TOM PHILLIPS + ASSOCIATES
TOWN PLANNING CONSULTANTS



# ENVIRONMENTAL IMPACT ASSESSMENT REPORT

## NON TECHNICAL SUMMARY (NTS)

IN RESPECT OF

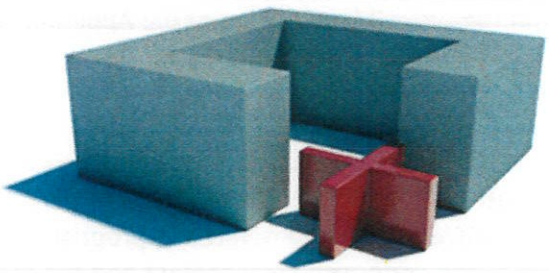
## PROPOSED BORROW PIT

AT

## AUGHINISH ALUMINA LTD., AUGHINISH ISLAND, ASKEATON, CO. LIMERICK

## JULY 2017





# 1.0 INTRODUCTION

## 1.1 Preamble

This is the Non-Technical Summary (NTS) of the *Environmental Impact Assessment Report* (EIAR) relates to a Planning Application by Aughinish Alumina Limited (referred to as the Applicant throughout) for the provision of a Borrow Pit in Aughinish East within the overall landholding of the Applicant, in the townlands of Aughinish East, Aughinish West, Island Mac Teige, Glenbane West, Morgan North and Fawnamore at or adjacent to Aughinish Island, Askeaton, Co. Limerick.

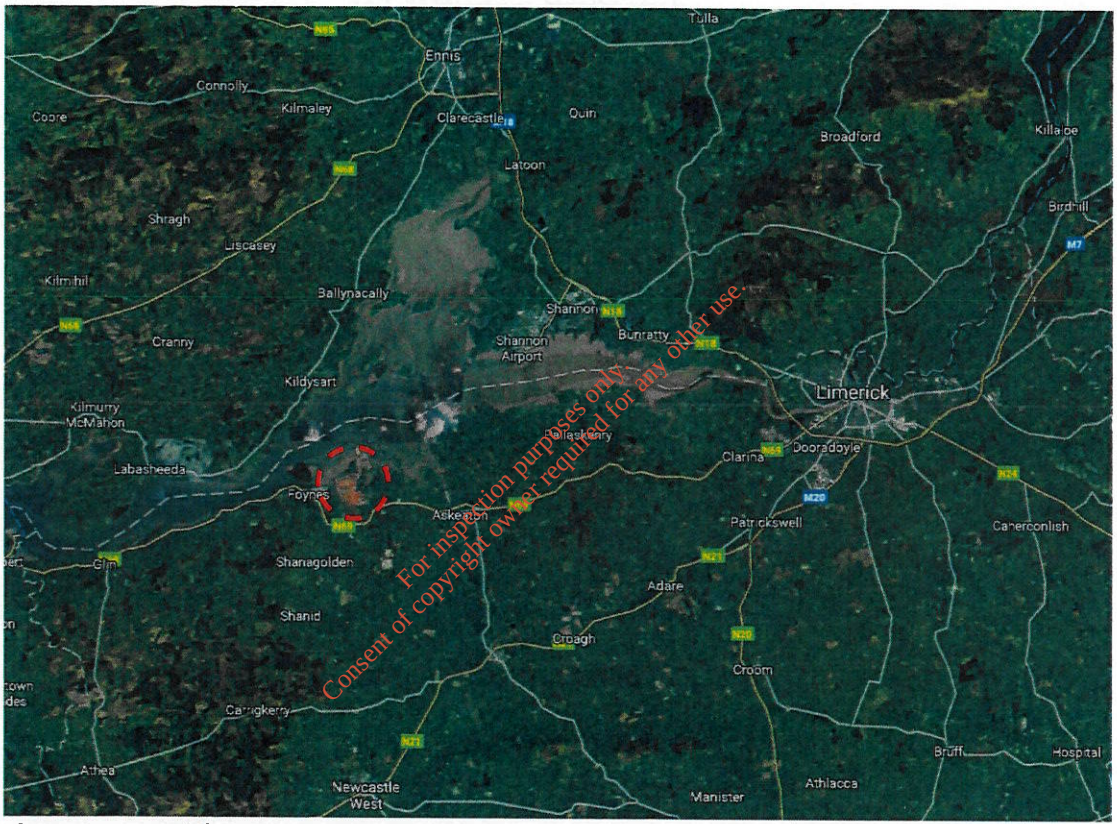





**Figure 1.1: Aerial view of the site and its surrounding context (source: Google Maps, 2017, annotated by Tom Phillips + Associates).**

The subject lands comprise an area of previously disturbed ground and a former Borrow Pit to the south. These lands are located within the overall landholding of the Applicant, which extends to c. 338 ha at Aughinish Island. The subject lands currently include a landscape contractor's compound and associated single storey compound building.

As set out in Section 1.3 below, the proposed development is below the threshold of development of a type that requires a mandatory *Environmental Impact Assessment (EIA)* – referred to as an EIAR in this document. However, it was considered appropriate that an EIAR be prepared given the nature and size of the proposed development and the location at Aughinish Island. In addition, given the proximity to River Shannon and River Fergus Estuaries and the Lower River Shannon, protected Natura 2000 sites, an Appropriate Assessment Screening is also submitted.

## 1.2 Purpose of the Environmental Impact Assessment Report

In order to ensure that all potential impacts associated with the development proposal are identified and addressed, this EIAR provides a systematic and integrated evaluation of the direct, indirect and secondary effects (positive and negative) of the project on the natural and socio-economic environment.

The aim of the approach is to identify and predict (for a given proposed development) any impacts of consequence; to describe the means and extent by which they can be avoided in the first instance or reduced or ameliorated; to interpret and communicate information about the impacts; and to provide an input into the decision making and planning process.

The aim of the EIAR is to:

- Describe the project using information on the site, design and size of the proposed development;
- Identify and predict any impacts on environmental features likely to be affected, having regard to the specific characteristics of the proposed development;
- Describe the measures envisaged in order to avoid, reduce and, where possible, remedy significant adverse effects;
- Provide the data required to identify and assess the main effects which the proposed development is likely to have on the environment; and
- Provide a Non-Technical Study of the information.



The preparation of the EIAR has been co-ordinated by Tom Phillips + Associates, Town Planning Consultants,[1] in association with other members of the Project Team as identified in Section 1.5 below.

A copy of the full EIAR is available for reference/purchase at the offices of the Planning Authority, Limerick City and County Council, Dooradoyle, Limerick.

## 1.3 Need for Environmental Impact Assessment Report

Directive 2011/92/EU of the European Parliament and Council (the EIA Directive) codified the existing 1987, 1997 and 2003 EIA Directives and requires the assessment of certain public and private projects which are likely to have significant effects on the environment. Thus, Environmental Impact Assessment (EIA) requires that projects likely to have significant effects on the environment by virtue of, *inter alia*, their nature, size or location are made subject to a requirement for development consent and an assessment with regard to their effects. As such, the EIA undertaken by the competent authority, will include an integrated evaluation of both direct and indirect impacts of a project on, *inter alia*, the natural environment; on beneficial uses of the environment, including man-made structures, amenities and facilities; and on the socio-cultural environment.

[1] Tom Phillips + Associates, Town Planning Consultants, 80 Harcourt Street, Dublin 2, D02 F449

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The EIA Directives have been transposed into Irish law for the purposes of this planning application by the provisions of Part X of the *Planning and Development Acts, 2000 – 2016* and Part 10 of the *Planning and Development Regulations, 2001 – 2015*.

It is noted that Directive 2014/52/EU was due to be transposed into Irish law by 16th May 2017 but that this process has been delayed. Notwithstanding the above, regard has been had to this directive in the preparation of this Report and the Circular Letter PI 1/2017 issued by the Department of Housing, Planning, Community and Local Government (15th May 2017) on the implementation of Directive 2014/52/EU.

The aim of the approach taken in this EIAR is, consequently, to identify and predict for the proposed development any impacts of consequence; to describe the means and extent by which they can be reduced or ameliorated; to interpret and communicate information about the impacts; and to provide an input into the decision making and planning process.

Specifically, with reference to Schedule 5, Part 2, 2(b) of the *Planning and Development Regulations, 2001-2015,* an Environmental Impact Statement (called an EIAR throughout) is a mandatory requirement for the *"Extraction of stone, gravel, sand or clay, where the area of extraction would be greater than 5 hectares".* Similarly, an EIAR is a mandatory requirement where the proposal would "result in an increase in size greater than 25 per cent or an amount equal to 50 per cent of the appropriate threshold" (Schedule 5, Part 2, 13).



The proposed development includes *inter alia* an extraction area of c. 4.5 hectares. In this regard, given the nature and size of the proposed development and the location at Aughinish Island, it was considered appropriate that an EIAR be prepared to address any potential impacts of the proposed development on the environment, as set out below.

As noted in the Preamble to the EIAR, a *Non-Technical Summary* of the EIAR has also been submitted.

A core objective of this EIAR is to provide the appropriate information and evaluation of the proposed development, having regard to the specific characteristics of the project, the proposed scale of the development and the potential for significant effects arising from the proposed development (in particular, biodiversity and landscape and visual impact).

## 1.4 Scoping of the Environmental Impact Assessment Report

A non-statutory scoping exercise was conducted for this EIAR to establish what format the EIAR would take and the range and aspects of the environment to be considered, and led to a decision on the matters to be addressed and the format to be used (the so-called 'grouped' ER format - see Section 1.5). This exercise was conducted following consultations between the Applicant, its professional advisors, discussions with Limerick City and County Council (LCCC), public consultation and consultation with statutory bodies.

