdoor recreation feature which focuses on the landscape • Valued views enjoyed by the community • Tourist visitors to scenic viewpoint • Occupiers of residential properties with a high level of visual amenity
Medium	• Outdoor sports or recreation pass-times which do not offer or focus attention on landscape • Occupiers of residential properties with a medium level of visual amenity
Low	• Regular commuters • People at place of work • Occupiers of residential properties with a low level of visual amenity

13.2.2.2 Magnitude of Visual Impact

The magnitude of visual effects is determined on the basis of two factors; the visual presence of the development and its effect on visual amenity. Visual presence is something of a quantitative measure relating to how noticeable or visually dominant the proposal is within a particular view. This is based on a number of aspects beyond simply scale in relation to distance. Some of these include the extent of the view as well as its complexity and the degree of movement experienced. The backdrop against which the development is presented and its relationship with other focal points or prominent features within the view is also considered. Visual presence is essentially a measure of the relative visual dominance of the development within the available vista (Table 13.5).

Table 13.5: Magnitude of Visual Impact

Criteria	Description
High	Total loss or alteration to key elements/features/characteristics of the existing landscape or view and/or introduction of elements considered totally uncharacteristic when set within the attributes of the receiving landscape or view.
Medium	Partial loss or alteration to key elements/features/characteristics of the existing landscape or view and/or introduction of elements that may be prominent but not necessarily substantially uncharacteristic when set within the attributes of the receiving landscape/view.
Low	Minor loss or alteration to key elements/features/characteristics of the existing landscape or view and/or introduction of elements that may not be uncharacteristic when set within the attributes of the receiving landscape/view.
No Change	Very minor loss or alteration to key elements/features/characteristics of the existing landscape or view and/or introduction of elements that are not uncharacteristic when set within the attributes of the receiving landscape/view.

13.2.2.3 Significance of Visual Impact

As stated above, the significance of visual impacts is a function of visual receptor sensitivity and visual impact magnitude. This relationship is expressed in the significance matrix in Table 13.6 below.

Table 13.6: Visual Impact Significance Matrix

Magnitude of Visual Resource Change	**Visual Sensitivity**		
	Low	**Medium**	**High**
No Change	No Change	No Change	No Change
Low	Slight	Slight/Moderate	Moderate
Medium	Slight/Moderate	Moderate	Moderate/Substantial
High	Moderate	Moderate/Substantial	Substantial

13.2.2.4 Assessments of Impacts

The classification of an impact results from assessing the following parameters:

- The scale and nature of any visual impact;
- The visibility of any visual impact;
- The potential number of receptors affected (i.e. residences, roads, tourists, etc.).

The assessment of visual impacts of the application area can be determined by studying photographs of current views from the main road and also the by-roads around the

development, observing the surrounding landscape and its form, and the examination of the local land use and location of local residences.

The visual impact on the surrounding countryside is affected by:

- The scale and outline of the pit.
- The exposure and appearance of the sand and gravel pit and its interaction with its environment.
- The scale and character of stockpile areas.

13.2.2.5 Zone of Visual Influence

The ZVI is the area within which views of the development can be obtained. The extent of the ZVI is determined primarily by the topography of the area. The ZVI is refined by field studies to indicate where relevant buildings, woodlands, berms, hedges or other local features obscure visibility from the main roads, local viewpoints/landmarks, settlement, etc. It is through such field studies that prediction of visual impacts takes place within the ZVI. A series of representative viewpoints were selected within the ZVI to illustrate typical views towards the existing sand and gravel pit.

13.3 Landscape Appraisal

County Offaly largely comprises a flat landscape which is particularly typified by its extent of boglands. It also contains an esker landscape which encapsulates the geographical change that emerged following the ice age and merits protection given its unique importance in providing scientific, recreational and amenity value. The Slieve Bloom Mountain uplands area, located in the southwest of the county, is the only substantial upland area within the County. Offaly's landscape is further marked by its ancient religious traditions and its monastic settlements. The Shannon River flows along the western boundary of the county and coupled with its callows area, its landscape is unique and of importance locally, nationally and internationally.

The sensitivity of a landscape is the measure of its ability to accommodate change or intervention without suffering unacceptable effects to its character and values. The sensitivity of the landscapes of County Offaly varies and is thereby classified within the following sensitivity classes: Low, Moderate and High Sensitivity.

Landscape considerations are an important factor in all land use policy for the county. This ensures that a positive view of developments is undertaken whilst maintaining respect for

the environment and the County's landscape, having regard to the principles of sustainability.

The majority of the application site is located in an area which is classified as having 'High' sensitivity with part of the existing development located in a 'Low' sensitivity area. The 'High' sensitivity is due to the presence of Esker features in the area. In general terms, the planning, design and management implications for 'High' and 'Low' sensitivity areas located in the vicinity of the pit are outlined in Tables 13.7 and 13.8.

Plate 13.1: Landscape Sensitivity Areas

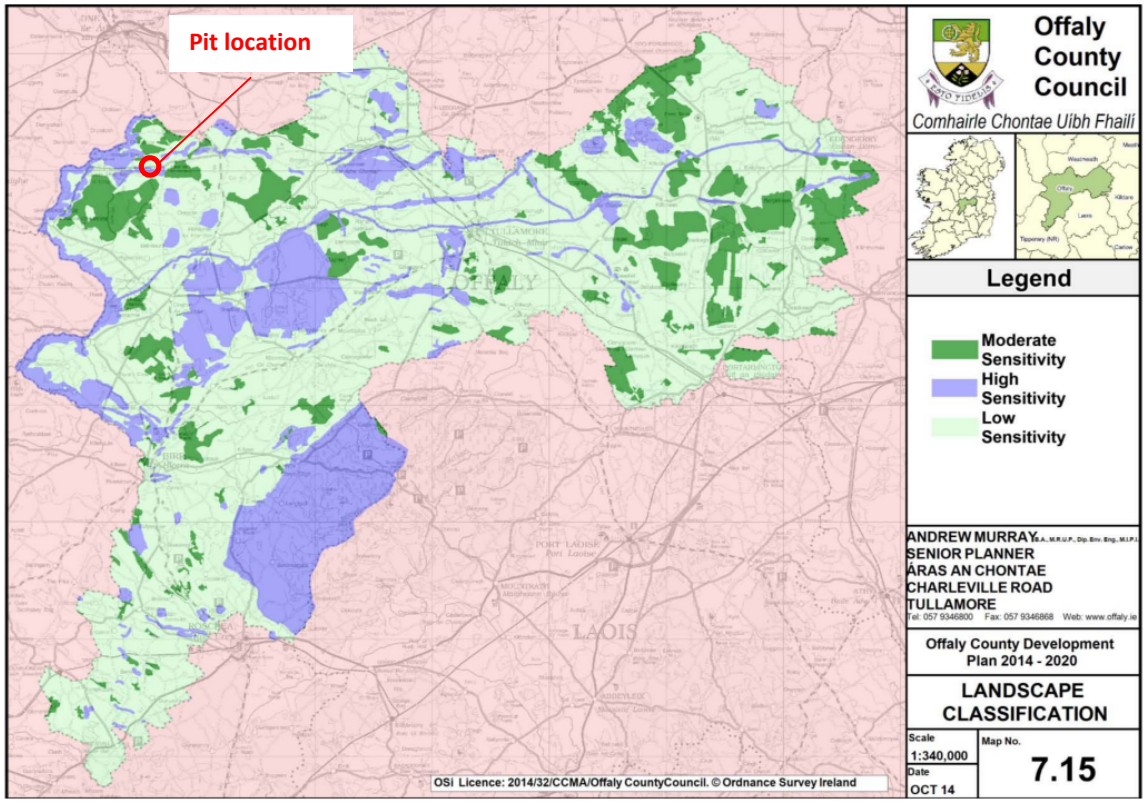


Table 13.7: Low Sensitivity Areas Characteristics and Sensitivity

Low Sensitivity Areas
Rural and Agricultural Areas
Characteristics: • County Offaly is largely a rural county which comprises of a predominantly flat and undulating agricultural landscape coupled with a peatland landscape. Field boundaries, particularly along roadside verges which are primarily composed of mature hedgerows typify the county's rural landscape.
Sensitivities: • These areas in general can absorb quite effectively, appropriately designed and located development in all categories (including: telecommunication masts and wind energy installations, afforestation and agricultural structures). • Due to the rural nature of the area, development shall be screened by appropriate natural boundaries that are sympathetic to the landscape generally, where possible. • New housing proposed should respect the Councils rural housing design guidelines, coupled with conformity with development standards.

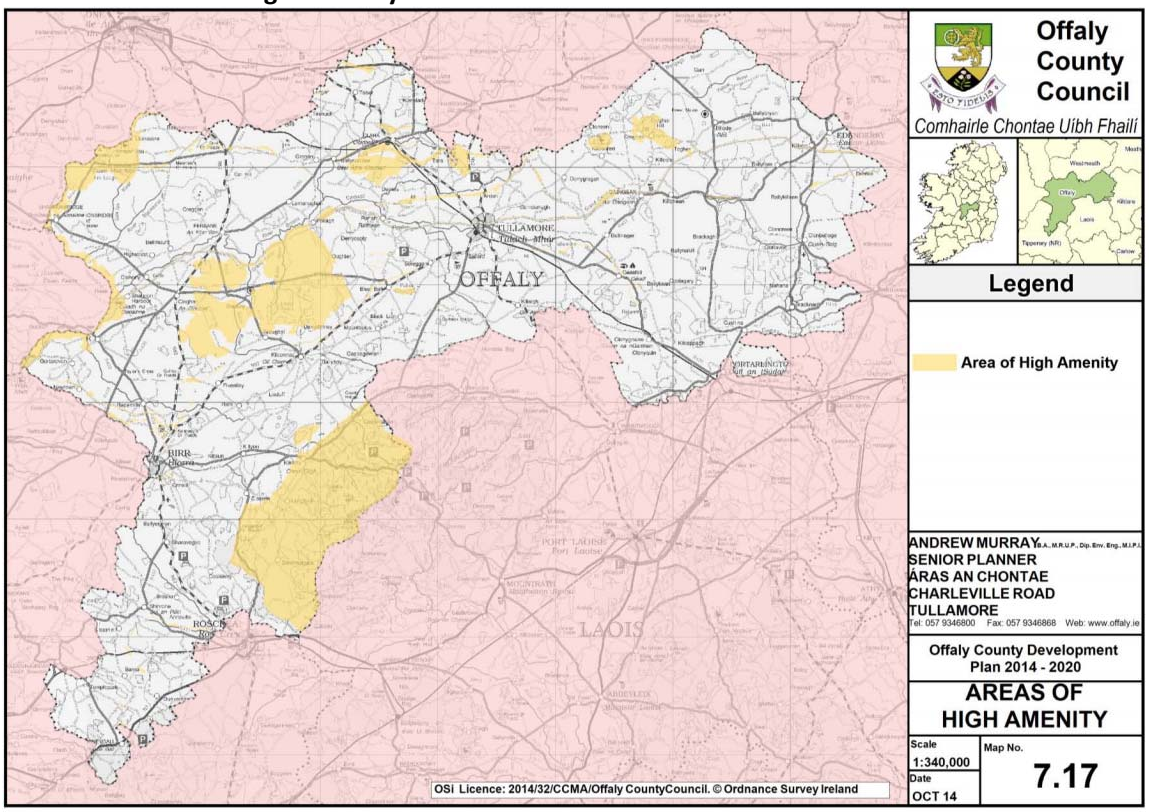
Table 13.8: High Sensitivity Areas Characteristics and Sensitivity

High Sensitivity Areas
G) THE ESKER LANDSCAPE **Characteristics** • Eskers were built up under the ice cap about ten thousand years ago and also have archaeological significance, as they formed the early highways in Ireland. • In old Irish, 'eiscir' means divide while 'riada' means road. **Sensitivities** • The eskers have geomorphologic, scientific, historical, cultural, recreational and amenity value and uniqueness. • In particular, the esker system north of Clara bog is critically important, as it is most likely the source of nutrient rich water, which feeds the bogs soak systems. • Eskers are also of economic importance and there is a need to balance the conservation of the important landscape features associated with eskers providing educational / tourism and recreational potential with the requirements of aggregate extraction and economic development. Hence, the esker landscape is highly sensitive to any future development and the opening up of new pits for sand and gravel extraction will be strongly resisted (refer to Chapter 2, Economic Development Strategy).
H) ARCHAEOLOGICAL AND HISTORICAL LANDSCAPES **Characteristics** • County Offaly is rich in landscapes of archaeological and historic interests as is shown in Map 7.16. This ranges from large ecclesiastical sites such as Clonmacnoise and Durrow Abbey to archaeological features such as the Durrow High Cross. • Section 7.18, Built Heritage of this plan provides further policies and objectives concerning the county's archaeological and historical landscapes. These primarily include Clonmacnoise, Durrow, Killeigh, Leamonaghan and Rahan. **Sensitivities** • These landscapes are highly sensitive to new developments, which could potentially damage the historical character and the cultural and social importance of the area. • The Council shall endeavour to ensure that planning applications for development, refurbishment and restoration works etc. within close proximity to these areas are sympathetic to the sensitive nature of the landscape.

