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ENVIRONMENTAL IMPACT ASSESSMENT REPORT NON-TECHNICAL SUMMARY (NTS)

IN RESPECT OF

PROPOSED SAND AND GRAVEL QUARRY DEVELOPMENT

AT

ON A SITE OF C. 8.5HA ON LANDS AT KNOCKNAMOE AND BALLYMULLEN TOWNLANDS, ABBEYLEIX, CO. LAOIS

PREPARED FOR

BOOTH PRECAST PRODUCTS LTD.

SEPTEMBER 2023

TABLE OF CONTENTS

Non-Technical Summary of Environmental Impact Statement Report

This Non-Technical Summary of the Environmental Impact Assessment Report (EIAR) is provided as part of the application documentation as required by article 94 of the *Planning and Development Regulations, 2001 (as amended)*.

Contact

The preparation of this EIAR has been co-ordinated by Tom Phillips + Associates, Town Planning Consultants, in association with the proposed development's project team as identified in Chapter 1 of the EIAR:

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Environmental Impact Assessment Report

A copy of the full EIAR is available for reference/purchase at the offices of the Planning Authority, Laois County Council, Áras and Chontae, JFL Avenue, Portlaoise, Co. Laois, R32 EHP9.

1.0 INTRODUCTION

This Environmental Impact Assessment Report (EIAR) Non-Technical Summary (NTS) has been prepared to accompany a Section 34 Planning Application to Laois Co. Co. for a proposed sand and gravel pit at Knocknamoe and Ballymullen townlands, Abbeyleix, Co. Laois. The site is located approximately 1km south of Abbeyleix town. The planning application is being submitted by Booth Precast Products Ltd.

The development consists of a total area of 8.5 Hectares comprising of the following:

- Removal of existing stand of trees, vegetation and overburden;
- Extraction of underlying sand and gravel;
- Upgrading of existing entrance and site lines to include removal of boundary vegetation;
- Construction of screening berms, wheel wash facility & refuelling area;
- Landscaping and restoration of the site;
- All associated ancillary facilities/works;
- The applicant is seeking a 10 year permission as part of the planning application;
- The application is accompanied by an Environmental Impact Assessment Report (EIAR) and a Natura Impact Statement (NIS).

The application site is located approximately 1km south of Abbeyleix town in the townlands of Knocknamoe and Ballymullen. The applicant also operates a manufacturing facility located approximately 1.3km to the south of the application site. The majority of the material extracted from the application site will be transported to the manufacturing facility with some material transported directly to market.

Access to the site is via a gated entrance off the L-5731-25 road which is located to the west of the pit. Land use in the surrounding area is largely agricultural with scattered rural pattern of residential dwellings along the local roads. The density of housing increases on approach to Abbeyleix. Abbeyleix Bog is located on the lower lying area to the west of the site.

The application site is 8.5 hectares in area and comprises of several grazing fields with some woodland and scrub in the central area which are separated by hedgerows. The site has an elevation range of between approximately 92mOD and 130mOD (Ordnance Datum) and is located on a hillside that steadily slopes in a westerly direction towards the lower lying and flatter peatlands of Abbeyleix Bog.

2.0 SCREENING & ALTERNATIVES

The first step of the EIA process is screening which establishes whether an EIA is required or not. The project needs to be considered in its entirety for screening purposes. The proposed development is greater than the 5 hectare threshold listed under Schedule 5 of the *Planning and Development Regulations, 2001* (as amended).

Therefore, EIA is a mandatory requirement. A number of areas were considered as part of the assessment process which included areas in the existing land holding and off-site locations. The proposed development was the preferred option as it has a number of advantages over the other options assessed.

3.0 DESCRIPTION OF PROPOSED DEVELOPMENT

3.1 Introduction

This section of the EIAR provides supporting information in relation to the activities that will be undertaken at the proposed development as part of the enabling phase, operational phase and decommissioning phase.

As stated in Chapter 1.0, this EIAR has been prepared following the withdrawal of a planning application for a very similar development on the same site (Reg. Ref. 21/694). The Local Authority issued a Request for Further Information (RFI) in relation to that planning application; however, due to time constraints in preparing a full response to the RFI, the applicant decided to withdraw that planning application.

The development proposed in the subject application differs from that lodged under Reg. Ref. 21/694 in that the area of proposed Phase 4 of the extraction plan has been reduced in size, thus omitting a section of the landholding from the proposed quarry development i.e. the portion directly upslope/upstream of the petrifying springs located in Abbeyleix Bog. This is discussed in Chapter 7.0 (Water).

Considering buffer areas around the boundary of the application site, the removal of this section of Phase 4 will reduce the area proposed from extraction from approximately 6.5ha to approximately 6.1ha compared to that originally proposed. Due to the revised extraction plan (i.e. reduced area at Phase 4) there is now no proposed aggregate extraction directly up-gradient of the spring location. It is proposed to plant this area with wildflower to increase the biodiversity of the area.