The scope of the *Environmental Impact Assessment* conducted in respect of the proposed development includes the following:

- The requirements of the EIA Directive (Directive 2011/92/EU, the codified EIA Directive), the *Planning and Development Acts 2000-2015*, and the *Planning and Development Regulations, 2001-2015;*

- European Commission *Impact Assessment Guidelines*, 2009;

- *Guidelines on the recommended information to be contained in Environmental Impact Statements* published by the Environmental Protection Agency (EPA 2002);

- *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* (EPA 2003);

- *Revised guidelines on the information to be Contained in Environmental Impact Statements (Draft), September 2015*

- *Advice Notice for Preparing Environmental Impact Statements (Draft), September 2015*; and

- Regard was also had to the new EIA Directive 2014/52/EU adopted on 16th April 2014, and which came into force on 15th of May 2014 and the Circular Letter PL 1/2017 issued by the Department of Housing, Planning, Community and Local Government (15th May 2017).

- The requirements of Limerick City and County Council, as elaborated in the current *County Development Plan* and as advised by the Officers, to facilitate evaluation of the proposed development.

- The likely concerns of local residents and other third parties.

- The nature, location and scale of the proposal.

- The existing environment, as well as any vulnerable or sensitive features and current uses.

- The likely and significant impacts of the proposed development on the environment.

- Available methods of reducing or eliminating undesirable impacts.

- The *Planning and Development Regulations, 2001-2015* specify the aspects of the environment likely to be significantly affected by the proposed development, including in particular:

    - Population and Human Health, Biodiversity (Flora and Fauna).

    - Soil, Water, Air, Climatic Factors, Noise and Vibration, the Landscape and Visual Impact.

    - Material Assets – Site Services, Traffic and Transportation, Waste Management.

- Architectural, Archaeological and Cultural Heritage.

- The inter-relationship between the above factors and an indication of difficulties encountered in compiling the required information.

These considerations are addressed in the EIAR.

## 1.5 EIAR Methodology and Format

*Environmental Impact Assessment Reports* require the assimilation, co-ordination and presentation of a wide range of relevant information in order to allow for the overall assessment of proposed development. To allow for ease of presentation, and consistency when considering the various elements of the environment and the proposed development, a systematic structure is proposed for the main body of the statement.

The structure proposed is a 'Grouped Format' and is outlined below.

### 1.5.1 Receiving Environment (Baseline Situation)

In outlining the receiving environment, the context of the proposed development is described and assessed.

### 1.5.2 Characteristics of the Proposed Development

Consideration of the 'Characteristics of the Proposed Development' allows for a projection of the 'level of impact' on any particular aspect of the environment that could arise.

### 1.5.3 Potential Impact of the Proposed Development and Remedial and Mitigation Measures

This section allows for a description of the direct and indirect impacts that the proposed development may have on aspects of the environment likely to be significantly affected. This is done with reference to both the *Receiving Environment* and *Characteristics of the Proposed Development* sections, while also referring to the magnitude, duration, consequences (including use of natural resources) and significance of the development.

### 1.5.4 Avoidance, Remedial or Reductive Measures

A description of the measures envisaged to prevent, reduce and (where possible) offset any significant adverse effects on the environment that are practicable or reasonable, having regard to the potential impacts.

### 1.5.5 Residual Impact of the Proposal

Residual effects refer to those environmental effects predicted to remain after the application of mitigation measures and the likely significance of these residual effects are described.

### 1.5.6 Monitoring

This involves a description of monitoring required in a post-development phase, if required. It addresses the effects that require monitoring, in order to confirm the impacts predicted in the EIAR, along with the methodology and the agencies responsible for such monitoring.

### 1.5.7 Reinstatement

While not applicable to every aspect of the environment considered within this EIAR, certain measures need to be proposed to ensure that once extraction is discontinued, an appropriate restoration plan can be implemented with minimal impact on the environment.

## 1.6 EIAR Study Team and Guarantee of Competency and Independence

The *Environmental Impact Assessment Report* was completed by a project team led by Tom Phillips + Associates, who also prepared a number of the chapters.

The members of the team and their respective inputs are outlined below in Table 1.1. The EIAR Chapters as set out in Table 1.1 are provided with Appendices for each section provided immediately thereafter. A separate Non-Technical Summary of the EIAR is also enclosed within the inside cover.

In accordance with EIA Directive 2014/52/EU, we confirm that experts involved in the preparation of the EIAR are fully qualified and competent in their respective field. Each has extensive proven expertise in the relevant field concerned, thus ensuring that the information provided herein is complete and of high quality.



**1.1: EIAR Chapter Headings and Contributors**

| CHAPTER | ASPECT OF THE ENVIRONMENT ASSESSED | CONTRIBUTOR |
|---|---|---|
| Chapter 1 | Introduction | Tom Phillips + Associates (TPA) |
| Chapter 2 | Site Location and Context | TPA |
| Chapter 3 | Description of the Proposed Development | TPA, Golder Associates, AAL |
| Chapter 4 | Examination of Alternatives | TPA |
| Chapter 5 | Statutory and Public Consultation | TPA |
| Chapter 6 | Population and Human Health | TPA |
| Chapter 7 | Biodiversity (Flora and Fauna) | Ecology Ireland |
| Chapter 8 | Soils and Geology | Golder Associates |
| Chapter 9 | Hydrology and Hydrogeology | Golder Associates |
| Chapter 10 | Air Quality & Climatic Factors | AWN |
| Chapter 11 | Noise and Vibration | AWN |
| Chapter 12 | Landscape and Visual Impact | Brady Shipman Martin |

| | | |
|---|---|---|
| Chapter 13 | Traffic & Transportation | Transport Insights |
| Chapter 14 | Archaeological & Cultural Heritage | Irish Archaeological Consultancy Ltd |
| Chapter 15 | Waste Management | TPA |
| Chapter 16 | Interactions and Cumulative Impacts | TPA |
| Chapter 17 | Difficulties Encountered | TPA |

## 1.7 The Applicant

Aughinish Alumina Limited (the Applicant) operates a long-established alumina extraction plant, located on Aughinish Island on the southern side of the Shannon Estuary near the village of Foynes, Co. Limerick. The landholding extends to c. 338 ha.

The industrial activity undertaken at the site comprises the processing of bauxite in order to extract alumina (aluminium oxide) which is required for the production of aluminium as well as having a number of other industrial uses. The bauxite, which is transported by ship from South America and West Africa, is unloaded at a dedicated Marine Terminal located in the Shannon Estuary, and transferred by enclosed conveyor to the plant, where it is refined using the Bayer Process . This process results in the production of alumina and a bauxite residue, which is deposited in the Bauxite Residue Disposal Area ('BRDA'). The alumina extraction plant is permitted[2] to produce up to 1.95 million tonnes of alumina per annum, which is exported to smelters in other European countries, where it is used to produce aluminium.



The alumina extraction plant commenced operations in 1983, and has been the subject of considerable expansion and investment over the past 31 years. The plant is now one of the most efficient facilities for alumina extraction in the World, and the state-of-the-art facilities provide a total of c. 450 jobs directly plus 185 maintenance and installation contractor employees, and considerable further employment for local service industries.

Aughinish Alumina Ltd is owned by RUSAL, the world's largest aluminium producer, with interests throughout the aluminium production process – from bauxite ore mines to alumina extraction plants to aluminium smelters.

AAL has a limited store of rock on site which is used in the ongoing construction and maintenance works associated with the BRDA's on site. This existing stockpile of rock is due to be used during by the end of the 2017 period and thus alternative rock sources are being investigated.



[2] Planning Permission Reg. Ref. 05/1836 (ABP Ref. PL13.217976) refers.

## 2.0 SITE LOCATION AND CONTEXT

### 2.1 Location of the Subject Site

Aughinish Alumina Limited (the Applicant) operates a long-established alumina extraction plant, located on Aughinish Island on the southern side of the Shannon Estuary near the village of Foynes, Co. Limerick. The landholding extends to c. 338 ha and is located c. 6 km north-west of Askeaton and c. 30 km west of Limerick City Centre.

The Limerick – Foynes railway line runs to the south of the island, as does the N69 National Secondary Route between Limerick and Tarbert. Aughinish Island is accessed via the L1234 Aughinish Road, which is a two way local road which connects with the N69.

The application site is located is located towards the centre of the Applicant's landholding at Aughinish Island, to the south of the process area of the plant. The site is surrounded by grassland and the AAL Sports Grounds to the east and south, the BRDA to the west, and the plant area to the north.