13.3.1.1 Amenity Areas

Areas of High Amenity (AHA) are identified in the County Development Plan to protect and enhance areas of scenic and amenity value in the County Offaly which are worthy of special protection in order to preserve their uniqueness and amenity value. These designations are additional to statutory environmental designations National and European which may overlap these AHAs.

Plate 13.2: Areas of High Amenity



The application site extracted sand and gravel from the Clonfinlough Esker which is a southern spur off the main Eiscir Riada system and which is designated as an Area of High Amenity. This extraction from the pit was authorised by way of being a Pre-1963 development and by two subsequent planning applications; P91/049 and P03/191. In granting both planning permissions, Offaly Co. Co. would have taken into consideration the compatibility of the planning proposals with regards to the Area of High Amenity which traverses the site.

Only 0.064 Ha. of the 0.97 Ha. area (6.6%) is located within the AHA boundary and this area had been subject to sand and gravel extraction prior to 31st December 2009 in line

with previous authorisations attached to the pit. Therefore the development undertaken post 31st December 2009 did not result in an impact on the AHA.

Eskers

The Council recognises the unique importance of Offaly's Esker Landscape deriving from its geological, zoological, botanical and scientific value. An Offaly Esker Study published in 2006 is a valuable source of information regarding the existing eskers in part of the county. There are twenty esker systems in Offaly containing 208 segments. Each esker system comprises a landform or series of landforms (esker segments) having a single process history, in a specific zone. The esker system covers over 4,000 acres in Offaly (Offaly Esker Study, 2006). The Eiscir Riada which traverses the north-western corner of County Offaly in a more or less continuous line of Eiscir Riada from Shannonbridge to Clonmacnoise and on to Clara, Durrow and Rahugh (County Westmeath), is worthy of conservation due to its geomorphologic, scientific, historical, recreational and amenity value and uniqueness.

As stated above, although a limited portion of the 0.97 Ha. area is located within the AHA boundary, this area was disturbed and subject to extraction as part of the previous planning permission attached to the area of the pit. Therefore the development undertaken post 31st December 2009 did not result in an impact on the AHA.

Clonmacnoise

Clonmacnoise is one of Ireland's foremost national monuments and is of international importance as a spiritual, historic, archaeological and cultural centre. The unique atmosphere and attractiveness of Clonmacnoise derives not only from the monastic site itself but its relationship to the River Shannon and the callows together with the sense of enclosure provided by the eskers. The effect is heightened by the unfolding of the site as it is approached either from the river or any of the three approach roads. The Council is conscious of the fact that the interaction of all these elements contributes significantly to the impact of the area and that it is necessary to preserve and protect these fully in order to retain the unique and special character of Clonmacnoise. In addition to the monastic site, the area surrounding Clonmacnoise, including Mongan Bog, Fin Lough and Clonmacnoise Callows, are areas of international importance.

Areas of High Amenity Objective

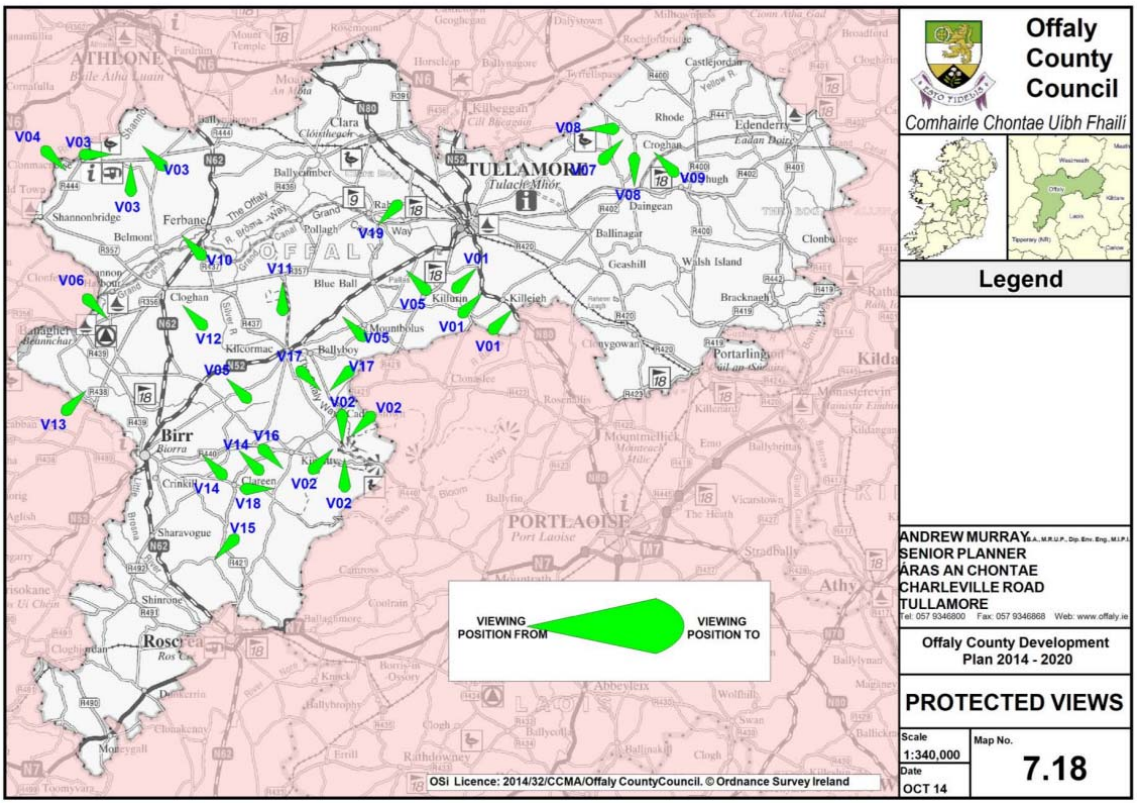
AHAO-01 It is an objective of the Council to protect and preserve the county's primary areas of high amenity namely the Slieve Bloom Mountains, Clonmacnoise Heritage Zone, Durrow High Cross, Abbey & surrounding area, the River Shannon, Lough Boora Parklands,

Grand Canal, Croghan Hill, Raheenmore Bog, Pallas Lake, Clara Bog and Eskers, Eiscir Riada and other eskers.

13.3.1.2 Views and Prospects

The designation of Areas of High Amenity and scenic amenity routes within County Offaly provide a basis for the protection of views and prospects of certain visually vulnerable features. There are 19 different individual views and prospects identified in the County Development Plan (Plate 13.3) which warrant protection within the county. The application site is located within the vicinity of designated view (V03). However, having undertaken a visual assessment of the pit, views of the pit from publically accessible locations are limited.

Plate 13.3: Co. Offaly Views & Prospects



13.3.1.3 Designated Sites

A review of the Natura 2000 network shows that the pit is located in the vicinity of two Natura 2000 sites (Mongan Bog SAC & SPA and Fin Lough SAC). The application site is located adjacent to the Clonfinlough pNHA.

13.4 Existing Environment

The existing sand and gravel pit is located in the townland of Clonfinlough, Co. Offaly which is located approximately 6.3km south west of Ballinahown village, 8.7km north west of Ferbane and 8.6km north east of Shannonbridge. The existing pit has an overall area of approximately 15.34 hectares and consists of a Pre-63 area and areas which were authorised by way of two separate planning permissions. Material was extracted by excavators and was processed into various grades depending on market demand at the processing plant on site.

The study area is relatively flat with slight undulations which may be attributed to glacial events at the end of the last Ice Age, around 12,000-13,000 years ago. The topography of the sand and gravel pit varies as a result of extraction undertaken to date. The pit is located on an esker feature composed of a narrow ridge of sand and gravel which more or less runs in a continuous line from Shannonbridge to Clonmacnoise and onto Clara, Durrow and Rahugh, Co. Westmeath and dominates much of the landscape in the north west of the county. Existing berms and hedgerows in place around the boundary of the pit screen the pit from public view at the majority of locations. Access to the pit is gained via an existing entrance off the R444 Regional Road which links Shannonbridge and Ballinahown.

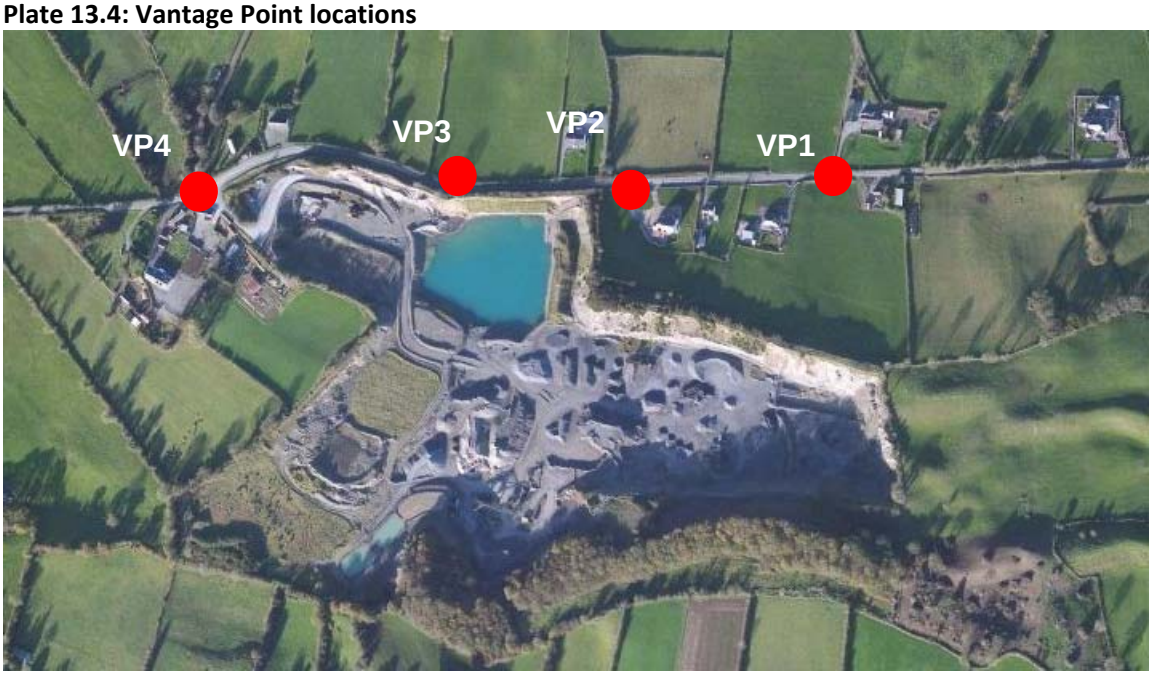
Land surrounding the application site consists predominantly of agricultural land which is subject to livestock grazing and areas of peatland which are subject to peat extraction. The area is sparsely populated with one off dwellings and farmhouses located along roads in the vicinity of the site.