The removal of part of Phase 4 of the extraction plan has resulted in a reduction in the extractable reserve from 1.58 million tonnes to 1.53 million tonnes.

An additional three monitoring wells have been drilled and installed along the northeastern boundary of Abbeyleix Bog in July 2022 between the proposed site and the petrifying spring.

The installation consists of 3 no piezometer couples/sets (3 no. deep sub peat piezometers, and 2 no. shallow standpipes). Water level monitoring in these piezometers, and all 5 no. on-site monitoring wells, was completed during July and August 2022.

3.2 The Existing Environment

The application site is approximately 8.5ha. in area and is situated in the townlands of Knocknamoe and Ballymullen which is located approximately 1km south of Abbeyleix town. The site comprises mainly grassland with some woodland and scrub in the central area of the site. It is bordered by agricultural grassland to the north, east and south and by a local public road to the west which defines the western site boundary. West of the local public road, the land is low-lying and slightly boggy before it transitions into peatland.

The site is made up of several grazing fields which are separated by hedgerows. Access to the site is from the public road to the west. Landuse in the surrounding area is largely agricultural with scattered rural pattern of residential dwellings along the local roads to the west. The density of housing increases on approach to Abbeyleix.

The site has an elevation range of between approximately 92mOD and 130mOD (Ordnance Datum) and is located on a hillside that steadily slopes in a westerly direction towards the lower lying and flatter peatlands of Abbeyleix Bog that exists to the west of the site. There is a number of existing sand and gravel pits in the area, the closest one is a small disused pit located approximately 500m to the southeast of the site. This is currently used as a Defence Forces and An Garda Síochána Shooting Range.

3.3 The Proposed Development

The applicant proposes to extract the sand and gravel material and transport the material to the applicant's existing manufacturing facility located approximately 1.3km to the south of the application site. There will be no processing of the material on site and there will be no direct transport of material from the application site to market.

The proposal will include an enabling phase associated with installing a haul road from the entrance to the proposed infrastructure consisting of a wheelwash and refuelling area. The operational phase will include the day-to-day activities that will be undertaken at the proposed development which will include vegetation and overburden removal, extraction of material and transport of the material to the manufacturing facility where it will be processed into various grades of aggregate which will be sold to market or used to manufacture a range of concrete products.

Berm construction along the western boundary will be undertaken in tandem with vegetation and overburden removal from Phase 1 of the extraction plan during the operational phase therefore assessed under the operational phase of the proposed development.

Once the available resource has been extracted final restoration works and decommissioning of the infrastructure will be undertaken as per the landscape, restoration, and decommissioning plan. The enabling, operational and restoration/decommissioning phases are described under the respective heading. The existing and proposed layouts and sections through the application site are illustrated on Figures 3.1 to 3.4 located at the end of this section.

3.3.1 Enabling Phase

It is proposed to install a short haul road from the entrance of the site to the proposed infrastructure consisting of a wheel wash bath and refuelling area which will be situated close to the entrance to the site. The proposed infrastructure is relatively simple in design and will be in place within a short time period of time of approximately 4 to 6 weeks. The run-off from the refuelling area and overflow from the wheel wash will discharge to ground via a full retention oil interceptor. Once the infrastructure is in place the operational phase will commence.

3.3.3 Operational Phase

The operational phase will consist of the day-to-day activities which will be undertaken associated with the removal of overburden and vegetation, extraction of material and transport off-site.

The extraction of material from the application site will be undertaken in line with a phased extraction and restoration plan consisting of 8 phases with each phase ranging from 7 to 19 months or an average of 12 months of sand and gravel material depending on the level of extraction. The maximum rate of extraction will be in the region of 200,000 tonnes/annum; however, this will depend on the demand for material.

Prior to extracting the underlying sand and gravel material from each phase, trees and vegetation will be removed and overburden will stripped. The overburden and some of the sand and gravel material from Phase 1 will be used to construct the berm along the western boundary. When all sand and gravel material has been extracted from Phase 1 work will commence on Phase 2 with the removal of trees and vegetation and stripping of overburden which will be used to restore Phase 1. The extraction and restoration on a rolling phased basis will ensure that only a minimal area of the site is operational at any one time with continuous restoration being undertaken.

3.3.2.1 Removal of Woodland

The existing hedgerow along the western boundary will be removed and a new hedgerow planted set back from the road in order to improve site lines. The woodland in the centre of the site will be removed in phases using excavators and chainsaw operatives. The wood has no commercial value and will be used for firewood with smaller branches chipped on site. This will be undertaken on an intermittent basis outside the bird breeding season.