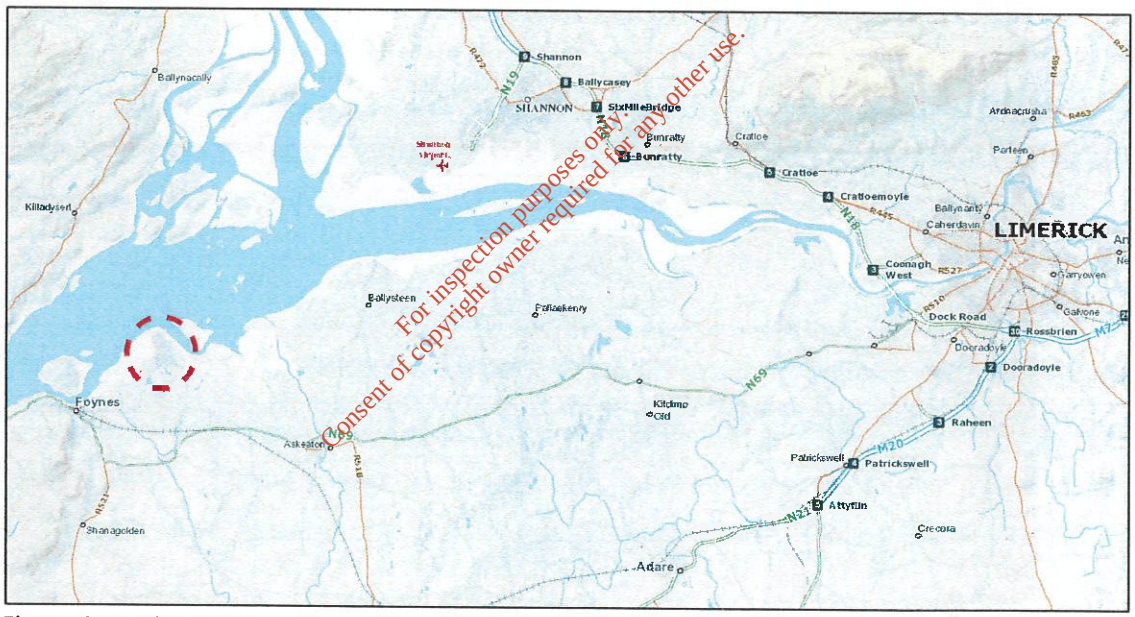





**Figure 2.1: Site Context Map with subject site highlighted in red (source: www.myplan.ie 2017, Annotated by TPA).**

### 2.2 Description of the Subject Site

The lands generally comprise of previously disturbed ground which has recently been used as a compound area for the landscaping contractor at Aughinish Alumina Ltd., which also includes a small contractors shed/building. The landscape contractor has relocated to another area within the Applicant's landholding.

The southern part of the application site comprises a former Borrow Pit area which was previously associated with the construction of the original plant. The extraction works within this former Borrow Pit area were completed in 1982 and it has since been left to naturally regenerate.

There is a difference in height of c. 9m between these two parts of the site due to the extraction works which took place previously. The application site is generally rectangular in shape and extends to c. 7 ha.

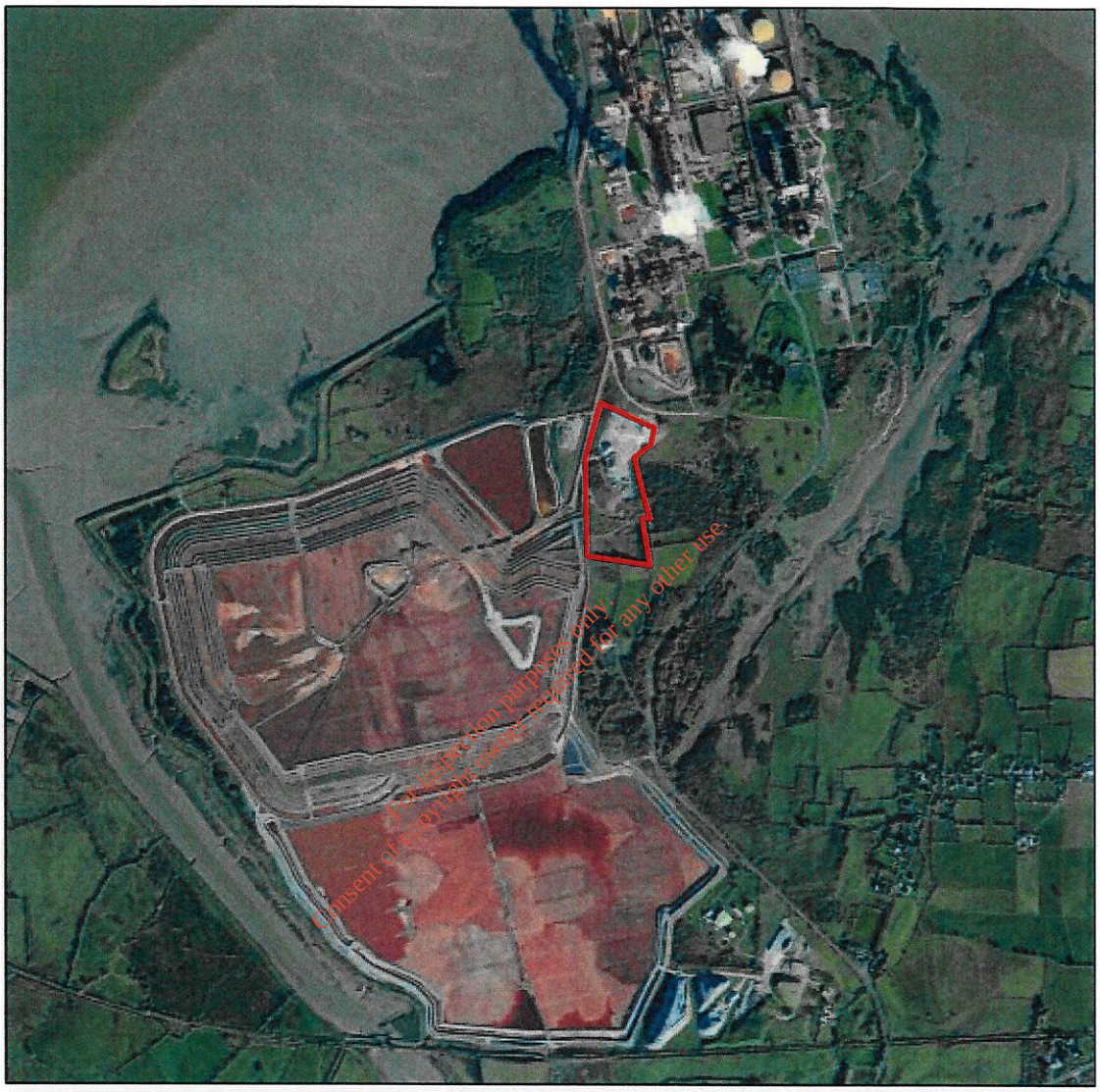




**Figure 2.2: Annotated aerial view of the site and its immediate context, illustrating the Applicant's landholding (source: Bing Maps, annotated by Tom Phillips + Associates).**

# 3.0 DESCRIPTION OF PROPOSED DEVELOPMENT

## 3.1 Introduction

This chapter of the *Environmental Impact Assessment Report* has been prepared by Tom Phillips + Associates in conjunction with Golder Associates and the Applicant and provides a detailed description of the proposed development together with details of the existing environment.

As set out in Chapter 2 of this EIAR, the subject site at Aughinish Island, Askeaton, Co. Limerick, is c. 7 ha and comprises previously disturbed ground including part of a former Borrow Pit. The site also includes a landscape contractors building.

In summary, the Applicant is applying for planning permission for development comprising the provision of a Borrow Pit of c. 4.5 ha to extract c. 374,000 m³ of rock, and associated crushing and stockpiling of the rock, to provide for ongoing works associated with the BRDA. The works also provide for a restoration plan of the extracted area.

## 3.2 Proposed Development

### 3.2.1 Overview of Proposed Development

AAL estimate there is a requirement for c. 374,000 m³ of rock (post-2017) to provide for ongoing works associated with the BRDA over the lifetime of the permitted development at Aughinish. The extracted rock will be used within the confines of the site and will not be transported off site.

The proposed Borrow Pit extraction area is c. 4.5 hectares with extraction occurring to an elevation of c. 8.5 metres OD (overall depth of the Borrow Pit is c. 8 metres). Extraction will take place in a northern direction, from the existing former Borrow Pit toward the plant area (Figure 3.1). It is proposed that extraction will occur over a 10 year period, with the Borrow Pit operational between April and September, with blasting occurring up to 7 times within this period (per year).