Sand and gravel extraction undertaken at the site has resulted in the creation of a void and alteration of the natural topography of the site. The applicant does not propose to extract any further material from the pit. A landscape and restoration plan for the entire pit is proposed as part of the application.

13.4.1 Vantage Point Photographic Survey

The vantage points were chosen to give a representative sample of views of the existing development within the landscape. The viewpoints have been chosen to give a representative sample of views of the development within the landscape to illustrate the impact on local residential properties and on protected views, where relevant. 4 No. vantage points were chosen which are depicted below and illustrated on Plate 13.4. Each vantage point is detailed below with a brief description of the view from each location.

Plate 13.4: Vantage Point locations



Vantage Point 1 – North of site along R444 Regional Road

Vantage Point 1 shows a view from the north of the pit from the R444. As seen from the photo, the land rises towards the boundary of the gravel pit. The trees present on the esker at the southern boundary of the pit are visible to the left of the photo. However, the pit is not visible.

Vantage Point 2 – North of site along R444 Regional Road

Vantage Point 2 shows a view from the north of the pit further east along the R444 road. The existing vegetation left in place along the boundary fence aids in screening the pit.

Vantage Point 3 – North of site along R444 Regional Road

Vantage Point 3 shows a view from the north of the pit further east along the R444 road. As seen from the photo, existing vegetation aids in screening the site from public view.

Vantage Point 4 – Entrance to site off R444 Regional Road

Vantage Point 4 shows a view of the entrance to the pit which is well landscaped. The pit is well screened at the entrance due to the alignment of the entrance road to the site.

13.4.2 Landscape Impact Assessment

Based on the field survey and reference to the current Offaly County Development Plan, the landscape value of the study area has been given a rating of 'High'. While previous sand and gravel extraction operations at the pit have altered the landform and vegetation cover, the magnitude of change in the landscape as a result of previous development has been assessed as 'Medium'. As defined by Table 13.3, the significance of landscape impacts of the development as a result of previous extraction is assessed as 'Moderate/Substantial'. The losses of existing vegetation as a result of extraction of sand and gravel will be offset by the proposed landscape and restoration plan for the pit.

13.4.3 Visual Impact Assessment

The visual assessment shows that the application site is well screened due to existing hedgerows, field boundaries and the topography of the study area. Based on the visual impact assessment criteria detailed above, an assessment of each vantage point location was undertaken which is summarised below in Table 13.9.

As illustrated in Table 13.9, the assessment of the significance of visual impacts on the vantage points is based on a combination of the visual sensitivity and magnitude of visual changes to the viewpoint. While sand and gravel extraction has altered the landscape to date, the assessment of the existing visual environment and the impact of extraction and its various component parts on visual receptors have been assessed. The historic sand and gravel extraction did not result in an increase in visibility of the pit. Therefore the magnitude of visual impact is assessed as 'Low'.

Table 13.9: Visual Impacts with Mitigation

VP No.	Viewpoint Sensitivity	Magnitude of Visual Impact	Visual Impact Significance	Remedial Measures
1	Low	Low	Slight	None
2	Low	No Change	No Change	None
3	Low	No Change	No Change	None
4	Low	No Change	No Change	None

13.4.4 Tourism, Recreation and Amenity

The previous development of the pit did not result in a significant increase in visibility of the pit. The existing entrance is not visible from any vantage points. Therefore, it is concluded that there was no impact on amenity or tourism of the area as a result of past development.

13.5 Landscaping and Restoration Measures

It is noted that landscape and restoration works have been undertaken in areas of the pit as illustrated in Plates 13.5 – 13.6 and it is proposed to restore the remaining areas. A landscape and restoration plan has been compiled for the existing pit. The following matters were taken into consideration as part of the restoration plan:

- Habitat type and species local to the site.
- Planning requirements and applicable legislation.
- Interaction with the surrounding environment.
- Health and safety considerations.
- Nature and extent of aggregates extracted.
- Availability of suitable restoration materials.

This section outlines the work to be carried out in a phased programme to ensure that the restoration of the sand and gravel pit lands will be implemented in accordance with the landscaping proposals. The restoration of the pit is divided into the following 3 phases:

- Phase I – Landscaping of berms.
- Phase II – Restoration of side slopes.
- Phase III – Final restoration of areas.

13.5.1 Phase I – Landscaping of Berms

Berms have been constructed around the boundary of the pit which have been allowed to regenerate with indigenous vegetation over time. Where required, these will be reshaped and covered with overburden to stimulate growth of vegetation. Shrubs and trees will be planted where required.

13.5.2 Phase II – Restoration of Side Slopes

To increase the biodiversity at the site, side slopes will be graded to a 70 degrees and a layer of overburden placed on them. The side slopes will then be allowed to vegetate naturally. This has proven successful to date as illustrated on Plate 13.5 to 13.7. It is

proposed to leave areas of side slopes bare in order to allow sand martins to nest as present in the north western are of the pit.

Plate 13.5: Restored Side Slopes Eastern Boundary

Plate 13.6: Retired Side Slopes North Eastern Boundary

Plate 13.7: Restored Side Slopes North Eastern Boundary

13.5.3 Phase III – Restoration of Pit Floor

The restoration of the pit floor will consist of the following:

1. Any stockpiled aggregate material and plant and machinery will be removed from the application site.
2. All site boundaries will be secured.
3. The pit excavation area will be levelled out, covered with a layer of overburden, seeded with grass-seed and restored to agricultural grassland.

The above restoration will ensure that the site sets back into the landscape reducing the impact associated with extraction of sand and gravel to date.

13.5.4 Additional Measures

The land landscape and restoration plant will serve to mitigate the impact associated with previous activity at the pit and will be implemented on granting of substitute consent. As part of the substitute consent application, measures will be put in place to reduce loss of biodiversity and enhance the conservation value of the area and reduce environmental impacts of extraction activity on the surrounding area. These include the following:

- The use of native species will support a wider range of insects and animals and will contribute more to the ecology of the region.

- This added vegetation will also enhance the local wildlife corridor, connecting the site with the surrounding landscape.
- Using plants adapted to or tolerant of the existing site conditions will reduce the need for expensive remedial measures (such as replacing failed plants).
- Hedgerows and tree lines along the site perimeter will be retained.
- Planting of trees and shrubs where required to replace dead plants will take place during the dormant seasons. Bare-rooted plants transplant most successfully during their dormant season, this is usually between November and March/April. Avoiding times when the ground is actually frozen, this will mean either autumn or spring planting.
- Planting areas will be suitably fenced to exclude farm stock, rabbits, sheep and other browsing animals. It may be more economical to protect each tree individually rather than fence the whole area.
- No herbicides, pesticides or fertiliser will be applied to the berm.

13.6 Monitoring

A designated person from the project management team will have overall responsibility for ensuring that all landscape and restoration operations are carried according to an agreed landscape and restoration plan.

13.7 Decommissioning and After Use

The main feature of the worked out area will be an agricultural grassland field and all preparations for the formation of the agricultural grassland are designed to make it support plant and animal life along its perimeters.

Habitats and species that are attracted to a site should be reflective of the local habitat and species in order to restore a natural ecological balance. When creating habitats, it is beneficial to create a new habitat block close to a similar habitat as this will assist colonisation by desirable species and will allow larger populations to inhabit the area.

13.8 Residual Impacts

The proposed landscaping and restoration works will mitigate the impact associated with sand and gravel extraction activities.

13.9 Technical Difficulties

No technical difficulties were encountered.

13.10 References

Offaly County Council Development Plan 2014 – 2020.

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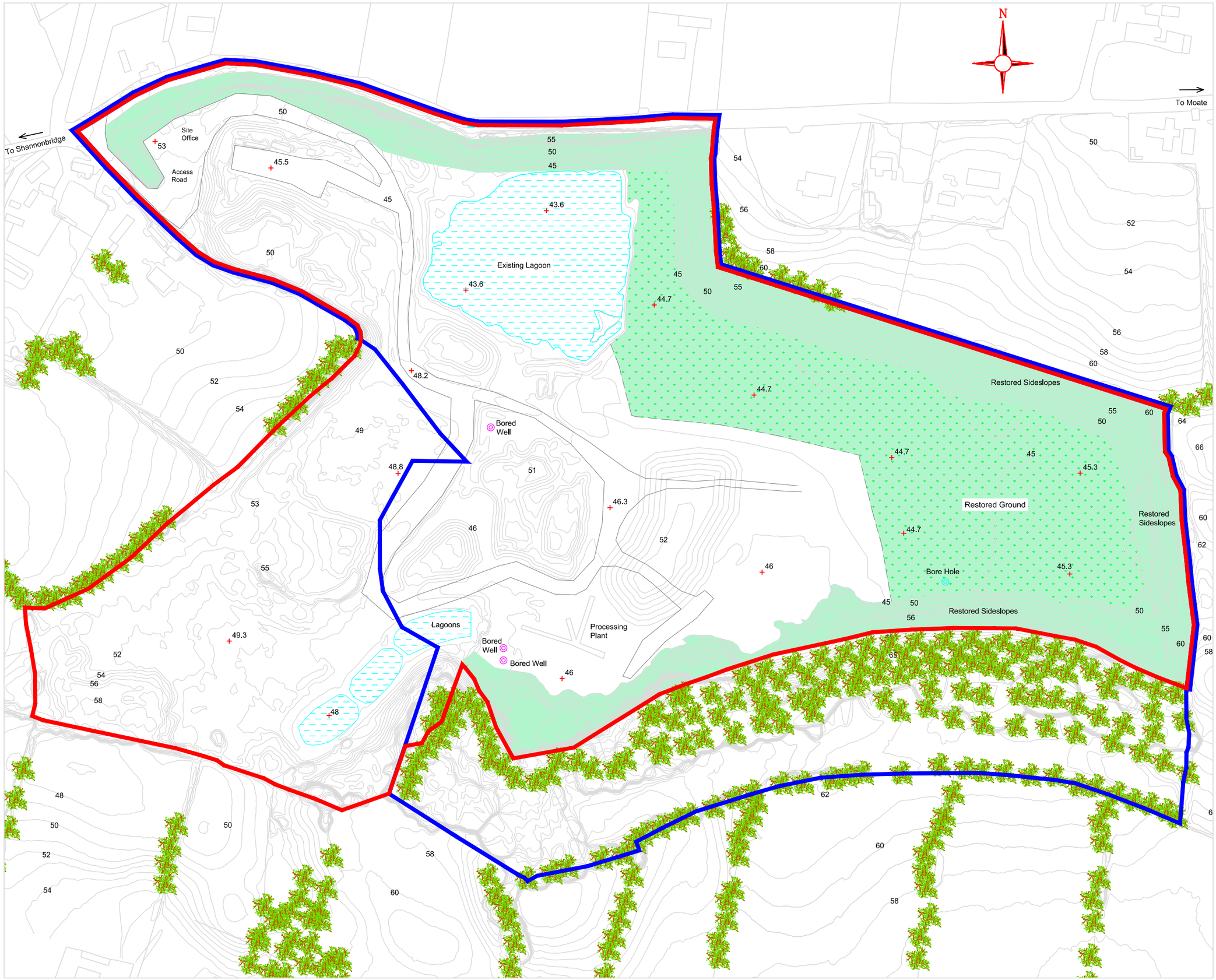
Rodríguez, Z. R. (2016) Guide for the Management of Sand Martins (*Riparia riparia*) in Gravel Pits. Available at: https://www.quarrylifeaward.com/projects/spain/guide-management-sand-martin-populations-riparia-riparia-gravel-pits
[Accessed on: 27/11/2018]

Figures



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Legend

Ownership Boundary

Application Area

Area = 15.34 Ha

Borehole

Bored Well

Water

Restored Ground

Restored Sideslopes

Vegetation

All Levels Relative to Ordnance Datum

ITM Coords: 604783 E, 730080 N

Rev.	Description	Date

EARTH SCIENCE PARTNERSHIP
CONSULTING ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS
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Client: Dermot Nally Stone Ltd.