Mr. John Morgan of Independent Tree Surveys was commissioned to provide a Tree Survey of the site and prepare an Arboricultural Impact Assessment, Method Statement and Tree Protection Plan in accordance with BS5837. The report concluded that the re-vegetation of the site will involve the phased planting of large numbers of trees that in time will establish and develop into mature woodland to replace those trees removed to facilitate the pit. With good planting stock and proper aftercare, along with improved hedgerow management of the surrounding hedges, these post-quarrying landscape works should see the loss of trees and woodlands mitigated in the longer term. A copy the report is attached to the landscape and restoration plan located in Appendix 12.1.

3.3.2.2 Removal of Vegetation & Overburden

Overburden consisting of topsoil and subsoil will be removed in phases prior to excavating the underlying sand and gravel material. Overburden removal will be an intermittent operation which will be undertaken during periods of suitable weather.

Overburden material from Phase 1 will be stored in constructed berms along the western boundary of the pit adjoining the local road and will be used for final restoration of the site on completion of extraction of material. Sand and gravel material extracted from Phase 1 will be used to supplement berm construction. As extraction proceeds into various phases, overburden removed from the working phase will be used to restore the previous phase

where material has been extracted. This will be undertaken on a rolling basis to minimise the uncovered area of the site.

3.3.2.3 Extraction of Material

Once the overburden has been removed the sand and gravel material will be extracted using a tracked excavator. The material will be loaded directly onto road trucks and transported to the manufacturing facility. The extraction of material from the application site will be undertaken in line with a phased extraction and restoration plan consisting of 8 phases as shown on Figure 3.3 with each phase corresponding to approximately 12 months of sand and gravel material. Material will be extracted in phases with all material being removed from one phase before extraction begins in the next phase. The material transported to the manufacturing facility will be processed into various grades of aggregate which will be sold to market or used to manufacture a range of concrete products.

The maximum time scale for the proposed development is for 10 years, including complete restoration of land for agriculture use. This will depend on the economy and the levels of construction activity. The application site will be landscaped and restored, on a phased basis, during the life of the permission.

3.3.2.4 Transport to Manufacturing Facility or Market

The material will be transported off site by road trucks to the manufacturing facility located approximately 1.3km south of the application site. Vehicles will pass through the wheel wash facility prior to exiting the site to ensure no dirt or debris is transported onto the L5731 local road. The road is visually assessed daily and a road sweeper is deployed on a regular basis. The frequency of deployment will be reviewed as part of the proposed development. There will be no processing of material on site and there will be no direct transport of material from the application site to market.

3.3.2.5 Description of Plant On-Site

As the application site will consist only of an extraction and haul operation, the plant and machinery which will be required to operate at the application site will be minimal and will consist of the following:

- Excavators
- Road Trucks
- Water Bowser

3.3.2.6 Fuel & Chemical Storage

For security reasons no fuel will be stored at the pit. Excavators will be refuelled by an authorised distributor which will deliver fuel to the pit and dispense directly into plant as required. Plant will be refuelled on the proposed refuelling area. Procedures will be put in

place for dispensing fuel into plant. Road trucks will be refuelled at fuel stations located in the vicinity of the pit or at the manufacturing facility. The location of the proposed refuelling area is located on Figure 3.4. It will consist of a concrete pad which will drain into the oil interceptor before discharging to a soakaway.

3.3.2.7 Surface Water & Groundwater

As all excavations will be undertaken above the groundwater table, there will be no requirement to manage groundwater. A minimum of a 3m buffer is proposed between the final excavation level and the highest winter groundwater level in order to protect groundwater quality. Precipitation falling on the pit will percolate to ground or evaporate. The assessment of both the surface water and groundwater environment is detailed in Section 7.0.

Four monitoring wells are located on the application site and a further three monitoring locations have been drilled in the field located to the west of the application site on the opposite side of the L5731 local road. These wells will be used to monitor groundwater quality and levels during the operational and decommissioning phases.

3.3.2.8 Working Hours & Employment

The pit will operate between the hours of 0700 hours and 2000 hours Monday to Friday and 0800 to 1800 hours on Saturday. However, it is unlikely that the pit will operate to these maximum operating hours as the activities will be mainly confined to daylight hours. The pit will not operate on Sundays or Public Holidays. All works proposed as part of the development will be undertaken during these operating hours. These proposed times coincide with the operating hours of the manufacturing facility. The applicant provides employment at the main plant for approximately 35 people directly with a further 25 people employed indirectly. The application site will provide employment for approximately 2 additional people.

3.3.2.9 Utilities & Services

At present the pit does not require any connection to the relevant utilities. Should a connection be required, the relevant utility companies will be contracted.