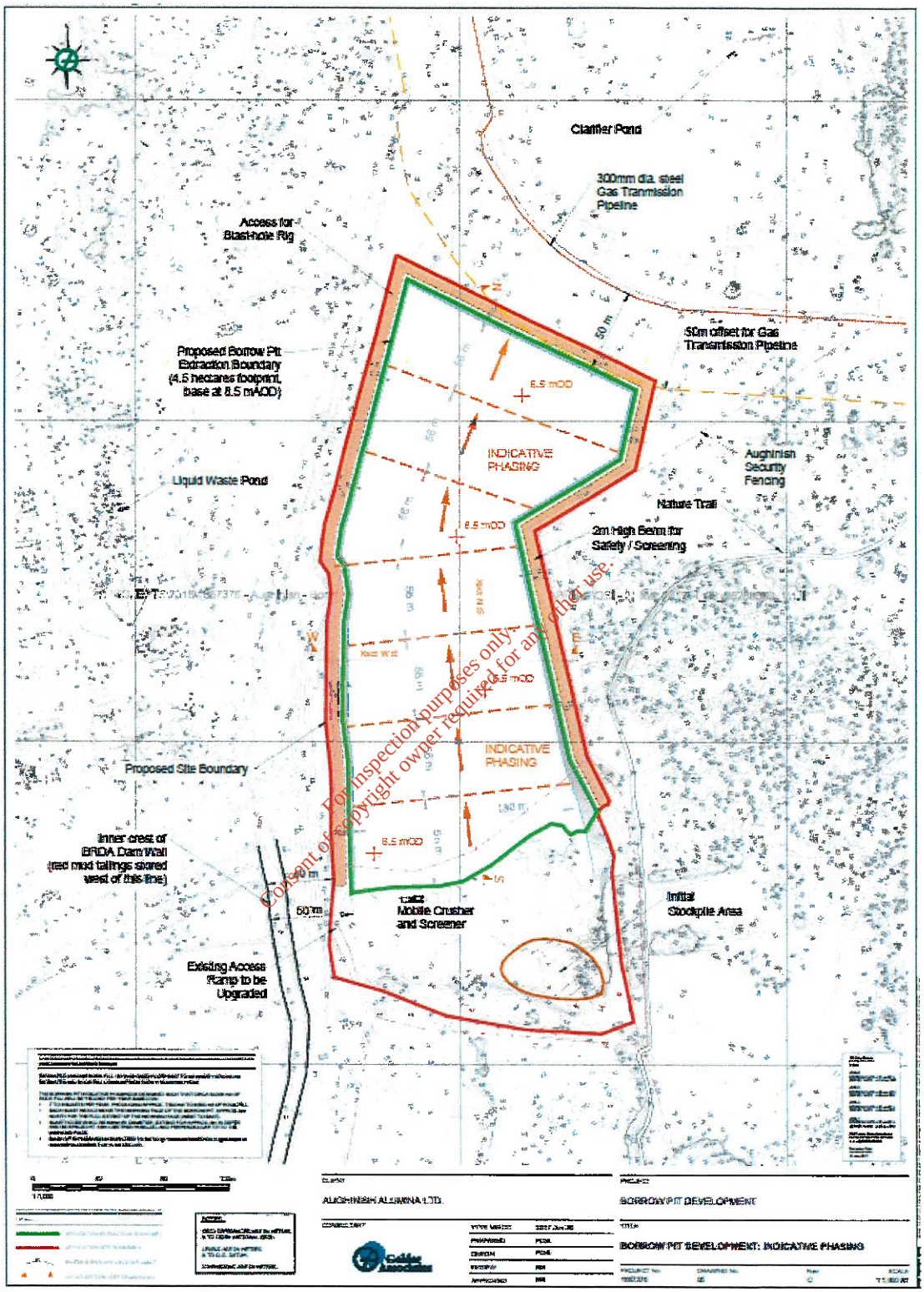





**Figure 3.1: Proposed Site Layout Illustrating Indicative Borrow Pit Phasing (source: extract from Golder Associates Dwg. No. 05).**

### 3.3.2 Site Area

The site area subject to the application comprises c. 7 ha. This comprises the existing former Borrow Pit and lands to the north which comprises disturbed ground. The extraction area of the Borrow Pit is c. 4.5 ha. The site is accessed via a private road which links to the L1234 Aughinish Road.

### 3.3.3 Phasing

It is proposed that the Borrow Pit will be extracted over a number of phases during the lifetime of the development. The Pit will be extracted in a northern direction, from the existing former Borrow Pit area toward the plant (Figure 3.1). It is expected that the extraction of the Pit will be phased over a 10 year period. The existing contractors shed (of. c. 86 sqm) will be demolished as part of the 1st phase of works on the site.

### 3.3.4 Volume Calculations

The volume of material to be extracted from the proposed extension to the Borrow Pit site has been calculated by Golder Associates. The calculations indicate that there is c. 374,000 cubic metres (c. 673,200 tonnes) of material to be extracted within the proposed extension area.

It is expected that c. 37,400 $m^3$ will be extracted on average per annum. To allow for instances where there is an additional requirement for rock on site in any given year a maximum extraction rate is allowed for at c. 45,000 $m^3$ per annum. This would provide for a resource of c. 8.3 years. However, extraction will not always be at this maximum rate depending upon the requirement for rockfill within the site, and therefore a planning permission for extraction over a 10 No. year period is sought.



## 3.4 Site Access and Access Road

The proposed development will be accessed via the L1234 Aughinish Road to the south of the application site which links to the N69. The Borrow Pit itself can only be accessed via the internal road system with the Applicant's landholding. There is an existing hard surface haul route providing access to the existing former Borrow Pit.

The extracted rock will not be transported outside of the Applicant's landholding and will be used in ongoing construction projects within Aughinish Island. The haul route associated with the proposed development will relate to trucks exiting the application site and turning left (south) and joining the one-way internal haul route which runs around the perimeter of the BRDA.

Vehicles exiting the Applicant's landholding (from the application site) shall make use of the existing wheel wash facilities within the plant area.

### 3.5 The Extraction Process

There are three broad stages in the extraction process:

1) Blasting of rock faces;
2) Crushing of Rock; and
3) Stockpiling of Rock.

Each of these steps is summarised below.

#### 3.5.1 Blasting of Rock Faces

In order to extract the limestone, the active rock face must be blasted using explosives. The blast charges will be placed at regular intervals. It is anticipated that blasting will occur on site c. 6 to 7 times per year. The operational period of the Borrow Pit (blasting, crushing and stockpiling) will be restricted to between April and September each year.

The Applicant will employ specialist blast contractors to design and carry out each blast in the Borrow Pit. All blasts at the site are subject to a specific design, which is carried out in accordance with the relevant design standards, which establish best practice and safety, and has regard to the built environment.

Each blast is specifically designed to release a quantum of rock from the working Borrow Pit face. In this regard, a pre-determined grid of vertical holes is drilled on top of the Borrow Pit face to a required depth. The intervals between the drill holes are specifically designed having regard to the explosives to be placed within each of the holes and the depth of the rock, which is sought to be released. There are pre-determined intervals or delays in the detonation of explosives in the drilled holes. This process minimises vibration arising from the blasting and increases the efficiency with which the rock can be removed. The shot-firing of the blasts and the explosives used are monitored by the Borrow Pit Manager.



The preliminary blasting programme is expected to produce c. 7,500 to 8,500 $m^3$ of rock fill per blast (c. 13,500 to 15,300 tonnes).

It is proposed to develop a site-specific protocol for blasting in cooperation with the blasting contractor and in accordance with current international best practice. On completion, the protocol will be incorporated into the *Environmental Management System* for the Borrow Pit. The protocol will consider all activities related to blasting, especially the selection of explosives (including forms such as slurries or emulsions), storage and handling controls, blast design considerations and loading controls.

#### 3.5.2 Crushing of Rock

Once blasting has occurred, the blasted rock is fed into the mobile primary crusher (by way of a wheel loading shovel or large tracked excavator bucket), which is located on the Borrow Pit floor. There are two crushing stages, primary crushing and secondary crushing. Each crusher consists of a set of electrically operated rotating drums, which function to reduce the particle size of the rock to a scale that can be easily transported using belt conveyors.

The crushing and screening is expected to process c. 450 $m^3$ to 550 $m^3$ per day.

### 3.5.3 Stockpiling of Rock

The crushed rock will be stockpiled to the south of the proposed extraction area (within the existing former Borrow Pit area) using a wheel loading shovel. All of the extracted rock will be used on site in the ongoing construction of the BRDA and other associated works within the Applicant's landholding. None of the rock will be transported for use off site.

## 3.6 Borrow Pit Operations

In this regard, the operation of the Borrow Pit will take place between 08:00 and 1800 hours on Monday to Friday. No operations will take place on site on Saturdays, Sundays and Public Holidays.

## 3.7 Borrow Pit Safety and Security

Safety and security measures will be put in place for the extraction operations on the subject site. In this regard, fences and landscaping berms will be located and regularly maintained along all boundaries of the site, thereby preventing inadvertent access to the Borrow Pit.



## 3.8 Site Services

In terms of site services, it is noted that there are no built structures proposed as part of the proposed development. There is no water supply or foul water drainage serving the site. Persons employed on site will use the existing facilities available at the Applicants facility.

A pumped water system will be installed as a mitigation measure in relation to dust emissions associated with operations at the Borrow Pit. In addition, a mobile bowser will also be made available for dust suppression on haul roads and on stockpiles being generated or being reduced by haulage of crushed rock to the BRDA.

As extraction will take place above the water-table, rainwater will be allowed to naturally infiltrate the ground surface, with any surface runoff being collected in a sump on the Borrow Pit floor, prior to reporting back to the Plant Effluent Treatment System.

## 3.9 Borrow Pit Landscaping and Restoration Plan

A restoration landscaping proposal for the site is submitted by Brady Shipman Martin Landscape Architects as part of the Planning Application Documentation (Drawing No. 101 refers) and as per Figure 3.2 below.

The landscaping proposals include an allowance for the natural regeneration of vegetation in certain areas together with additional hedge and tree planting.

All plant will be removed at the end of the extraction activities. Screening berms will be used to dress the Borrow Pit faces and hard standing areas with soils of varying degrees of thickness depending on the type of planting proposed.