Project: Remedial Environmental Impact Assessment Report to Accompany a Substitute Consent Application for a Sand & Gravel Pit at Clonfinlough, Co. Offaly

Title: Existing Site Layout Map

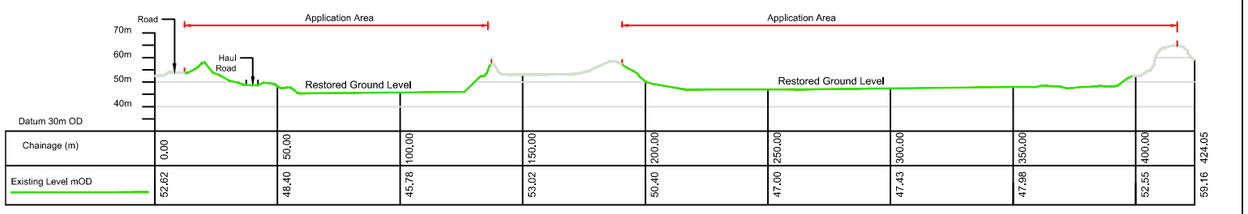
Drawn By: Sean O' Donnell

Checked By: Patrick O' Donnell

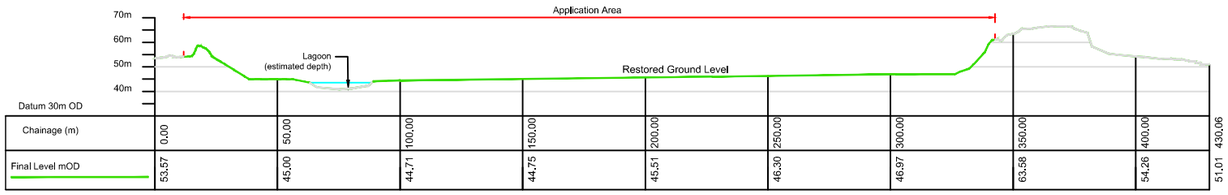
Scale : 1:2,000 @ A3 | Date: July 2019

Job No: EI 171 | Rev: 0

Figure 13.1



Section A - A Scale 2,500



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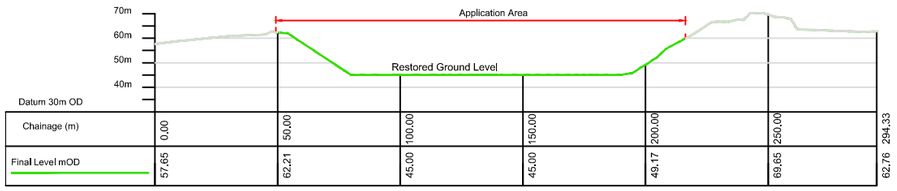

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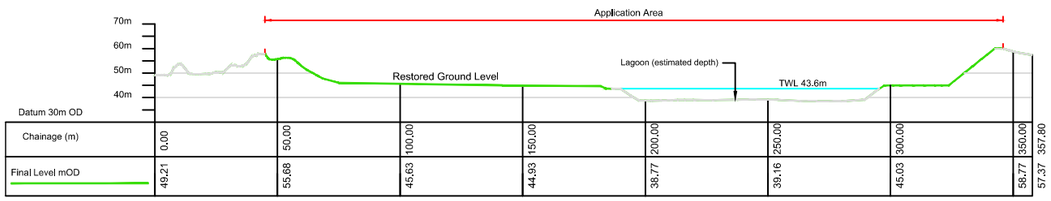

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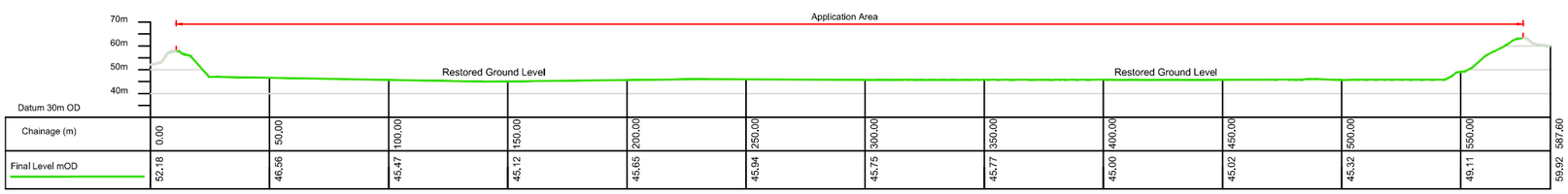

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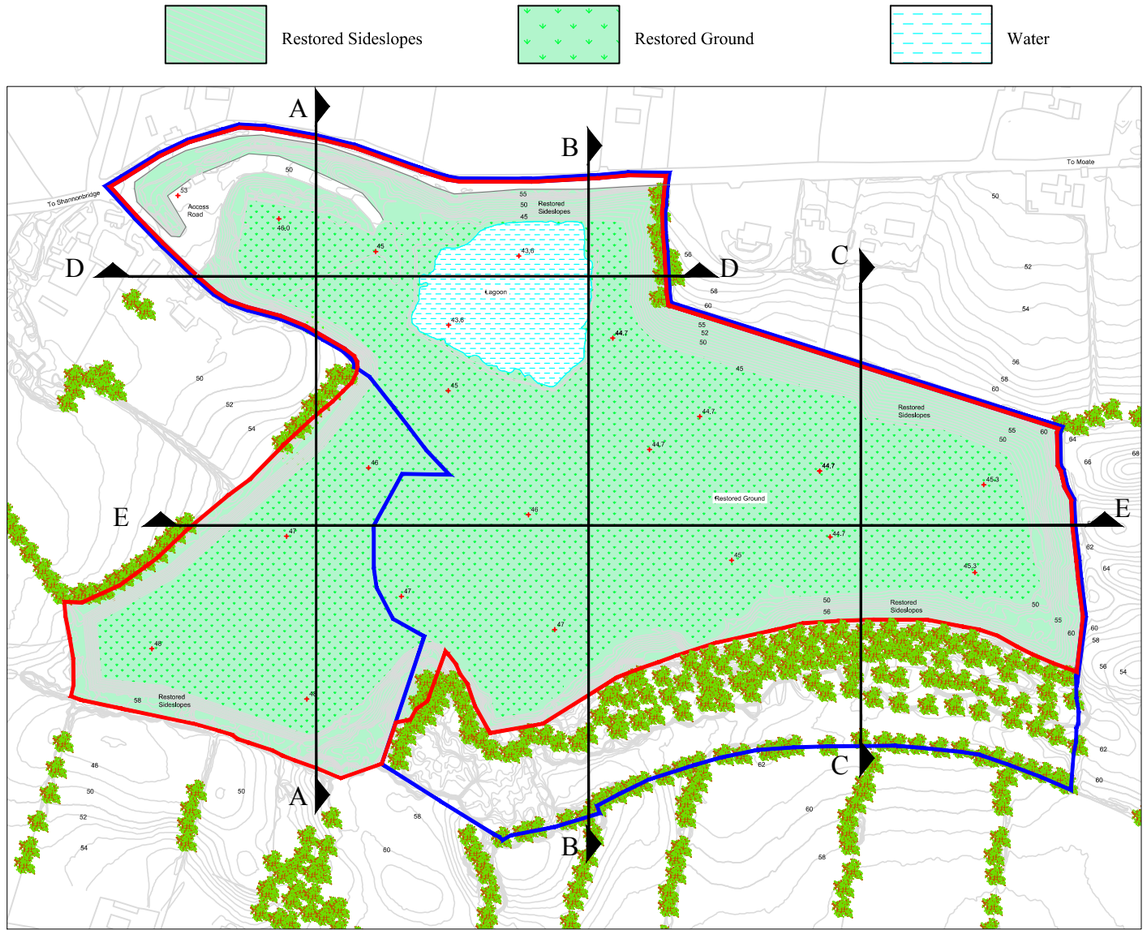

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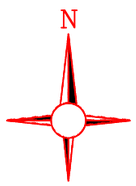

Legend

Ownership Boundary

Application Area

Area = 15.34 Ha

Fencelines and Boundaries

Final Level

Vegetation

OS. Map Reference : 3301

ITM Coords: 604783 E, 730080 N

All Levels Relative to Ordnance Datum

EARTH SCIENCE PARTNERSHIP
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Client: Dermot Nally Stone Ltd.

Project: Remedial Environmental Impact Assessment Report to Accompany a Substitute Consent Application for a Sand & Gravel Pit at Clonfinlough, Co. Offaly