3.3.2.10 Water Supply & Wastewater

An existing on-site well will be used to top up the water required for the wheel wash and for dust suppression when required.

3.3.2.11 Energy Usage

Plant and machinery which will operate at the pit will be diesel powered with fuel supplied by a local authorised distributor.

3.3.2.12 Transport & Access

The site will be accessed via a gated entrance off the L-5731-25 local road. The gate will be locked outside operating hours. Material from the pit will be transported along the L-5731-25 local road for a distance of approximately 1 kilometre before turning down a private road for a further 0.6 kilometres to the existing manufacturing facility located approximately 1.3km south of the application site.

Each load will be inspected by the driver of the lorry prior to leaving the site to ensure that the lorry has been loaded correctly with no loose or overhanging debris present on the load. Once the load has been cleared for transport, the vehicle will pass through the wheel wash facility prior to exiting the site to ensure no dirt or debris is transported onto the public road.

The maximum anticipated traffic from the proposed development is 29 loads/day with all loads going directly to the manufacturing area. At present a large percentage of the raw material being processed at the existing plant is hauled from sources outside the area and transported through the towns of Abbeyleix and Ballinakill. The proposal will result in raw material being sourced closer to the manufacturing facility thereby reducing HGV traffic on the roads through Abbeyleix, Ballinakill and the upper section of the L-5731-25 local road between the application site and the junction of the of the N83 which will have a positive impact. There will also be traffic generated by the two employees working at the site.

Warning signs will be erected on the L-5731-25 road to warn drivers of the presence of a sand and gravel pit and HGV traffic movements. The proposed signage will be subject to agreement with Laois Co. Co. Traffic is dealt with in more detail in Chapter 11.0.

3.3.2.13 Offices & Facilities

There will be no canteen, office, toilet facilities etc. located at the application site. These facilities are located at the manufacturing facility where sand and gravel material will be transported to. The only infrastructure to be constructed on the site is a wheel wash facility and refuelling area which can be easily removed from the site on completion of excavation of the available material. Plant and machinery will be serviced at the workshop located at the manufacturing facility. There will be no lighting required at the application site as it is unlikely that the site will operate outside daylight hours.

3.3.2.14 Waste Management

All waste generated at the pit will be properly recovered, recycled and or disposed of at the main facility in an environmentally friendly and sustainable manner. The applicant will comply with all existing environmental legislation and guidelines in relation to waste management.

3.3.2.15 Safety & Security

Security fencing and stock proof post and wire fencing will be erected around the boundary of the pit to prevent unauthorised access. A berm will be constructed close to the western boundary of the pit in order to provide visual screening. A hedge will be planted along the western boundary set back from the road boundary to achieve the necessary site lines. The gate located at the entrance to the pit will be locked outside working hours.

Side slopes will be inspected on a regular basis to ensure they are stable. Warning signs will be put in place around the pit to inform personnel of potential hazards. All staff and visitors will be required to wear appropriate Personal Protective Equipment (PPE).

All staff will attend the Solas Safe Pass Health and Safety Awareness Training Programme and attend regular toolbox talks in relation to safety. All visitors to the site will be required to report to the main office at the processing plant and will not be authorised to enter the proposed extraction site unsupervised.

3.3.2.16 Ecological Sensitive Areas

Areas of conservation interest located within 15km of the development site are outlined in Table 3.1. There are three SACs, one SPA and 11 pNHAs located within a 15km radius of the quarry.

Abbeyleix Bog encompassing an area of almost 500 acres of diverse habitats including degraded (but recovering) raised bog, lagg, cutaway, wet carr woodland and meadows is located to the west of the application site.

The various assessments of the EIAR will take into account the requirements of the Abbeyleix Bog Project as expressed through their aims and objectives as stated in their Conservation Management Plan (CMP) which promote guidelines for the protection and enhancement of the wildlife and habitat diversity of the bog. Full details of the ecological assessment are given in Section 5.0 (Biodiversity) of the EIAR. A Natura Impact Statement (NIS) has been compiled and assesses the potential impacts of the proposed development on Natura Sites. The NIS accompanies the application as a separate document.

3.3.2.17 Dust Generation & Control

The excavation and transport of material has the potential to generate windblown dust if not managed effectively. Various measures will be adopted at the pit to prevent dust at source. These include dust suppression which will be undertaken on an as required basis using a tractor and bowser. Dust generation and control is dealt with in Section 9.0 of the EIAR.

3.3.2.18 Noise & Vibration Generation & Control

Noise will be generated due to the activities being undertaken at the application site. All necessary precautions will be put in place to ensure that the operation of the application site will not lead to elevated noise levels. Monitoring will be undertaken at nearest noise sensitive locations to ensure compliance with levels. Noise is discussed further in Section 10.0 of the EIAR.