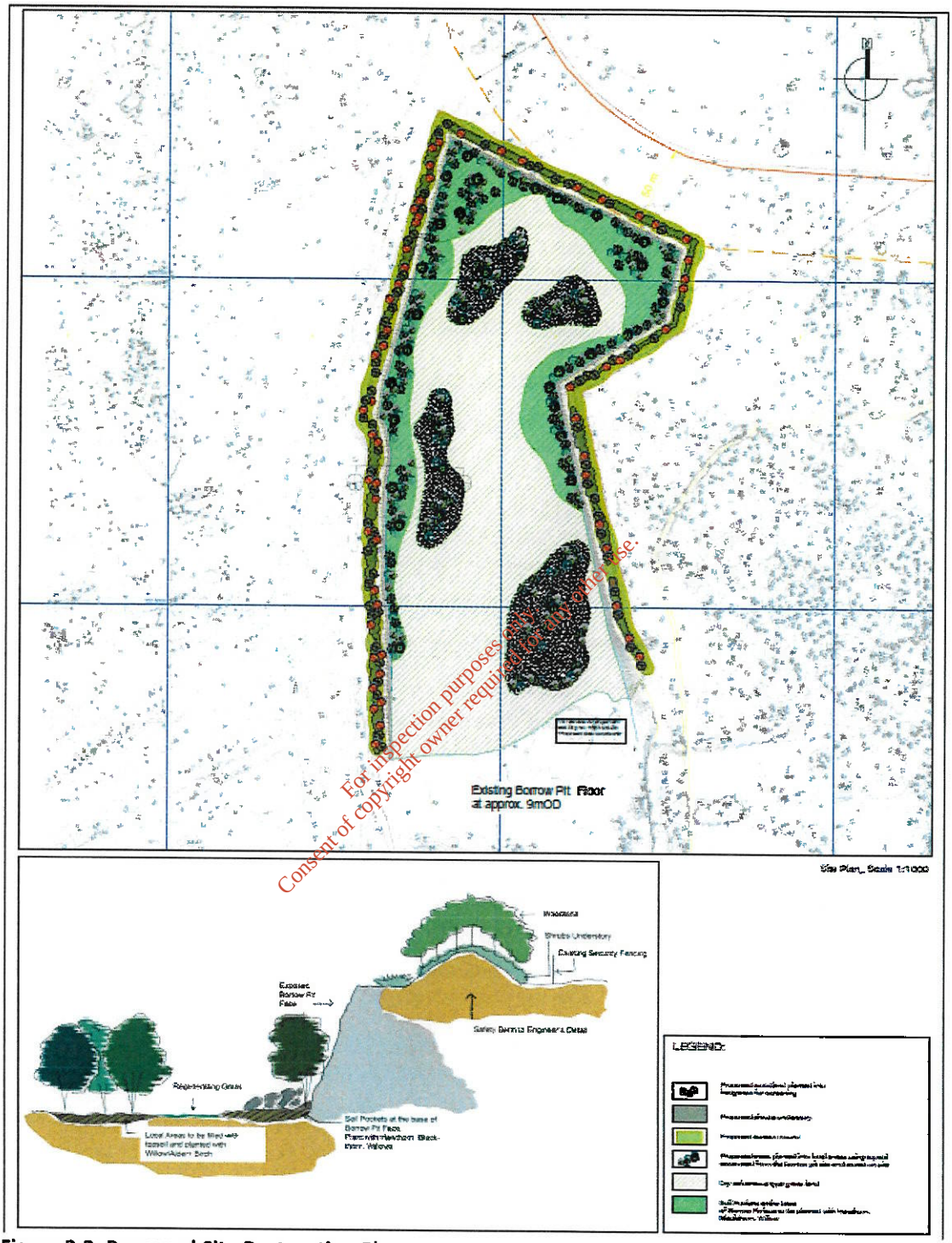



**Figure 3.2: Proposed Site Restoration Plan**
**(source: extract from BSM Landscape Architects Dwg. No. 101).**

# 4.0 EXAMINATION OF ALTERNATIVES

## 4.1 Main Alternatives Studied

### 4.1.1 Alternative Locations

The Applicant has already provided significant capital investment in the operation of the alumina extraction plant at Aughinish Island. The provision of a Borrow Pit at a location within this landholding was investigated further given the requirement for additional rock fill for construction purposes and to reduce the reliance on external sources for this material. The location of the proposed Borrow Pit has had regard to the availability of land within this area, the location of the former Borrow Pit (within the south of the development site) and the location of sensitive receptors in the vicinity of the site.

In addition, as a result of Section 261 and Section 261A of the *Planning and Development Acts, 2000-2016*, a large number of quarries across Ireland that do not have the requisite permissions and particulars in place or that have significant negative impacts on the environment, will be required to cease operations. As a consequence, the importance of the high-quality reserve on this site for use in the construction activities within Aughinish Island cannot be underestimated.



### 4.1.2 Alternative Designs/Layout

A number of alternative Borrow Pit designs (different size of extraction area, depth of Borrow Pit, direction of extraction, etc.) have been investigated within the overall landholding of the Applicant. This has also included alternative layouts and had regard to the height of the water table at this location.

The design which now forms part of the development proposal was chosen as it was considered to provide for the optimum solution in terms of extracting materials using a best practice approach and which also lends itself to creating the least visual impact in the surrounding area.

### 4.1.3 Alternative Mitigation Measures

The mitigation measures outlined in this EIAR, where appropriate, have been developed by competent experts relevant to the aspect of the environment under consideration and represent best practice with a view to avoiding or otherwise minimising potential impacts on the environment.

There are no predicted residual impacts once mitigation measures have been successfully applied and as such alternative mitigation is not considered necessary.

### 4.1.4 "Do Nothing" Alternative

The "do nothing" alternative would involve the importation of c. 374,000 $m^3$ of rock, as permitted, to provide for the construction of the BRDA, further to the existing stockpile of rock within the AAL landholding being used post 2017. This may have an adverse impact on the local area through additional movements of Heavy Good's Vehicles (HGV's) on the local road network used to import rock.

## 4.2 Conclusion

The location of the proposed Borrow Pit within the Applicant's overall landholding has had regard the availability of land and location of sensitive receptors. The design proposed for the Borrow Pit is considered to represent the most appropriate size, depth and extraction method for this site and will allow the Applicant to rely on a high-quality reserve which will be available for construction activities within their landholding.

# 5.0 POPULATION AND HUMAN HEALTH

The area in which the subject site is located is predominantly rural in character. The immediate area is dominated by the Aughinish Alumina Limited landholding (c. 338 ha) with agriculture being the dominant land use in the surrounding area.

Residential property is generally dispersed along local roads with increased density notable at settlements such Barrigone, Fawnamore and along the N69 leading into Foynes and Askeaton. The closest residential property to the application site is c. 1km to the east.

According to the 2016 Census the subject site at Aughinish Island is located within the Electoral Division of Aughinish (ED No. 109) and had a population of 238 No. persons in 2016. This represents a population percentage change of 11.74% or an actual population change of 25 from the 2011 total population of 213 No. persons (see Figure 5.1 below). The average household size in the electoral division of Aughinish has also fallen to 2.93 persons in 2016 from 2.96 persons in 2011.



The alumina extraction plant operated by the Applicant at Aughinish Island provides a total of 450 jobs directly plus another 185 maintenance and installation contractor employees, with considerable further employment for local service industries. Aughinish Alumina Ltd. contributes significantly to employment provision in the local and Limerick area and the proposed development seeks to further copper fasten these employment levels at the facility.

The potential impacts between human beings and Air and Climate, Noise & Vibration, Landscape and Visual, Water, Traffic and Health and Safety are further detailed in Section 5.0 of the EIS. In summary, it is considered that there will be no further impact experienced on the environmental sensitivities in the area over those experienced at the existing AAL plant. The proposed Borrow Pit development will result in a reduction in traffic on the local road system (post 2017 once the existing rock fill resources on site are exhausted) as there will no longer be a requirement to import rock fill from external sources to the facilitate construction works at AAL's landholding.

## 6.0 STATUTORY AND PUBLIC CONSULTATION

A Pre-Application Consultation Document was issued to the Statutory Bodies, detailed in Chapter 6 (via email on 4th April 2017). The Consultation Document highlighted the proposed works within the Applicants landholding and requested that any comments in this regard be provided to TPA by 28th April 2017.

Outlined below is a summary of the responses received from Statutory Bodies.

An Bord Pleanála (ABP) responded via email on 19th April 2017 that they would not be making any comment on the EIAR.

Transport Infrastructure Ireland (TII) responded via email on 25th April 2017 and outlined that TII are not in a position to engage directly with planning applicants in respect of proposed development but they did provide general guidance in relation to EIAR scoping issues and did highlight that regard should be had to the preferred route for the N21/N69 Foynes to Limerick scheme. The commentary in the TII submission has been considered in preparing this EIAR.

The Geological Survey Ireland (GSI) responded via email on 28th April 2017 and noted that an audit of County Geological Sites has not been carried in Co. Limerick yet but a list of potential sites has been development and is available on the GSI Public Viewer. The GSI states that *'From our records there are no un-audited County Geological Sites within your area of interest and therefore we will be making no further comments on the proposed development'*. Regard has been had to the commentary provided by the GSI in this EIAR.



The Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs (DoAHRRGA) responded via email on 10th May 2015 and outline general guidance in relation to the preparation of an EIAR with regard to archaeology. Regard has been had to the commentary provided by the Department in this EIAR.

In addition, to the correspondence outlined above it is noted that the Applicant has further consulted with the Environmental Protection Agency (EPA) and Gas Networks Ireland (GNI) due to the nature of the proposed development and the existing infrastructure at Aughinish Island which relates to the operation of the alumina extraction plant.

A conference call took place on 3rd March 2017 between the Applicant and representatives of GNI to discuss the proposed development and the location of the 300mm diameter steel Gas Transmission Pipeline which is located to the south of the plant and which (at the closest point to the extraction area) is c. 50m to the north of the Borrow Pit. GNI were satisfied based on the information provided by Golders Associates, that the 50m setback provided to the Borrow Pit face and a 50mm/sec peak velocity on the pipeline were sufficient. It was agreed with GNI that:

- The Applicant will give GNI notice of any trial blasting and subsequent blasts during the initial development of the Borrow Pit;
- GNI are informed by the Applicant of any amendment to the vibration model based on any trial blasts;

- GNI are informed by the Applicant of the blasting schedule for the Borrow Pit and are given notice to be present at any trail blasts and subsequent blasts and given access to monitoring records of the blasts.

The EPA have been consulted on an ongoing basis with regard to the proposed development in the context of existing activities on the overall alumina extraction site which is subject to an Industrial Emissions Licence.

A Pre-Application Consultation Document was issued to local residents in the immediate area (south and east of Aughinish Island) and to resident/community associations in Askeaton, Foynes and Shanagolden (via letter on 6th April 2017). This letter was issued to 157 No. local residents and 3 No. resident/community associations. The addressees to whom the letter was sent is based on the list of neighbours to which the Applicant invites to a yearly meeting to keep updated with regard to operations and future development of Aughinish Alumina Ltd. Feedback from the addressees was requested to be issued to the Applicant by 30th April 2017. 1 No. response was received from a local resident in this regard.