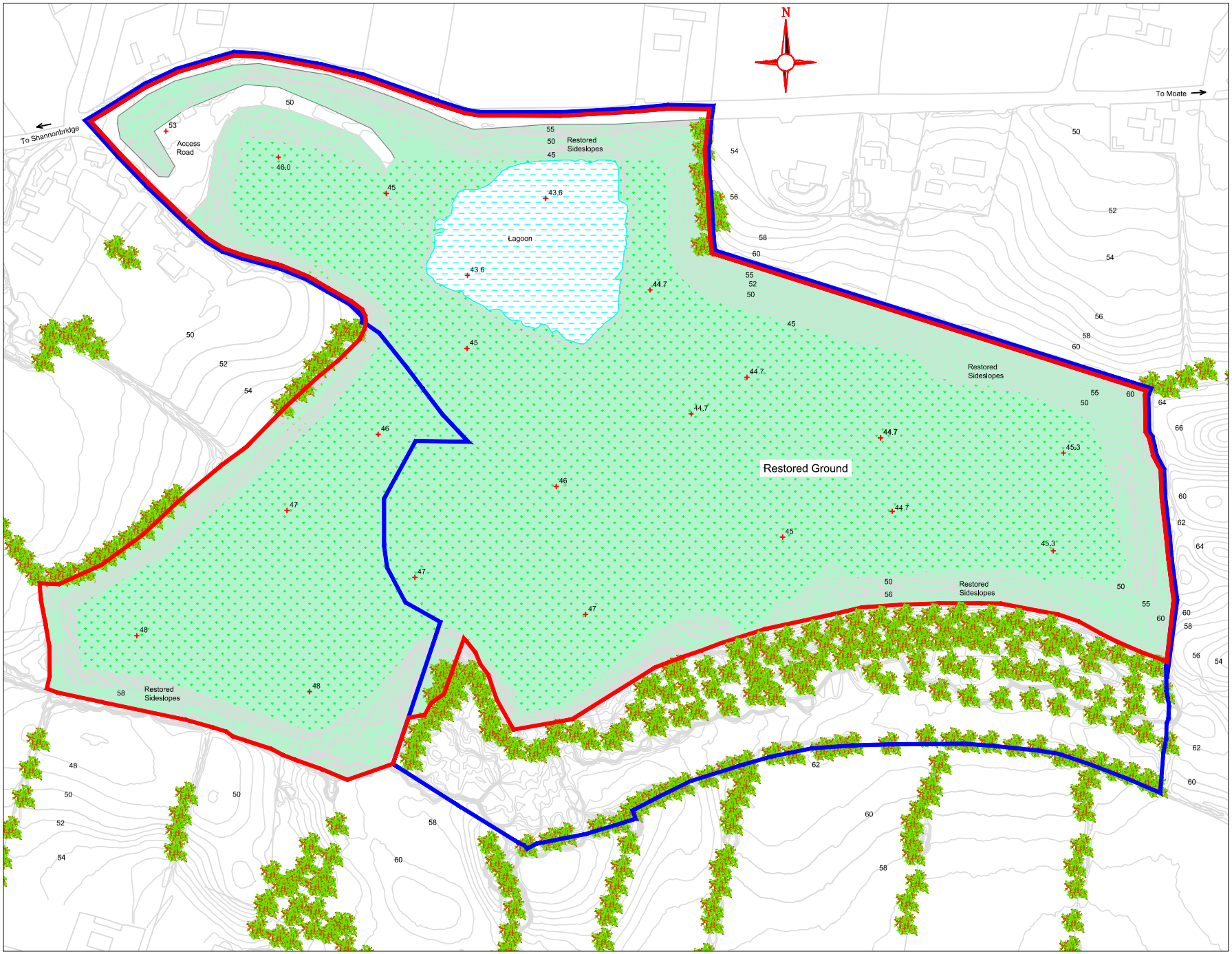
Title: Restored Site Sections

Drawn By: Sean O' Donnell

Checked By: Patrick O' Donnell

Scale: 1:2,500 @ A3	Date: July 2019
Job No: EI 171	Rev: 0

Figure 13.2



Legend

Ownership Boundary

Application Area

Area = 15.34 Ha

Water

Restored Ground

Restored Sideslopes

Vegetation

ITM Coords: 604783 E, 730080 N

Rev.	Description	Date

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Client: Dermot Nally Stone Ltd.

Project: Remedial Environmental Impact Assessment Report to Accompany a Substitute Consent Application for a Sand & Gravel Pit at Clonfinlough, Co. Offaly

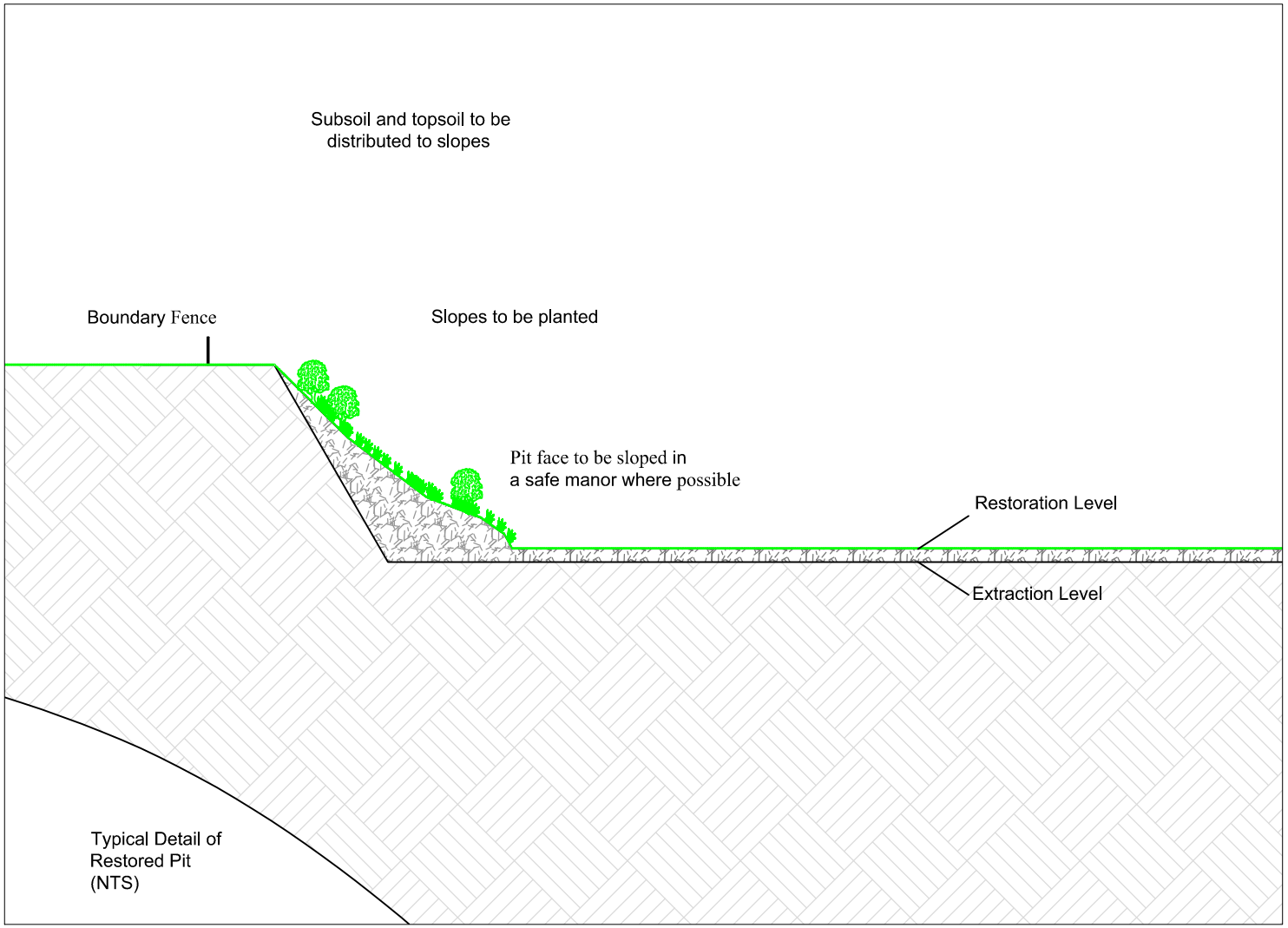
Title: Restored Site Layout Map

Drawn By: Sean O' Donnell

Checked By: Patrick O' Donnell

Scale: 1:3,000 @ A4	Date: July 2019
Job No: EI 171	Rev: 0

Figure 13.3



Legend

N

ITM Coords: 604783 E, 730080 N

Rev.	Description	Date

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Client: Dermot Nally Stone Ltd.

Project: Remedial Environmental Impact Assessment Report to Accompany a Substitute Consent Application for a Sand & Gravel Pit at Clonfinlough, Co. Offaly

Title: Sideslope Detail

Drawn By: Sean O' Donnell

Checked By: Patrick O' Donnell

Scale: NTS	Date: July 2019
Job No: EI 171	Rev: 0

Figure 13.4

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14.0 MATERIAL ASSETS

14.1 Introduction

This chapter of the remedial EIAR addresses the impacts of the past development of the application site on the material assets located in the vicinity. Material assets are defined in the EPA "Draft Advice Notes for preparing an EIAR" (2017) as 'resources that are valued and that are intrinsic to specific places, they may be either human or natural origin and the value may arise for either economic or cultural reasons'.

The development's utilisation of the area's material assets, or proximity to these material assets, can lead directly and indirectly to potential environmental impacts. The objective of the assessment is to ensure that these assets have been used in a sustainable manner with respect to the past development.

14.2 Methodology

The information for the assessment of the impacts of the application site was obtained from:

- Guidelines on the Information to be contained in Environmental Impact Statements Environmental Protection Agency (2002);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements Environmental Protection Agency (2003);
- Draft Revised Guidelines on the Information to be contained In Environmental Impact Statements (EPA, September 2015);
- Draft Advice Notes for Preparing Environmental Impact Statements (EPA, September 2015);
- Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EIAR) (EPA, August 2017);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DHP&LG, August 2018)
- Offaly County Council Development Plan (2014 – 2020).

The material assets, which have been identified as being within and adjacent to the sand and gravel pit and which may be directly affected by the past activities undertaken are addressed below. The EPA Guidelines on the information to be contained in Environmental Impact Statements (March 2002) states that the material assets should be assessed under the headings of:

- Archaeological Heritage
- Folklore/Tradition/History
- Architecture/Settlements
- Monuments/Features
- Designed Landscape
- Natural Resources of Economic Value
- Buildings & Structures
- Infrastructure.

The Draft Revised Guidelines on the Information to be contained in Environmental Impact Statements (2015) and Draft Advice Notes for Preparing Environmental Impact Statements (2015) state that the following material assets should be assessed in relation to quarries:

- Built services
- Roads and traffic
- Effects of vibration on surface structure
- Road damage due to transport and machinery use
- Loss of, or damage to, water supplies
- Effects potential for groundwater development in the area, in the future, especially downgradient of the site
- Impacts on geological heritage

The EPA Draft Guidelines on the Information to be contained in an Environmental Impact Assessment Report (2017) state that built services, roads and traffic, and waste management should be assessed.

There is an element of crossover between this chapter and certain other chapters. Some of the items listed above have been dealt with under the relevant chapters of the rEIAR. For instance, impacts on geological heritage have been dealt with under Chapter 7.0 Land, Soils and Geology, designed landscape is dealt with under Chapter 13.0 Landscape and Restoration, and archaeological heritage, folklore, architecture and monuments have all been dealt under Chapter 15.0 Cultural Heritage.

14.3 Existing Environment

The existing sand and gravel pit is located in the townland of Clonfinlough, Co. Offaly which is located approximately 6.3km south west of Ballinahown village, 8.7km north west of Ferbane and 8.6km north east of Shannonbridge.

The existing pit has an overall area of approximately 15.34 hectares and consists of a Pre-63 area and areas which were authorised by way of two separate planning permissions. Material was extracted by excavators and was processed into various grades depending

on market demand at the processing plant on site. The topography of the sand and gravel pit varies as a result of extraction undertaken to date. Existing berms and hedgerows in place around the boundary of the pit screen the pit from public view at the majority of locations. Access to the pit is gained via an existing entrance off the R444 Regional Road which links Shannonbridge to the N62 south of Ballinahown village.

Land surrounding the application site consists predominantly of agricultural land which is subject to livestock grazing and areas of peatland which are subject to peat extraction. The area is sparsely populated with one off dwellings and farmhouses located along roads in the vicinity of the site.

A restoration plan for the entire pit is proposed as part of the application and will be implemented on phased basis during the life of the permission.

14.3.1 Residential Buildings

There are a number of residences located within the vicinity of the existing sand and gravel pit mainly consisting of ribbon development along the local roads and one off rural housing/farmsteads. The main potential impacts on residences from the past development would be associated with landscape, noise and dust as a result of day to day activities.

14.3.2 Geological Resource

According to the GSI the subsoil of the pit consists of glaciofluvial sands and gravels derived from limestones (GLs). This material was excavated from the sand and gravel pit and processed into a saleable aggregate. An Esker located along the southern boundary of the pit runs from east to west along the boundary. The esker consists of basic esker sands and gravels (BasEsk). Bedrock was not extracted from the pit. The loss of a geological resource cannot be replaced; however, material was used to supply the local and regional construction industry thereby contributing to the local and regional economy.