3.3.2.19 Extraction Duration & Phases of Extraction

A topographical survey of the site was carried out using a fixed wing drone and GPS surveying unit to establish the existing ground levels at the site. The survey was transferred into

AutoCAD Civil 3D and multiple cross sections were drawn to calculate the volume of material between the existing ground level and the proposed maximum extraction level.

Due to the removal of part of Phase from the extraction plan, the estimated volume of material available for extraction from the application site is approximately 787,310m3 of which 23,500m3 consists of overburden which will be used to construct berms and restore the site. An average depth of 0.3m of overburden was used to calculate the volume of overburden. Therefore, the volume of material to be transported to the manufacturing facility is approximately 763,810m3 or approximately 1.53 million tonnes using a conversion factor of 2m3/tonne. The removal of part of Phase 4 of the extraction plan has resulted in a reduction in the extractable reserve from 1.58 million tonnes to 1.53 million tonnes.

Figure 3.3 details the proposed 8 Phase extraction plan and existing and proposed sections through the application site. Figure 3.4 details the final extraction plan levels and sections through proposed berms. As it is proposed to keep a 3m buffer between the final excavation level and the highest winter groundwater level, the final excavation level will range between approximately 97mOD on the western boundary and 103mOD on the eastern boundary.

The maximum rate of extraction will be in the region of 200,000 tonnes/annum; however, this will depend on the demand for material. Therefore, the applicant is seeking a 10 year permission in order to extract the available reserve allowing for years when the anticipated extraction rate will not be achieved and to allow time to restore the pit in line with the restoration plan.

3.3.2.20 Environmental Monitoring

Environmental monitoring including noise, dust deposition, groundwater level and quality monitoring will be undertaken during the enabling, operational and decommissioning phase of the proposed development. An Environmental Management Plan will be compiled and agreed with Laois Co. Co. on granting of planning permission.

3.4 Landscaping, Restoration, Decommissioning & Aftercare

Landscaping and restoration works will be undertaken during the operational phase of the proposed development with final restoration works and decommissioning undertaken on completion of extraction of the available resource. A Landscape and Restoration plan for the site has been compiled and is attached in Appendix 12.1. A summary of the landscape restoration and decommissioning of the site is provided below:

3.4.1 Removal of Existing Roadside Hedgerow

The existing roadside hedgerow along the western boundary of the application site will be removed to improve sight lines for traffic safety. Security fencing/stock proof post and wire fencing will be erected set back from the road edge and a new hedge will be planted on the inside.

3.4.2 Berm Construction

A berm will be constructed along the western boundary of the pit to screen the pit from the local road. Overburden and sand and gravel material removed from Phase 1 of the development will be used to construct the berm.

3.4.3 Restoration Measures

The site will be extracted and restored on a rolling basis as part of an 8 Phase extraction plan. A strip of land between the existing boundary hedgerows and the edge of the quarry face will be left unplanted and kept clear to allow for maintenance works to the hedgerows. The side slope and strip of land left intact along the edge of the quarry cutting will be planted up with a mix of tree species. When completed, the new woodland planting will cover an area somewhat greater than the area cleared of tree cover to facilitate the quarry works. A layer of topsoil overburden will be applied to exposed surfaces and seeded with grass seed to return the area to agricultural grassland.

3.4.4 Removal of Berm

Once all phases have been extracted, the berm will be removed and the overburden will be used to restore Phase 8 and other areas of the pit where overburden is required.

3.4.5 Decommissioning

When extraction activity has ceased at the site, all plant and infrastructure present will be removed and reused at a different location. Plant and infrastructure on site will not pose any environmental concern during the decommissioning phase. After plant equipment and unused structures are removed from the site an inspection will be undertaken.

3.5 Other Development

A search of other development located within a 5km radius of the application site which could potentially lead to a cumulative impact was undertaken. The location of the sites identified is illustrated in Plate 3.2 with details tabulated in Table 3.2. These developments have been assessed for cumulative impacts against the proposed development in the various chapters of the EIAR.

4.0 POPULATION AND HUMAN HEALTH

The assessment of impacts on human beings considers the impact of the development on population and settlement, land use, employment and other impacts of a social and economic nature. It considers the services and infrastructure that exist on the site.

The likely significant effects on Population & Human Health associated with the development relate to the issues of socio-economic activity, human health and safety and nuisance relating to emissions from the pit, specifically in relation to dust, noise and blasting. The assessment indicates that there will be no significant negative impacts arising from the proposed development on Population & Human Health provided that mitigation measures referred to in various sections of the EIAR particularly in relation to noise, air and water are adhered to.

5.0 BIODIVERSITY

This chapter examines the potential likely significant effects of the proposed sand and gravel pit at Ballymullen, Abbeyleix, Co. Laois on the baseline condition and ecology of the receiving environment. Where likely significant effects are identified, appropriate mitigation measures to reduce / avoid these effects are outlined.