Articles have been published in local newspapers in relation to the proposed development of the Borrow Pit. An article was published in the Limerick Leader on 1st June 2017 in relation to the proposed development. In the article, the Cappagh Farmers Support Group were quoted as having concerns in relation to the potential of the blasting associated with the Borrow Pit to impact on the foundations of the BRDA.



In this regard, we note that Golder Associates have prepared a report entitled *Borrow Pit: Phase 1 BRDA Blast Vibration Assessment*, which is included as Appendix 11.1 of the EIAR. This report provides an assessment of the effect of blasting within the footprint of the proposed Borrow Pit and was found to pose minimal risk to the stability of the adjacent BRDA. The report also provides for recommendations which will be incorporated into the proposed development.

## 7.0 BIODIVERSITY (FLORA AND FAUNA)

An ecological impact assessment and Screening for Appropriate Assessment was prepared for the proposed borrow pit. Field surveys were undertaken at the site of the proposed borrow pit in 2016 and 2017 by Ecology Ireland. Habitat & botanical studies, baseline bird, mammal and other taxa studies were completed to inform this EcIA. A comprehensive desktop review was also completed, including consideration of other available ecological reports and studies, as part of the overall ecological assessment of the proposed borrow pit development. Assessment of the potential impacts on the existing ecology of the study area (i.e. proposed borrow pit site and surrounding area) arising from the proposed borrow pit was subsequently made, and appropriate mitigation measures to reduce potential negative impact(s) to an acceptable level were considered.

Habitats within the proposed borrow pit area are considered to be of low to moderate ecological value overall. There are no Annex I habitats listed under the EU Habitats Directive present within the proposed borrow pit works footprint. There are two Annex I habitats within Aughinish Island, adjacent to the proposed borrow site boundary (Dry Calcareous Grassland (GS2); 6210)) and to the west (Hay Meadow (GS2); 6510)) of the existing BRDA

and the aluminium production facility (*i.e.* Buildings and artificial surfaces (BL3)). Annex I habitats are outside the proposed borrow pit location and as such will be maintained and not directly impacted by the proposed borrow bit development. The existing habitats within the proposed borrow pit location are considered to be of moderate (i.e. Scrub (WS1), Grassland (GS2) and Immature Woodland (WS2)) or low overall ecological value (Buildings and artificial surfaces (BL3) and Spoil and Bare Ground (ED2)). No botanical species protected under the Flora (Protection) Order (1999), listed in the EU Habitats Directive (92/43/EEC), or listed in the Irish Red Data Books were recorded within the proposed borrow pit site boundary.

No mammal species of conservation concern were recorded within the proposed borrow pit area. The proposed borrow pit area is of generally low ecological value for mammal species in general. No mammal burrows or resting places were recorded during the site walkovers of the proposed extraction area. The only mammal species confirmed to be present, Fox, Rabbit and Irish Hare, are all common locally and nationally.

The bird surveys carried out at the site has established that the site supports a bird community dominated by small passerine species typical of lowland farmland. The site does not appear to be of any importance for wintering waterbirds as a roosting or foraging area. Cormorant was only recorded overflying the proposed development area.

The proposed borrow pit works (e.g., rock-breaking, blasting, crushing, screening, storage), may potentially impact on the existing ecology of the site and wider area. The site is not located within any designated site but is located proximate to several designated conservation areas which are considered within the zone of influence of the proposed development (*i.e.* indirect hydrological impact and ex-site disturbance impacts). The 'Do Nothing' and potential for cumulative impacts are assessed.



With the implementation of the environmental controls and mitigation outlined in the EclA it is concluded that the residual impacts on birds, mammals (including bats) and other fauna will be highly localised and slight negative in the short-to-medium term.

The residual negative impacts on habitats and associated species in the wider area are considered, *neutral imperceptible* in the long term. Potential impacts on habitats and botanical species at the site are regarded as slight positive as the restoration aims of the landscaping are achieved in the long-term. In conclusion, it is felt that the proposed development has adequately considered the ecological issues into its design, so that its impact on the existing environment results in an overall long-term slight, positive residual impact.

## 8.0 SOILS AND GEOLOGY

The principal soil types underlying the Application Site in which the development will take place consist of renzinas and lithosols, which have generally originated from limestone glacial till, with bare rock outcropping at frequent intervals. However, much of the soil cover at the Application Site has been removed due to previous activities, including the handling and temporary storage of overburden and aggregate materials previously extracted from the Borrow Aarea, for use in the construction of the BRDA.

Sub-soils underlying the Application Site are either absent or consist of glacial till of Carboniferous origin. Large areas of made-ground occur to the west and north-east, with estuarine sediments also occurring to the west. The depth of overburden across the Application Site where it has not been stripped or re-worked is typically variable in thickness (ranging from ca. 0.5 to 3 m).

The local bedrock geology of the area consists of mainly clean, massive, light grey, fine grained, micritic limestones (Waulsortian Limestone). These are fossiliferous, often occurring as massive knoll forms with cherty shaly-interbeds that are frequently dolomitised.

A geophysical (Electrical Resistivity Imaging (ERI)) survey was carried out over the Application Site area. The survey indicated that the majority of the site is underlain by competent limestone bedrock and associated discrete fracture zones/karst features. Based on the findings of the ERI survey a total of 6 boreholes were drilled to provide information on the bedrock geology and groundwater underlying the Application Site. All boreholes encountered fine grained Waulsortian Limestone and were drilled to a depth of 15 m below ground level (bgl). All boreholes, except one (BH4), encountered zones of heavily fractured ground or possible cavities.

The extraction of limestone bedrock will be on a phased basis from the Borrow Area in a northerly direction. The materials to be extracted from the Borrow Area will be used as raw materials for the maintenance and construction of facilities associated with the Aughinish Site. These activities are considered an acceptable use of the resource. The extraction of the limestone unit on the Application Site is an important aggregate resource but not an unusual geological unit and no geological importance or heritage value is attributed to this unit at the Application Site. Blasting and bedrock removal may cause unstable rock faces, however this would be a temporary impact at the Site. In the long-term, there will be no deleterious effects on the remaining bedrock and groundwater in the Borrow Area.



A series of mitigation measures will be adopted for the proposed extraction activities to reduce any potential impacts on the receiving soils and geology environment at the Application Site.

## 9.0 WATER

The hydrogeological and hydrological impacts associated with the proposed development at the Application Site were assessed by means of a desk study, reference to a number of freely available technical reports/papers, consultations with statutory bodies and fieldwork (geophysical (resistivity) survey and subsequent drilling of 6 groundwater monitoring boreholes).

### Surface Water - Hydrology

The area of the Aughinish site including the plant and the BRDA is bounded to the north and west by the Shannon Estuary, to the east and southeast by Poularone Creek and to the southwest by the Robertstown River to form Aughinish Island.

On the island, eighteen springs (Estuarine Streams) of measurable flow have historically been identified, with the locations of these springs generally corresponding to areas that

were infilled during the construction of the facilities at Aughinish Island (i.e. where regrading works filled-in fracture zones in the bedrock surface). The springs are submerged during part of the tidal cycle and their flow varies significantly with seasonal fluctuations in rainfall. In addition, two additional springs exist in the Plant Area, a spring located to the north, and a waterbody lying at the southern end of the Plant Area, to the east of the South Pond.

The Estuarine Streams are the dominant mechanism for the discharge of recharge to groundwater from the island, with negligible output via groundwater base flow to the estuary and Poulaweala Creek.

**Groundwater - Hydrogeology**

The groundwater present in the Waulsortian Limestone underlying the Aughinish site is a Regionally Important Aquifer for the water resources of County Limerick as a consequence of enhanced secondary permeability from faulting and fracturing and enhanced primary permeability from dolomitisation (where it occurs).

The interpretation of the hydrogeological conceptual model presented in Golder (2015) identified that the groundwater present beneath Aughinish Island comprises a freshwater lens isolated laterally from the mainland by being laterally hydraulically isolated by Poulaweala Creek, Poularone Creek and the Robertstown River and the underlying saline groundwater. The Waulsortian Limestone bedrock beneath the Plant Area to the north of the Application Site has a very low primary permeability. As a consequence, flow of groundwater is dominated by the location of karstified fracture zones and valley infill. The depth at which groundwater is encountered across this area is typically within 1.5 m to 10 m of ground level which implies that the fracture zones start from a relatively shallow depth, and that, in the centre of the Plant Area, groundwater flows preferentially through the limestone rock fill used to level the valleys during the construction of the plant.



The overall trend for groundwater flow in the Plant Area is that flow is radial from approximately the centre of the Plant Area and discharges via springs (the Estuarine Streams) to the Shannon Estuary and the Poularone Creek.

In order to understand the hydrogeological setting and the potential for the presence of dolomitisation or karstic features within the footprint of the proposed Borrow Area a geophysical and intrusive investigation were undertaken. Based on the interpretation of the geophysical survey, possible areas of fractured bedrock and karst were identified in the proposed Borrow Area. As a consequence, these areas were targeted for investigation by the drilling of boreholes to identify whether the presence of karstic features could also include groundwater at a piezometric level that is above the base of the proposed excavation level (8.5 m OD) and in quantities that could be problematic to the excavation. Based on the findings of the geophysical survey 6 boreholes were drilled to 15 m depth below ground level which is deeper than the proposed depth of working.

Of the boreholes drilled, BH1, BH2, BH3, BH5 and BH6 encountered cavities within the limestone, whilst no cavities were observed in BH4. Water strikes during drilling were noted in BH1 and BH2 at elevations of 3.82 m OD rising to 7.32 m OD, and at 8.03 m OD respectively. No other water strikes were noted. Following completion of drilling, the boreholes were developed and pumped in preparation for test pumping. The recovery of the water level was sufficiently slow that test pumping was not possible, thereby indicating

that regardless of the presence of karst, the limestone was insufficiently transmissive to result in a rapid inflow of groundwater to the drilled boreholes in the areas considered.