14.3.3 Land Resource

Extraction activities to date has temporarily removed the capacity of these lands to provide agricultural production until future restoration. The change in land use has not resulted in a significant loss of the previous land use. The proposed restoration plan will result in the application site being restored to agricultural land which will mitigate extraction activities to date.

The assessment of the Natura 2000 sites and the related conservation objectives found that there was no impact on the conservation objective of the designated sites as a result of the activities undertaken to date.

Part of the pit is designated as an Area of High Amenity due to the presence of the Eiscir Riada Esker feature. Although a limited portion of the 0.97 Ha. area is located within the AHA boundary, this area was disturbed and subject to extraction as part of the previous planning permission attached to the area of the pit.

Extraction at the pit was undertaken close to the boundary of the Clonfinlough Esker pNHA which is located along the southern boundary with the majority of this extraction undertaken prior to the designation of the site. The 0.97 hectare extraction area is located along the northern boundary therefore the pNHA was not impacted on by extraction from the 0.97 hectare area. The proposed landscape and restoration plan will ensure that remaining areas are preserved.

14.3.4 Roads and Traffic

The existing sand and gravel pit is located in a semi-rural setting with the road infrastructure typical consisting of regional roads and local roads, however it is also in close proximity to national roads, particularly the R444 and N62. The pit generated a number of traffic movements based on the transport of products to market which was on average 5 loads/day associated with the extraction of the 0.97 hectare area.

14.3.5 Public Utilities and Access

There is an existing electrical and telecommunications connection at the pit. Water for dust suppression purposes was sourced from the main lagoon located to the north of the pit. A potable water supply was obtained from a well on-site.

14.3.6 Groundwater and Water Supplies

The development is located within the 1km radius of the Clonfanlough group water scheme supply well. Material extracted from the pit was from above the water table except for the main lagoon located to the north of the site in the Pre-1963 area which was formed as a result of extraction beneath the water table. There was no discharge of water off-site to adjoining water courses.

14.3.7 Scenic Routes and Views

The photographic visual impact assessment undertaken and presented in Chapter 13 – Landscape and Restoration concluded that the application site is well screened due to existing hedgerows, field boundaries and the topography of the study area.

14.3.8 Tourism

Tourism is a major industry in County Offaly and it attracts thousands of people on an annual basis. The Clonmacnoise Monastic Settlement located to the west of the site is one on the main tourist attractions in Co. Offaly. As stated in the visual assessment, the past development of the application site did not result in a significant increase in visibility of the pit. Therefore, it is concluded that there was no impact on amenity or tourism of the area as a result of the historical works undertaken at the site.

14.3.9 Archaeology

The ecclesiastical remains at Clonmacnoise were built in the midst of extensive raised boglands at the point where the Slí Mhór (Great Road) esker crosses the River Shannon. Together, they are an example of an Early Christian Insular Monastic City and are representative of a significant stage in the development of Early Medieval Christianity in the North Atlantic world.

The past development of the pit did not impact on the integrity of the Clonmacnoise Site which is located approximately 3.5km to the west. There are no Recorded Monuments situated within the application area (Chapter 15.0 – Cultural Heritage) and there are no undesignated monuments listed in the Sites and Monuments Record situated in the application area.

14.3.10 Waste

All material extracted from the pit had a use. Overburden was used to construct berms with remaining overburden stored on site to be used for landscaping and restoring areas around the pit. All material designated as waste, such as canteen waste, scrap metal, etc. was collected by an appropriately licenced contractor and recycled or disposed of at an appropriate facility. An emphasis was placed on recycling where possible.

14.4 Characteristics of the Development

The existing pit has an overall area of approximately 15.34 hectares and consists of an area of 0.97 ha. which was subject to extraction of material after expiry of planning permission on 31st day of December 2009. This extraction area is contained within the overall quarry area of 15.34 hectares consisting of areas ancillary to the extraction area (0.97 Ha.)

The ancillary areas of the pit consists of previously extracted areas, processing infrastructure and stockpiling areas, vehicle parking areas and areas used for the storage of overburden pending restoration.

Overburden material was removed prior to excavation of the underlying reserve and stored pending restoration works. The sand and gravel material was excavated, loaded onto dump trucks, transported to the fixed wet screening and crushing plant and processed into various grades depending on market demand.

Plant and machinery which operated in the application area consisted of tracked excavators, wheel loaders, dump trucks, processing plant and road trucks to haul material off site. Ancillary plant such as a water bowser for dust suppression was deployed where required.

Due to the porous nature of the underlying material, water falling as precipitation percolated to ground. The existing washing plant operated by way of a closed water management system whereby the plant removed the fine material (clays /silts) with run-off water diverted to a series of settlement lagoons. The water was then recycled for washing with water lost in the aggregate replaced with water from a groundwater well located near the plant.

A significant amount of landscaping and restoration works have been completed which have included placing a layer of overburden on side slopes and the pit floor. It is proposed to restore further areas of the pit as per the landscape and restoration plan detailed in Section 13.0.

14.5 Impact Assessment

14.5.1 Residential Buildings

Environmental monitoring undertaken during the operational phase for noise and dust were compliant with condtions and standard published guidelines. A number of dwellings have been constructed in the area in recent years which illustrates that activity associated with the sand and gravel pit has not deterred people from living in the general locality.

14.5.2 Geological Resource

Sand and gravel extraction is a long established activity in the study area with the existing pit a Pre-1963 development. The extraction of material to date has resulted in a change in the natural topography of the land. However, the extracted material has been used to supply the local and regional markets, thereby contributing to the local and regional economy. The proposed landscape and restoration plan will serve to mitigate the impact associated with extraction activity to date.

14.5.3 Land Resource

The application area was used for agricultural use prior to its development as a sand and gravel pit. As agriculture is a significant land use in the wider area, this has not resulted in a significant loss of land resource. The assessment of the Natura 2000 sites and nationally designated sites in the area and the related conservation objectives found that the historical operation of the development did not result in significant effects on the conservation objectives of the designated sites.

Although a limited portion of the 0.97 Ha. area is located within the AHA boundary, this area was disturbed and subject to extraction as part of the previous planning permission attached to this area of the pit. The Clonfinlough Esker pNHA located along the southern boundary of the pit was not impacted on by extraction of material from the 0.97 hectare area or ancillary activities in the wider pit area. The proposed landscape and restoration plan will ensure that remaining areas are preserved.

14.5.4 Roads and Traffic

The historical use did not significantly increase levels of traffic on the road infrastructure in the vicinity of the pit as levels of traffic associated with the development were relatively low particularly in recent years.

14.5.5 Public Utilities and Access

As mentioned above, the previous extraction of sand and gravel did not result in a significant increase in traffic levels on the local road infrastructure. There has been no impact on the quality or availability of public utilities of the study area. There is no public access to the application site. All visitors reported to the site office before entering the site.

14.5.6 Groundwater and Water Supplies

The assessment of the water environment concluded that the development to date did not impact on the water environment and groundwater supplies

14.5.7 Scenic Routes and Views

As stated in the visual impact assessment undertaken, there were no significant impacts on scenic routes and views as a result of the past development of the pit.

14.5.8 Tourism

Sand and gravel extraction activity in the area is an established land use and has not impacted on tourism in the past.

14.5.9 Cultural Heritage

There were no direct or indirect impacts on any known items of archaeology, cultural heritage or buildings of heritage interest in the application area or the vicinity.

14.5.10 Waste

Overburden was used to construct berms and stored on site for restoring areas around the pit. All material designated as waste, such as canteen waste, scrap metal, etc. was collected by an appropriately licenced contractor and recycled or disposed of at an appropriate facility. As such, there was no potential for significant impacts on the local environment as a result of waste generated from the past development of the pit.

14.5.11 Unplanned Events

The various chapters of the rEIAR have assessed the potential impacts associated with unplanned events occurring where relevant.

14.6 Remedial Measures

Measures are discussed in the relevant chapters where required to ameliorate any impacts identified.

14.7 Residual Impacts

Historical sand and gravel extraction activity resulted in the loss of a geological resource and this will be permanent in duration. The proposed landscape and restoration plan will mitigate the impact in so far as possible with the creation of new habitats.

14.8 Technical Difficulties

No technical difficulties were encountered during the completion of this assessment.

14.9 References

Offaly County Council Development Plan (2014 – 2020)

DECLG (2013) Guidance for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment

Directive 2014/52/EU European Parliament and of the Council EIA Directive (April, 2014)

EPA (2002) Guidelines on the information to be contained in Environmental Impact Statements, Environmental Protection Agency

EPA (2003) Advice notes on current practice in the preparation of Environmental Impact Statements

EPA (2006) Environmental Management Guidelines – Environmental Management in the Extractive Industry (Non – Scheduled Minerals)

EPA (2015) Draft Revised Guidelines on the Information to be contained In Environmental Impact Statements

EPA (2015) Draft Advice Notes for Preparing Environmental Impact Statements

EPA (2017) Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)

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Plates

15.0 CULTURAL HERITAGE

15.1 Introduction

This section of the rEIS addresses the potential impacts associated with the past development of the pit in relation to archaeology, cultural heritage and architecture of the pit and the surrounding environs. This assessment will determine, as far as is reasonably possible from existing records, the nature of the cultural heritage resource within the sand and gravel pit and environs.

15.2 Methodology

A part of a previous planning application, an archaeological assessment was undertaken by Elizabeth Connolly M.A. MIAI of the sand and gravel pit and the surrounding area which involved a desk based and site based assessment. The study was undertaken in two parts; the first involved the research of a number of cartographic and literary sources followed by a programme of field walking using the Discovery Series 1:50,000 and OS 6" Sheet No. OF006. No above ground traces of archaeological interest were noted during the course of the survey.

15.3 Existing Environment

15.3.1 General Archaeological Background of Co. Offaly

County Offaly is a low county, with about 80 per cent of its surface is between 30 and 120 metres above sea level and one third is overlain by raised or fen peats. Thus peat land is a dominant feature of the county's landscape. It is estimated that peat lands of County Offaly cover an area of over 64,000 ha. A distinctive feature of this region is the bog islands (areas of dry upland or partially drowned drumlins) that have over time been surrounded on all sides by raised bog. The archaeological record preserved in peat land is unlike that from most other environments. As a bog grows it seals within its layers a record of the natural environment and any human activity undertaken within it.

In Offaly evidence for human activity exists from prehistory right through to modern times. Archaeological evidence of this occupation can be uncovered during the process of peat extraction - either mechanical or by hand. With the systematic peat harvesting undertaken by Bord na Móna since the 1940's, the number of archaeological finds has grown. During the 1990's the large scale field survey work done by the Irish Archaeological Wetland Unit (IAWU) increased the number of known archaeological sites; for example over 880 new sites were identified by the IAWU in Bord na Móna bogs in northwest County Offaly.

The majority of the surviving prehistoric objects found on dry land are of metal and stone, but wood and other organic artefacts preserved within peat land allow us to see an extended range of material culture. The occupation sites on dry land islands as well as the

wetland bogs which surround them, together play a significant role in establishing a pattern of archaeological settlement in County Offaly.

The most common archaeological material identified during wetland archaeological survey is wood, and the most common site type is the togher or wooden track way. These track ways can be made from planks, round woods or brushwood. The presence of a togher indicates that some form of human activity must have taken place in its proximity at some stage in the past. With this particular type of site information such as the species of wood, condition and age of the wood, any details of tool marks (i.e. the range of angle, shape size of toolmarks), and shape dimensions and conversion of split timbers, joints in the wood, are all valuable in building up a picture of the wider archaeological landscape.