A standalone Natura Impact Statement (NIS) has also been produced, which evaluates the potential for significant effects on the Natura 2000 sites within a defined zone of influence of the proposed development.

A desktop review was carried out to identify features of ecological importance on the site and in its immediate surroundings. The application site also has been visited over the course of four years, in summer 2019 (13th June), autumn 2020 (20thOctober), 2021 (15th February) and 2022 (30th June) when the site itself and the surrounding area was examined as recommended by Best Practice guidance. These visits were augmented by a specialised study of badger and bat species carried out in July 2022.

A Phase I habitat survey was undertaken to describe the ecology and allow for evaluation of importance in accordance with methods outlined in the Heritage Council publication, "Guidance for Habitat Survey and Mapping" (Smith et al., 2011). Habitats were recorded using the habitat classification scheme published by the Heritage Council in A Guide to Habitats in Ireland (Fossitt, 2000) and evaluated using the geographical frame of reference scheme as per "Guidelines for Assessment of Ecological Impacts of National Road Schemes" (NRA, 2009).

Other ecological receptors such as birds, mammals, amphibians, reptiles, invertebrates were also recorded during the site walkovers, as per best practice survey methods. The site survey recorded the presence of a number of common bird species. No species cited as Red-listed under the Birds of Conservation Concern in Ireland (Gilbert *et al*. 2021) were recorded. Evidence of badger activity was noted in 2020 and 2022 [redacted] The bat survey has found that no animals were using the trees on site as roosts. Five species were encountered that use the site for feeding.

There are four EU designated sites (3 Special Areas of Conservation – SACs and 1 Special Protected Area – SPA) located within 15km of the application area. There are no surface hydrological connections between the application area and any Natura 2000 site though it could have a groundwater connection to the River Barrow & River Nore SAC and the River Nore SPA.

There are no full Natural Heritage Areas (NHAs) but six proposed Natural Heritage Areas (pNHAs) located within 15km of the application area. The project site has no surface hydrology connection with any of the NHAs or pNHAs though it could have a groundwater connection to the River Nore/Abbeyleix Woods pNHA. Abbeyleix (Killamuck) Bog is located west of the site on the opposite side of the road L5731. It is a relatively small raised bog, roughly oval in shape, which developed over a former lake contained by a glacial moraine on its eastern side. The bog is the subject of an ongoing conservation programme known as the Abbeyleix Bog Project and numerous ecological studies have been carried out which have informed the Abbeyleix Bog Project Conservation Management Plan 2015-2020 (Ryle, 2014) and subsequent management. There is no surface water connection between the application area and the bog but its proximity to the project and ecological importance warrants its inclusion in the evaluation of likely significant effects.

The habitats recorded in and beside the application area are presented and evaluated in accordance with "Guidelines for Assessment of Ecological Impacts of National Road Schemes" (NRA, 2009) and have been categorized as in Fossitt (2000). Habitats identified on the site are:

1. Improved Agricultural Grassland GA1;
2. Dry Calcareous Grassland GS1;
3. (Mixed) Broadleaved Woodland WD1
4. Recolonising bare ground ED3
5. Scrub WS1
6. Hedgerow/Treeline WL1/WL2
7. Marsh GM1

No protected plant species or invasive plant species were found during the habitat surveys.

The main impacts identified as a result the proposed development relate to the loss/reduction of habitat for breeding birds and mammals and a reduction of the calcareous grassland. It will not act in combination with the process area to the south to produce a cumulative effect on the local ecology as this has no significant ecological effects on the environment of Abbeyleix Bog. There are no other developments in the area which could result in a significant cumulative impact. A suite of mitigation measures are proposed to militate against all identified potential significant effects.

6.0 LANDS, SOILS & GEOLOGY

The site is located at the topographic transition between the Castlecomer Plateau to the east and Laois Central Lowlands to the west. Much of the site area has a characteristic hummocky, hilly terrain, which is typical of a glaciofluvial deposition area. The land then flattens westward towards the River Nore which is located 2.2km west of the site.

The site, which has an elevation range of between approximately 92 and 130m OD (Ordnance Datum), is located on a hillside that steadily slopes in a westerly direction towards the lower lying and flatter peatlands (Abbeyleix Bog) that exists to the west of the site.