Based on the findings of the investigation, it has been interpreted that the Waulsortian Limestone in the area of the proposed Borrow Area has limited secondary permeability. As a consequence, monitoring boreholes drilled to beneath the base of the proposed elevation of excavation have either not encountered groundwater or have encountered groundwater at elevations that do not compare laterally, indicating that either the water observed relates to perched waters in isolated karstic features, or that the aquifer transmissivity is low, thus enabling steep hydraulic gradients to develop.

It can therefore be concluded that the proposed Borrow Area excavation will encounter limited groundwater inflows and or isolated perched units of groundwater. The lateral extent of isolated seepages is interpreted to be limited and the transmissivity of the formation insufficiently large to measure by test pumping. Hence, it is interpreted that the accumulation of surface water from precipitation in the excavation could be larger than any isolated seepages of groundwater.

Three groundwater monitoring boreholes provide analyses on existing groundwater quality across the Borrow Area. The results when compared with EPA Interim Guideline Values for Groundwater Protection and S.I. No.9 (2010), the European Communities Environmental Objectives (Groundwater) Regulations show no exceedances over the period monitored.



Mitigation measures will be put in placed at the Site to ensure that no adverse environmental impacts will occur to the underlying hydrogeology as a result of the proposed activities by adopting the existing Environmental Management System (EMS) for the Aughinish facility, and ensuring that no excavation will take place below 8.5 m OD (the current floor elevation of the existing Borrow Area). The proposed development will take place above the water-table and there will be no discharge to surface water. The intrusive hydrogeological investigations undertaken as part of this EIS indicate that there will be minimal impact to the groundwater regime associated with this proposed development, as the bedrock underlying the proposed borrow pit void extension is essentially 'tight'. The planning of the extraction and continuing good housekeeping during operations, by adhering to best industry practices within the Borrow Area will mitigate against potential impacts on the surrounding environment.

As no active borrow pits occur in the immediate vicinity of the proposed development, there will be no cumulative impacts on the surface water or groundwater environments as a result of the proposed activities at the Application Site.

## 10 AIR QUALITY AND CLIMATE FACTORS

In terms of the existing air quality environment, data available from similar environments indicates that levels of dust, particulate matter less than 10 microns ($PM_{10}$) and less than 2.5 microns ($PM_{2.5}$) are generally well below the National and European Union (EU) ambient air quality standards.

Air dispersion modelling was carried out using the United States Environmental Protection Agency's regulatory model AERMOD. The aim of the study was to assess the contribution of

operational emissions of dust, $PM_{10}$ and $PM_{2.5}$ from the Aughinish Alumina Borrow Pit to off-site levels of release substances. This study was carried out based on worst case predicted levels of operation at the Borrow Pits.

*Modelling Results for Aughinish Alumina Borrow Pit based on worst-case predicted operational conditions*

The worst-case dust deposition level at the boundary including background peaks at 106.7 mg/($m^2$*day) which is 31% of the TA Luft Limit Value of 350 mg/($m^2$*day).

With regard to $PM_{10}$, the modelling assessment has found that ambient $PM_{10}$ concentrations (including background) are in compliance with the relevant limit values, reaching at most 53% of the 24-hour limit value (measured as a 90.4$^{th}$%ile) and 52% of the annual limit value at the worst-case off site location.

With regard to $PM_{2.5}$, the modelling assessment has found that ambient $PM_{2.5}$ concentrations (including background) are in compliance with the relevant limit values, reaching at most 46% of the annual limit value at the worst-case off site location.

*Climate*

There is the potential for a number of greenhouse gas emissions to atmosphere from vehicles and generators used at the borrow pit which give rise to $CO_2$ and $N_2O$ emissions. However, due to the size and nature of the borrow pit activities, $CO_2$ and $N_2O$ emissions have a negligible impact on climate.



*Mitigation Measures*

A range of mitigation measures will be in place onsite to ensure that dust emissions are minimized at source. These measures include the restriction on vehicle speed onsite, the use of a bowser during periods of dry weather and the covering of vehicles with loads that have the potential to emit fugitive dust. The implementation of the full range of mitigation measures outlined in the Air Quality & Climate Chapter will ensure than compliance is maintained with the air quality air quality standards and guidelines.

## 11 NOISE AND VIBRATION

The likely noise and vibration impacts associated with the proposed Borrow Pit development at Aughinish Alumina has been assessed by AWN Consulting Ltd.

The existing noise climate has been surveyed during day, evening and night-time periods at nine boundaries and five noise sensitive locations. Noise sources that contribute to the measured noise levels include distant activity from the existing Aughinish Alumina facility as well as other noise sources such as traffic on the existing Local and National road network, noise from the nearby port, birdsong, pedestrian voices, dog barking, occasional aircraft movements and some slight wind generated noise on nearby foliage.

The noise impact assessment has focused on the potential outward noise and vibration impacts associated with the construction and operational phases of the proposed development on its surrounding environment.

During the construction phase of the project no significant impacts are predicted at the closest noise sensitive locations beyond the site boundaries once suitable noise mitigation measures are incorporated into the construction phase. A schedule of noise and vibration mitigation measures including construction working hours, noise limits and screening will all be employed to ensure any noise and vibration impacts during this phase will be kept to a minimum.

During the operational phase, the potential significant sources of noise and vibration are those associated with rock removal (i.e. blasting activities, crushing of rock and any other rock breaking that may be required), as well as vehicular movement to, from and within the site. A range of noise and vibration mitigation measures have been proposed in order to ensure appropriate noise and vibration limits are not exceeded. Such measures include restrictions on operating hours, recommendations for good practice blast design including trial blasting, public information circulars, regular timing of blasts where possible and ongoing noise, vibration and air overpressure monitoring during blasting by an independent body.

In summary, once consideration is given to the range of mitigation measures outlined in the noise and vibration impact assessment, the associated noise and vibration impact of the proposed development is not significant.



## 12.0 LANDSCAPE AND VISUAL IMPACT

The site proposed for the borrow pit development is located on Aughinish Island which is located in a rural, low-lying area dominated by the Shannon estuary with its associated wetlands, mud-flats and large areas of open water. The proposed development will be within the wider and existing Aughinish Alumina Ltd. lands, and on previously disturbed grounds including part of a former borrow pit.

The area is included within the Strategic Integrated Framework Plan (SIFP) for the Shannon Estuary which designates Aughinish Island as a Strategic Development Location, and this is further supported by the County Development Plan. The SIFP recognises the Shannon Estuary as *"an immensely important asset and one of the most valuable natural resources in Ireland".*

The County Development Plan also includes policies and objectives which respond to this strategic industrial importance of the area while simultaneously considering the sensitives of the surrounding landscape, including *Policy ED P10: Ensuring no adverse environmental impacts*, and *Objective ED 04: Safeguard Strategic Development locations along the estuary.* The proposal takes place on a piece of land which has been previously disturbed and used as a borrow pit. Due to the nature of the proposed development, the emerging and resulting site profile will be less visible than the existing site area, if not entirely invisible, from vantage points within the low lying rural context.

The nearest scenic route in proximity to the site extends along the N69 Coastal Road through the town of Glin to the west and eastwards as far as Foynes. As a result of the nature and scale of the proposed development, it will be absorbed within the existing industrial facility, and will not give rise to additional adverse landscape and visual impacts. In particular it will not impact on views and prospects from the section of the N69 between Foynes and Glin as identified in the County Development Plan.

The development includes the provision of extensive additional new native trees and vegetation along the proposed perimeter berms and also within the borrow pit upon restoration. The proposed development includes the early stage establishment of planted perimeter berms that will serve to mitigate construction activity. The planted perimeter berms will also provide early stage screening from the portion of the existing nature trail that extends from along the eastern side of the former borrow pit and continues along the eastern side of the proposed borrow pit and into the wider amenity area.

In summary, the proposed development is in keeping with the Development Plan and will not give rise to any significant landscape or visual impacts, either during construction or operation stages, or upon restoration.

## 13.0 TRAFFIC AND TRANSPORTATION



A borrow pit for rock material is required to accommodate the ongoing construction works associated with the BRDA over the lifetime of the permitted development at Aughinish. It is estimated that 374,000 cubic metre of rock will be required. The proposed planning application will therefore facilitate ongoing construction works on the site without a need to source rock material from external quarries, thus limiting the site's HGV traffic impact.

Pre-planning discussions with Limerick City and County Council's (LCCC's) Roads Department took place on 04 April 2017 following issue of a Scoping Note also on 04 April 2017. The proposed Traffic and Transport Chapter approach and methodology has been agreed with LCCC.