The narrow stretches between wetland and dry land have been shown to contain high concentrations of toghers, showing they were clearly recognised crossing point throughout prehistory. The wetland/dry land margins have long been the foci of human activity. The dry land islands would have provided comparatively rich farmland. The toghers not only exist as a result of a need to cross bog land but also to provide access to desirable settlement areas, as well as the bog's natural resources. These wetland natural resources include medicinal plants, peat for burning and wildlife for hunting.

The earliest evidence of human occupation in County Offaly was found at Lough Boora. This occupation site dates to the Early Mesolithic (beginning around 7000BC), and was recorded beneath peat cover. Given that the extensive peat lands in Offaly were in the process of forming in the early prehistoric period it can be argued that further sites of a similar nature remain to be identified.

Dating evidence is proving to be of great value in identifying areas of concentrated archaeological activity. From Offaly's peat land, evidence of prehistoric human activity in the form of toghers and track ways has been found, dating to the Neolithic as well as the Bronze Age. Another archaeological site type are mounds of heated burnt stone and associated troughs called fulacht fiadh, that are found close to water sources, in many cases in or at the edges of bogs. Evidence for Iron Age activity in Offaly includes some timber track ways (e.g. Brougal and Clonsast), and some few artefacts. In addition to sites, archaeological artefacts have been found spread throughout Offaly's bogs. These finds, such as daggers, axeheads and flint knives, may have been lost during work or travel, or could have been deliberate deposits.

15.3.2 Archaeological Background of Study Area

The townland of Clonfinlough is situated in the parish of Clonmacnoise, south east of the River Shannon and south of the Eiscir Riada, a road which linked the east of early medieval Ireland to the west, and which ran along eskers. This advantageous setting between two major transport routes meant that the early medieval monastic community at Clonmacnoise was not shut away from the world; it attracted wealth and prestige and was part of a wider network of prestigious monasteries including Durrow, Birr, Lorrha and Gallen. These early ecclesiastical sites interacted not only with Irish monasteries, but also with those of Britain and Europe.

The lake, Fin Lough, is described by Lewis (1833) as 'abounding in pike and perch'. A crannog was discovered in 1884 by the geological survey on the western shore. Nearby, to the north of the lake are several enclosure sites, which could be of early Medieval date, like the crannog, or which could be prehistoric. The advantages of the proximity to the River Shannon had already been exploited in Clonfinlough townland and certainly by the Late Bronze Age, as the excavation of a palisaded enclosure (Offaly Archaeological Survey No. 90,) on the south shore of Fin Lough, has shown. The enclosure encompassed three platforms which represented two substantial hut sites and one smaller hut site. Dendrochronological analysis of timbers from this site indicate that the construction and occupation of the site took place from 917-886 BC, perhaps representing one or two generations of an extended family. Among other finds, two amber beads were recovered from the site. Having probably originated in the Baltic or possibly from the eastern coasts of Scotland or England, amber was a highly prized material, and its existence at such a site would serve as an indicator towards trade and communications. Two boat paddles were also found. The site was revealed at a depth of 2-3m in bog, and was found due to peat extraction. It is possible that it was served by a network of timber trackways which would have linked it to enclosures of a similar nature.

An archaeological feature of indeterminate date, the 'Clonfinlough Stone' (Offaly Archaeological Survey No. 88), can be found almost 1km south west of the site, on the eastern downslope of a hill just to the north east of Fin Lough. The 'Clonfinlough Stone' is a glacial erratic limestone boulder decorated with a series of cruciform figures, incomplete T-shaped figures, a possible representation of a footprint and several longitudinal and transverse joints.

Archaeological features located within the wider are and within proximity of the sand and gravel pit are detailed on Plate 15.1 and 15.2 below. There are no features located within the immediate vicinity of the sand and gravel pit.

Plate 15.1: Archaeological Features Located in the Study Area

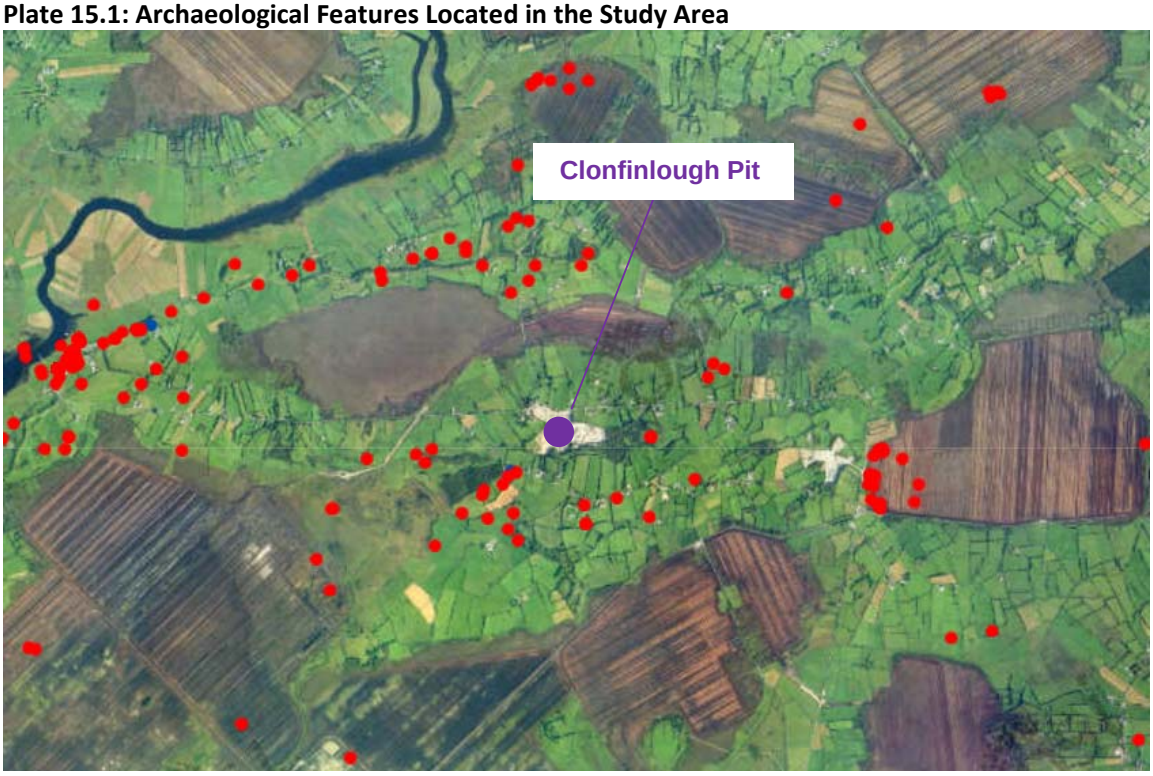

Plate 15.2: Archaeological Features Located Within the Vicinity of the Pit

15.4 Impact Assessment

There are no direct or indirect impacts on any known items of archaeology, cultural heritage or buildings of heritage interest in the substitute consent area or the vicinity. No further extraction is proposed at the pit and the applicant now proposes to restore the pit in line with the proposed landscape and restoration plan.

15.5 Mitigation Measures

Should any archaeological features be found during restoration works an Archaeologist should be retained to assess the significance of the find and any recommendations made by the Archaeologist should be implemented.

15.6 Residual Impacts

No residual impacts are envisaged

15.7 Technical Difficulties

No technical difficulties were encountered during the assessment.

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Tables

16.0 INTERACTIONS

16.1 Introduction

This chapter addresses the potential cumulative effects, indirect effects and main interactions between different aspects of the environment that may have been affected as a result of the past activities undertaken at the development. Only topics that could be logically linked to the development have been examined in detail. Accordingly, when a topic is not mentioned, it is concluded that no potential for conflict existed.

16.2 Interactions

Inter-relationships concern the interactions between potential effects which may have occurred within a project and the interactions between potential effects identified under one topic with effects identified under another topic. Each of the various environmental and related topics have been discussed separately in the preceding chapters of the rEIAR and the major interactions between the recorded environmental impacts are assessed within the individual chapters of the rEIAR. In examining the interactions of the potential effects associated with the past operation of the development, one must investigate the combined physical, environmental, visual and socio-economic effects of the historical activities on the receiving environment. Table 16.1 illustrates the interaction of effects assessed for this project.

Table 16-1: Interactions of potential effects assessed for this project.

Factors	Pop. and Human Health	Biodiversity	Land, Soils and Geology	Water	Climate	Air	Noise	Traffic	Landscape and Restoration	Material Assets	Cultural Heritage
Pop. and Human Health											
Biodiversity											
Land, Soils and Geology		x									
Water	x	x	x								
Climate	x										
Air	x	x		x	x						
Noise	x	x									
Traffic	x					x	x				
Landscape and Restoration	x	x	x								
Material Assets	x		x				x	x	x		
Cultural Heritage											

16.2.1 Population/Human Health and Water

Contaminants or leakages from plant and vehicles could have potentially leaked into groundwater which had the potential to impact on water quality. There were no visual signs of hydrocarbon contamination during site visits and no traces of hydrocarbons were evident in water monitoring results. As such, there were no potential interactions between population and human health and water as a result of the historical activities undertaken at the pit.

16.2.2 Population/Human Health and Climate

Plant associated with the operation of the development resulted in emissions to air associated with the day to day operations undertaken at the pit which were difficult to eliminate. Due to the low level of activity undertaken, it is unlikely that there would have been an impact on climate as a result of previous activities undertaken. As such, there were no potential interactions between population and human health and climate as a result of the historical activities undertaken at the pit.

16.2.3 Population/Human Health and Air

The primary interaction between air and humans would have related to potential dust emissions associated with extraction, processing and transport of material around and off-site. Exhaust emissions from vehicles and plant were also a source of air pollutants. Dust deposition monitoring was undertaken during the operation of the pit and dust levels were below recommended guideline values and conditions attached to the pit. It is unlikely that there would have been an impact on population and human health and air as a result of previous activities undertaken.

16.2.4 Population/Human Health and Noise

Activities undertaken at the pit generated noise associated with the extraction, processing, loading of vehicles and transportation of material within and off site. Various measures were in place to ensure noise levels were not elevated. Noise levels recorded during noise monitoring assessments undertaken at the pit showed that the pit was compliant with levels conditioned and recommended guideline values. As such, there were no potential interactions between population and human health and noise as a result of the historical activities undertaken at the pit.

16.2.5 Population/Human Health and Traffic

The transport of pit aggregate to market generated a number of traffic movements on the local road infrastructure; however the traffic assessment concluded that this increase was not significant. As such, there were no potential interactions between population and human health and traffic as a result of the historical activities undertaken at the pit which could have caused significant effects on either of these environmental factors.

16.2.6 Population/Human Health and Landscape/Restoration

The extraction of material at the application site has resulted in the creation of a void which has resulted in a permanent impact. This will be mitigated by the proposed landscape and restoration plan.

16.2.7 Population/Human Health and Material Assets

Extraction of sand and gravel has resulted in the loss of a geological resource which cannot be replaced. The proposed landscape and restoration plan will aid in mitigating the historical extraction activity. The material extracted would have served the demand for construction materials both locally and regionally which is considered to have had a positive impact.

16.2.8 Biodiversity and Land/Soils/Geology

The historical operation of the pit resulted in the site being stripped of overburden and extracted down to the existing pit floor level. This resulted in the direct loss of the agricultural land to a sand and gravel pit. The proposed restoration plan will offset any effect of excavation activity and has the potential to increase the biodiversity of the site.