Landuse in the surrounding area is largely agricultural with scattered rural pattern of residential dwellings along the local roads to the west. Further north (~200m) along the public road to the west, there are a number of housing estates on the out skirts of Abbeyleix. There is a number of existing sand and gravel pits in the area, the closest one is a small disused pit located approximately 500m to the southeast of the site. This is currently used as a Defence Forces and An Garda Síochána Firing Range. The existing Booth Precast Products manufacturing facility is located approximately 1.3km to the south of the site. The following surveys and investigations were carried out:

- A walkover survey to assess the ground conditions and layout of the proposed site including surveys of adjacent lands;
- Drilling of 5 no. investigation holes/monitoring wells to assess overburden lithology, depth to the bedrock and for groundwater level monitoring and sampling;
- Particle Size Distribution analysis was undertaken on material samples which were taken at 3m depth intervals; and
- Mineral soils and subsoils were logged according to BS: 5930:2015 Code of Practice for Ground Investigations.

The published soils map (www.epa.ie) for the area shows that the majority of the proposed development site (and surrounding area) is mapped to be overlain by shallow well drained mineral soil while the western low-lying side of the site is mapped to be overlain by shallow poorly drained soil. Immediately west of the local road (which defines the western boundary of the site) cutover peat is mapped. Down in a hollow immediately to the east of the site lacustrine clays are mapped in an area where a pond forms during wet periods.

Based on the GSI subsoils map (www.gsi.ie), glaciofluvial sands and gravels are mapped within the site boundary and these deposits are mapped to extend to the north, south and east of the site. Cutover bog, as described above, is mapped to the west of the site.

Based on the GSI bedrock geology map (www.gsi.ie), Dinantian Pure Bedded Limestones are mapped to underlie the proposed development and these comprise two bedrock formations in the area of the site, namely; the Ballyadams Formation and the Clogrenan Formation with the former underlying the majority of the site.

The Ballyadams Formation, which is mapped to underlie the central, western and northern sections of the site comprise crinoidal wackestone / packstone limestone. The Clogrenan Formation, which is mapped to underlie the eastern section of the site comprise chery, muddy, calcarenitic limestone.

The extraction will be carried out over 8 No. phases. In order to extract the aggregate, topsoil will be removed in phases and this will be used to construct a temporary berm along the western boundary and then ultimately used in the restoration of the site post extraction. For example overburden material removed from working phase will be used to restore the previously extracted phase. This will continue to be the case with further phases of extraction.

The removal of topsoil overburden and extraction of the underlying material will result in a significant impact which will be permanent in duration. The landscape and restoration of the pit will mitigate the impact in the longer term. This will increase the biodiversity of the area in the longer term.

The potential for accidental emissions from plant and machinery operating at the pit also exists. However, this is unlikely as plant and machinery are serviced regularly to reduce the likelihood of accidental emissions occurring. A number of mitigation measures are proposed as part of the development. It is envisaged that the proposed development, with the implementation of mitigation measures, no significant effects on soils and subsoils will occur.

7.0 WATER

Hydro-Environmental Services (HES) was engaged to carry out an impact assessment of any potential significant and likely effects of a proposed sand and gravel pit on water aspects (hydrology and hydrogeology) of the receiving environment. To complete the Water Chapter of the EIAR, the following surveys and investigations were carried out:

- Walkover surveys and hydrological mapping of the proposed site and the surrounding area were undertaken whereby surface water flow directions and drainage patterns were recorded;
- A preliminary assessment of flood risk was completed for the proposed development area and local watercourses;
- Drilling of 5 no. investigation holes/monitoring wells to assess overburden lithology, depth to the bedrock and for groundwater level monitoring and sampling;
- Groundwater sampling (3 no.) to assess baseline groundwater quality up-gradient and down-gradient of the site;
- Groundwater level monitoring by means of in-situ dataloggers (pressure transducers);
- Field hydrochemistry measurements (electrical conductivity, pH and temperature) were taken to determine the origin and nature of surface water flows;
- Visit to Abbeyleix Bog on 11th March 2021 to monitoring petrifying spring discharge and hydrochemistry along with sampling (in the company of a member of the Abbeyleix Bog Project) and,
- 3 No. piezometer couples/sets (3 no. deep sub peat piezometers, and 2 no. shallow standpipes) were installed along the north-eastern boundary of Abbeyleix Bog in July 2022 between the proposed site and the petrifying spring. Water level monitoring in these piezometers, and all 5 no. on-site monitoring wells, was completed during July and August 2022.

Regionally the proposed site is located in the River Nore surface water catchment within Hydrometric Area 15 of the South Eastern International River Basin District. The River Nore flows in a southerly direction approximately 2.2km west of the proposed site. On a more local scale, the proposed site is located within the Ballymullen Stream surface water catchment which flows in a northerly direction through Abbeyleix Bog approximately 250m to the west of the site. The Ballymullen Stream rises in higher hills to the east of the site before passing to the south of the site and flowing north/northwest towards the River
Nore which exists approximately 3km downstream of the site.