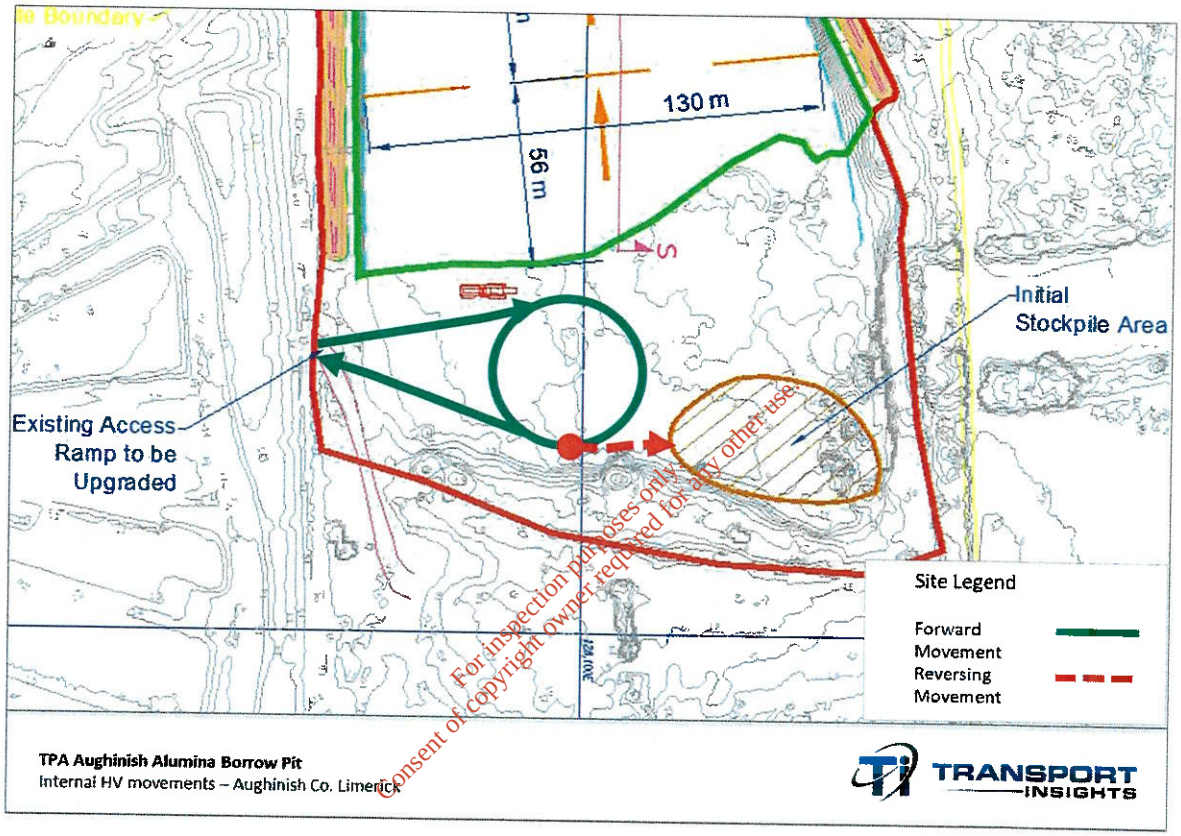
The operation of the existing road network and the potential traffic impacts of the proposed development was examined as part of the study.

In the 'Do Nothing' scenario AAL will source rock from external quarries from late-2017 onwards, once their current stockpile is exhausted. From this point on, traffic volumes on the adjacent road would consist of background traffic (including current Aughinish Alumina staff and operational traffic), in addition to heavy vehicle traffic associated with transporting rock to the site from nearby quarries.

In the 'Do Something' scenario, rock will be sourced from the borrow pit within the AAL site. As a result, heavy vehicle traffic volumes on local public roads will be reduced by an average of 9 (two-way) trips per day in comparison to the 'Do Nothing' scenario. Light vehicle trips will however increase slightly, as a small number of staff would be expected to travel to the site to carry out extraction related tasks at the borrow pit. A maximum of 6 staff will be based on site during periods at which rock is being excavated from the site, and rock will typically be excavated for 16-20 weeks per year, i.e. an average of 18 weeks. As a result, an average of 6 * 18/52 = 2 staff will be based on the site throughout the year, generating 4

one-way car trips on the conservative assumption that all drive to the site. Overall, the 'Do Something' scenario will result in a 1.04% reduction in AADT traffic volumes on L1234 and a 0.24% reduction on N69 during the year of opening (2018).

As can be seen from the following figure, dumper trucks will travel into the borrow pit area, reverse to the initial stockpile area, and when filled with rock, will exit the borrow pit in forward gear.






No construction phase traffic related impacts are anticipated.

As the proposed development will have no material impact upon the operation of the local road network during construction or operational phases, no mitigation measures are proposed.

Based on the level of traffic generated and taking into account the capacity of the local road network, no construction or operational phase residual impacts are predicted as a result of the proposed development.

## 14.0 ARCHAEOLOGICAL & CULTURAL HERITAGE

Irish Archaeological Consultancy Ltd has prepared this assessment on behalf of Aughinish Alumina Ltd. (AAL) to assess the impact, if any, on the archaeological, architectural and cultural heritage resource of a proposed borrow pit within the overall landholding of AAL, on Aughinish Island, County Limerick.

The site of the proposed Borrow Pit is located within the townland of Aughinish East, located in the parish of Robertstown in the barony of Shanid. The site is located within an existing alumina plant and as such there has been a large impact on the surrounding landscape. However, a recorded enclosure is located within undisturbed ground c. 50m to the southeast of the proposed development (LI010-108). There are no structures of built heritage merit located within 500m of the proposed borrow pit.

A field inspection, which was carried out on the 28th April 2017, sought to assess the site, its previous and current land use, the topography and any additional information relevant to the report. During the course of the field investigation the proposed development area and its immediate surrounding environs were inspected.

The inspection confirmed that the southern part of the site has already been subject to extraction activity. To the north of the former Borrow Pit area there is a small single storey modern structure within a small compound accessed by a track and an area shown as hard standing within the aerial photographs. This has now grown over with scrubby grass, although parts of the hard standing are visible, along with ruts from the movement of heavy vehicles. The surrounding area is characterised by features associated with the aluminium plant. It is clear that the proposed development area has been subject to a large amount of disturbance. No features or areas of archaeological potential were identified.

Due to the disturbed nature of the existing landscape environment no adverse impacts are predicted upon the archaeological, architectural or cultural heritage resource during the construction or operation of the proposed development.



## 15.0 WASTE MANAGEMENT

Both the construction and operational phases of the proposed development have the potential to result in the generation of small quantities of waste.

Waste at the proposed Borrow Pit site is considered to be an important material asset. When examining waste in relation to this site, it is necessary to consider both waste presently generated at the site, and future waste generation. In examining the issue of waste at the site, the following areas were considered:

1. Waste prevention
2. Waste minimisation
3. Waste recycling
4. Waste disposal

The overburden (consisting of the topsoil and subsoil up to a depth of 3.5m) will be used as materials for restoration of the extracted area and creation of berms. These materials are used in the provision of screening berms and will be stockpiled at appropriate locations on site and are used in restoration works when required.

The operator does not consider the stockpiled topsoil, and subsoil materials as 'waste', as the topsoil and subsoil constitute a valuable material when considering the restoration of the site following the cessation of works at the site. The topsoil and subsoil are crucial

materials for restoring the site successfully. It is essential that these materials are carefully stored and handled, in order to retain the productivity of the soil.

No maintenance of site vehicles is undertaken onsite and this reduces the risk of waste generation and potential pollutants significantly. There are no staff facilities on site and when required staff avail of facilities off site at the Applicants premises.

It is recommended that all waste arising be handled according to the existing waste management procedures at the facility. These procedures outline the methodologies for the handling, segregation, storage and disposal of all wastes that will arise during the proposed development. The procedures should as a minimum ensure that activities at the proposed site are carried out in such a manner so that

1. Minimal waste will be generated
2. Maximum recycling/reuse of waste will be ensured
3. All waste will be handled and contained in a safe manner
4. All disposal of waste will be carried out by a licensed contractor and will present no risk to the environment.



## 16.0 INTER-RELATIONSHIP BETWEEN FACTORS AND CUMULATIVE IMPACT

This section of the EIAR deals with likely interactions between effects predicted as a result of the proposed development.

In addition to the requirement under the *Planning and Development Regulations 2001-2015* to describe the likely significant effects of the proposed development on particular aspects of the environment, it is also required to consider the interaction of those effects. As such, the interactions between human beings, flora and fauna, soil, geology and hydrogeology, climatic factors, noise & vibration, landscape, material assets, archaeological, architectural and cultural heritage are assessed below.

This section addresses both the intra-project effects (i.e. those occurring between environmental topics within the project) and inter-project effects (i.e. those which occur as the result of the likely impacts of the proposed development interacting with the impacts of other projects in the locality).

This Chapter outlines the areas where interactions occur that are considered to be of a scale which may be potentially significant. Further detail relevant to the interaction of impacts may be found in the earlier chapters of the EIAR.

The interactions between factors arising from the proposed development are set out in the matrix provided as Table 16.1 below.

| Table 16.1: Matrix of Interactions Between Environmental Factors | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Human Beings | Biodiversity Flora & Fauna | Soils & Geology (Land) | Water & Hydrology | Air Quality/ Climate | Noise & Vibration | Landscape & Visual | Traffic | Waste | Archaeology & Cultural Heritage |
| Human Beings | | | | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Flora, Fauna & Biodiversity | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| Soils & Geology (Land) | | | | ✓ | | | ✓ | | | ✓ |
| Water & Hydrology | | | | | | | | | | |
| Air Quality/ Climate | | | | | | | | ✓ | | |
| Noise & Vibration | | | | | | | | ✓ | | |
| Landscape & Visual | | | | | | | | | | ✓ |
| Traffic | | | | | | | | | | |
| Waste | | | | | | | | | | |
| Archaeology & Cultural Heritage | | | | | | | | | | |

## 17.0 DIFFICULTIES ENCOUNTERED

In general, no significant difficulties, in terms of technical deficiencies or lack of sources of information, were encountered in compiling the specified information contained in the EIAR.

Where appropriate, details of referable standards and methods used that demonstrably conform to peer-reviewed standards are provided.

References to published sources of information are acknowledged in the text. In addition, studies commissioned specifically for the purposes of this Environmental Impact Assessment Report are also referenced, thus providing a clear documentary trail of the analysis used to arrive at conclusions. A list of all consultants involved in the compilation of information for this Report is provided in Chapter 1.