16.2.9 Biodiversity and Water

Contaminants or leakages from plant and vehicles could have potentially leaked into groundwater which could have impacted on water quality and biodiversity. There were no visual signs of hydrocarbon contamination during site visits and no traces of hydrocarbons were evident in water monitoring results.

16.2.10 Biodiversity and Air

Activities undertaken at the pit had the potential to create windblown dust which had the potential to affect the biodiversity of the local environment. Result of dust deposition monitoring show that the pit was compliant with planning conditions and recommended guideline values.

16.2.11 Biodiversity and Noise

Extraction of the resource material and related traffic had the potential to lead to noise emissions. Noise levels may have affected some bird and mammals species, particularly those sensitive to noise. Given the low level of traffic and the work methods that were employed at the pit, it is unlikely that previous extraction activities lead to a negative impact on the biodiversity in the vicinity of the working pit.

16.2.12 Biodiversity and Landscape/Restoration

A landscape and restoration plan is proposed, which will lead to a positive impact on the biodiversity of the area. The final restoration of the site will enhance the biodiversity of the area generating a positive effect.

16.2.13 Land/Soils/Geology and Water

The removal of overburden had the potential to increase the risk of contamination of groundwater in the event of accidental spillages occurring. There were no visual signs of hydrocarbon contamination during site visits and no traces of hydrocarbons were evident in water monitoring results.

16.2.14 Land/Soils/Geology and Landscape

Extraction to date at the application area has resulted in the removal of overburden and sand and gravel resulting in the creation of a void. Existing stockpiled overburden material will be used for restoring the pit. The impact on the geology and landscape will be mitigated in the longer term by the proposed landscape and restoration plan.

16.2.15 Land/Soils/Geology and Material Assets

The geological resource extracted from the application site has resulted in a void. Sand and gravel extracted from the pit was used as a raw material in the construction industry which is seen as a beneficial use. Part of the pit is designated as an Area of High Amenity due to the presence of an Esker feature. Although a limited portion of the 0.97 Ha. area is located within the AHA boundary, this area was disturbed and subject to extraction as part of a previous planning authorisation attached to the area of the pit.

16.2.16 Water and Air

Dust associated with sand and gravel extraction activities had the potential to contaminate surface water and groundwater. Due to the area of the pit and low level of activity, it is unlikely that there would have been significant dust blow generated.

16.2.17 Climate and Air

Plant and machinery operating at the pit resulted in emissions to air and climate which is difficult to mitigate against. The low level of activity and good management practices would have served to reduce the emissions in so far as is possible.

16.2.18 Air and Traffic

The transport of pit aggregate to market generated a number of traffic movements on the local road infrastructure; however the traffic assessment concluded that this increase was not significant therefore unlikely to have generates excessive emissions.

16.2.19 Noise and Traffic

Traffic associated with the development generated noise and a minor source of vibration. Due to the low level of pit related traffic on the local road infrastructure, there was no impact on noise levels of the area.

16.2.20 Landscape/Restoration and Material Assets

The visual impact assessment undertaken shows that the existing sand and gravel pit is not visible from any of the surrounding vantage point locations. The proposed landscape and restoration plan will mitigate the impact associated with historical extraction from the pit.

16.3 Conclusion

It has been concluded that there were no significant interactions between any of the various environmental factors as a result of previous operations within the application area.

Table of Contents

17.0 MITIGATION AND MONITORING SUMMARY

17.1 Introduction

This chapter of the rEIAR provides a summary of the mitigation measures that were practiced and any remedial measures proposed in order to avoid, reduce or remedy the potential impacts associated with previous operation of the pit.

17.2 Population and Human Health

Mitigation Measures

No measures other than those detailed in the following chapters of this rEIAR are required:

8.0 – Water
10.0 – Air
11.0 – Noise
12.0 – Traffic
13.0 – Landscape and Restoration

Remedial Measures

No remedial measures are proposed

Monitoring

Environmental monitoring will be carried out in accordance with the various sections of the rEIAR.

17.3 Biodiversity

Mitigation Measures

Dust deposition monitoring was undertaken and will continue to be carried out during the restoration phase. Re-fuelling of machinery will be carried out by trained personnel and spill kits will be on hand.

Additionally, as part of the application, the following ecological mitigation and restoration measures will be carried out to enhance the biodiversity value of the site.

- The use of native species will support a wider range of insects and animals and will contribute more to the ecology of the region. Suitable tree and shrub species include ash, hawthorn, hazel *Corylus avellana*, blackthorn, gorse and willow *Salix spp.*
- This added vegetation will also enhance the local wildlife corridor, connecting the site with the surrounding landscape.

- Using plants adapted to or tolerant of the existing site conditions will reduce the need for expensive remedial measures (such as replacing failed plants).
- Hedgerows and tree lines along the site perimeter will be retained.
- Planting of trees and shrubs where required to replace dead plants will take place during the dormant seasons. Bare-rooted plants transplant most successfully during their dormant season, this is usually between November and March/April. Avoiding times when the ground is actually frozen, this will mean either autumn or spring planting.
- Planting areas will be suitably fenced to exclude farm stock, rabbits, sheep and other browsing animals. It may be more economical to protect each tree individually rather than fence the whole area.
- No herbicides, pesticides or fertiliser will be applied to the berm.
- The immediate area around the sand martin colony near the site entrance will not be planted to ensure the continuation of access for the birds to their nesting burrows in the cliff face.

Remedial Measures

No remedial measures are required.

Monitoring

No monitoring is proposed.

17.4 Land, Soils and Geology

Mitigation Measures

Previous operations were undertaken in accordance with "best practice" and appropriate guidelines for example EPA's Environmental Management in the Extractive Industry guidelines and Irish Concrete Federation (ICF) Environmental Code. The following measures were practiced when the pit was operational.

- Fuelling and lubrication were undertaken in a designated area and where possible off-site, and not within 30m of groundwater wells or water features.
- Only a limited volume of fuel was stored on-site.
- An adequate supply of spill kits and hydrocarbon absorbent packs were stored on-site in the event they were required.
- Soils retained on site were used in rehabilitation and this shall be the case going forward. The site will be capped with a layer of topsoil in order to restore back to agricultural use.
- Restoration works were not carried out during excessively dry or wet weather.

Remedial Measures
No remedial measures are required.

Monitoring
No monitoring is proposed.

17.5 Water

Mitigation Measures
Groundwater Level Impacts
No mitigation. Pumping volumes were very small and had no effect on groundwater levels locally. The water balance presented demonstrates an excess of recharge over abstraction within the site boundary.

Groundwater Contamination from Oil / Fuel Spills and Leaks

The following mitigation was practiced during the operation of the pit:

- As stated above in the report fuels were rarely stored on-site as fuel delivery trucks were used to refuel plant and machinery.
- Mobile plant was refuelled on a dedicated hardstanding area on the north-western section of the site. This hardstanding drains to an oil interceptor and therefore any leaks or spills were contained.
- Maintenance of mobile plant also occurred on this hardstanding area and potential spills were therefore contained.
- Refuelling of plant was undertaken by a trained fuel delivery operator and spill kits were on the ready in the unlikely event of an accidental spill.
- Plant was also inspected on a regular basis to ensure there was no fuel or oil leaks.
- Procedures and contingency plans were in place to deal with emergency accidents or spills, but none occurred; and,
- There was no surface water discharge from the site.

Remedial Measures
No remedial measures are required.

Monitoring
No monitoring is proposed.

17.6 Climate

Mitigation Measures

The following measures were practiced at the existing development during the operational phase of the development in order to limit the effects of the development on the local and regional climate:

- Strict adherence to 'good site/engineering practices' (e.g. all vehicles and plant were be switched off when not in use) which would have minimised the generation of any unnecessary air emissions.
- Plant was serviced regularly to ensure efficient fuel consumption.
- Energy audits were undertaken at the pit in order to reduce energy requirements.
- When purchasing plant, preference was given to plant which have low emissions.

The above measures will be practiced during any future works undertaken at the pit associated with landscaping and restoration.

Remedial Measures

No remedial measures are required.

Monitoring

No monitoring is proposed.

17.7 Air

Mitigation Measures

The following mitigation measures were implemented as part of the operation of the pit:

- The duration of soil handling activities such as overburden removal were restricted to periods of dry weather with little or no wind.
- The access road was inspected regularly and kept in good condition.
- Imposition and enforcement of an appropriate speed limit on haul roads to prevent unnecessary generation of fugitive dust emissions.
- During very dry periods, dust emissions from heavily trafficked locations were controlled by spraying surfaces with water.
- Stockpiles were sprayed with water to reduce dust blow where required.

It is recommended that the above measures are practices during the landscaping and restoration phase of the development.

Remedial Measures

No remedial measures are required.

Monitoring

To ensure that the existing development is not impacting on air quality, dust deposition monitoring will be undertaken during the landscape and restoration phase of the development

17.8 Noise

Mitigation Measures

The following mitigation measures were implemented at the pit during the operational phase.

- Haul roads were maintained to a good standard in order to reduce the noise level associated with vehicles transporting material
- Regular maintenance and lubrication of plant and machinery.
- The enclosure and cladding of plant and machinery where possible.
- Minimising drop heights of material from plant and machinery.
- Avoidance of over revving where possible.
- Machinery were throttled down or turned off when not in use.

The above measures will continue to be practiced as part of the landscape and restoration phase of the pit.

Remedial Measures

No remedial measures are required.

Monitoring

Monitoring of noise levels will continue at 3 locations on an annual basis during landscape and restoration to ensure that noise levels are below the recommended guideline values.

17.9 Traffic

Mitigation Measures

The following measures were practiced in order to reduce the impact on local road infrastructure and users.

- Vehicles adhered to the legal weight restrictions.
- All vehicles leaving the site were clean and free of dirt and grit.
- Regular inspections of the access road and roads used by quarry traffic were undertaken to ensure that they are maintained in tidy manner.

Remedial Measures

No remedial measures are proposed.

Monitoring

No monitoring is proposed.

17.10 Landscape and Restoration

Mitigation Measures

The land landscape and restoration plant will serve to offset the impact associated with previous activity at the pit and will be implemented on granting of substitute consent. As part of the substitute consent application, measures will be put in place to reduce loss of biodiversity and enhance the conservation value of the area and reduce environmental impacts of extraction activity on the surrounding area. These include the following:

- The use of native species will support a wider range of insects and animals and will contribute more to the ecology of the region.
- This added vegetation will also enhance the local wildlife corridor, connecting the site with the surrounding landscape.
- Using plants adapted to or tolerant of the existing site conditions will reduce the need for expensive remedial measures (such as replacing failed plants).
- Hedgerows and tree lines along the site perimeter will be retained.
- Planting of trees and shrubs where required to replace dead plants will take place during the dormant seasons. Bare-rooted plants transplant most successfully during their dormant season, this is usually between November and March/April. Avoiding times when the ground is actually frozen, this will mean either autumn or spring planting.
- Planting areas will be suitably fenced to exclude farm stock, rabbits, sheep and other browsing animals. It may be more economical to protect each tree individually rather than fence the whole area.

- No herbicides, pesticides or fertiliser will be applied to the berm.

Remedial Measures
No remedial measures are proposed.

Monitoring
No monitoring is proposed

17.11 Material Assets

Mitigation Measures
No measures other than those detailed in the following chapters of this rEIAR are required

Remedial Measures
No remedial measures are proposed.

Monitoring
No monitoring is proposed

17.12 Cultural Heritage

Mitigation Measures
Should any archaeological features be found during restoration works an Archaeologist should be retained to assess the significance of the find and any recommendations made by the Archaeologist should be implemented.

Remedial Measures
No remedial measures are proposed.

Monitoring
No monitoring is proposed