The Groundwater Body (GWB) in which the proposed site is located is called the Abbeyleix Gravels GWB (IE_SE_G_171). The sand and gravel deposits which overlie the bedrock in this GWB are classified by the GSI as a Locally Important Gravel Aquifer (Lg). The total area of the gravel aquifer is a mapped at approximately 7km^2. The Dinantian Pure Bedded Limestones which are mapped to underlie the majority of the site, are classified by the GSI as a Regionally Important Karstified Aquifer (RKd).

Discharge from the sand and gravel aquifer is expected to be to the River Nore as baseflow. There are known to be springs present along the east of the River Nore which are likely to be discharge zones from the gravels and/or underlying limestone aquifer. With respect the underlying karstified limestone bedrock aquifer most groundwater flow is likely to be concentrated in the upper 20m or so (GSI, 2004).

Based on the groundwater levels measured as part of this investigation, the groundwater gradient (flow direction) within the sand and gravel aquifer in the area of the site is westerly, with groundwater likely discharging into the Ballymullen Stream as baseflow and into the River Nore via the Ballymullen Stream and/or via baseflow/springs.

Groundwater sampling was undertaken as part of the assessment. There were no exceedances with respect to the groundwater regulation values. The only exceedances with respect to the drinking water regulation values were for iron and manganese which are likely to be naturally elevated due to the local geology. Iron and Manganese were only elevated in MW04. Levels of nutrients (i.e. nitrate, ortho-phosphate, ammonia) are relatively low which indicates that the use of surrounding area for agricultural not affecting groundwater quality at the site.

The proposed extraction depth varies between 97.3m OD on the west of the site and 102.5m OD on the east of the site. This is just over 3m above the monitored groundwater levels to allow for higher groundwater levels in winter.

In addition, as a surface water control measure it is proposed to excavate an infiltration drain/swale along the perimeter of each phase bench level within the pit to ensure all potential runoff is collected and diverted to ground. This will ensure there will be no reduction in groundwater recharge at the site. Currently at the greenfield site there are no drainage outfalls and this will continue to be case at the proposed developed site.

The proposed development at each phase will initially require the stripping of vegetation cover which will expose the underlying sand and gravel deposits. Therefore, in the absence of vegetation, during the operational /extraction phase of the development, there is actually the potential for slightly increased groundwater recharge during the spring/summer months due to a reduction in evapotranspiration. However, due to the fact that the site will be extracted in 8 No. phases, the effect would not be significant.

Compaction of the pit floor due to quarry traffic/machinery (leading to increased surface water runoff and reduced recharge) is not expected as the material proposed for extraction was found to be dense with no significant fines (i.e. silts/clays) and regular course layers (i.e. clay/silt) proportions. Therefore, the material by its nature has very limited ability to compact and seal. Any areas of minor pockets of surface water ponding that might occur will be drained into the proposed infiltration trenches/swales as outlined above. Also, once each phase is completed, the exposed deposits will be ploughed before reinstating the topsoil layer to ensure good drainage / percolation is maintained.

A greenfield corridor (approx. 30m wide) will remain along the low-lying western side of the application site. This is the lowest point on the site, particularly the northwestern section/field of the site, where runoff collects naturally during very wet periods and percolates to ground over a period time. This section of the site will remain as grassland as it acts as a natural soakaway for the existing site. This will act as a natural drainage buffer between the proposed extraction area and Abbeyleix Bog.

There will be no processing of aggregate at the application site, therefore there will be no requirement to manage or store fines (clay and silts) at the site. The fact that fines will not be separated and will not require management at the application site will prevent the risk of increased runoff as a result of storage of such material.

There will be no discharge of wastewater at the site, as wastewater will be contained and moved off-site. Groundwater quality impacts from wastewater will therefore not occur. Fuel and oil will be delivered to site and dispensed directly into plant and equipment. There will be no storage of oils and fuels on-site.

Finally, a greenfield corridor (approx. 30m wide) will remain along the low-lying western side of the application site. This is the lowest point on the site, particularly the northwestern section/field of the site, where runoff collects naturally during very wet periods and percolates to the ground over a period time. This section of the site will remain as grassland as it acts as a natural soakaway for the existing site. This will act as a natural drainage buffer between the proposed extraction area and Abbeyleix Bog.

Therefore, even in the absence of mitigation, the proposed development would have no significant potential to impact on groundwater recharge at the application site. However, the proposed mitigation measures outlined will maintain the existing drainage regime at the application site and ensure no negative effects on groundwater recharge.

A number of hydrological /hydrological investigations have been undertaken on Abbeyleix Bog and the most extensive of these is a PhD Thesis by Michael Swenson of Trinity College (2017). The PhD investigated the regional scale hydrology and hydrogeology at Abbeyleix Bog to characterise the catchment scale hydrology and water balance. The investigations carried out as part of a PhD Thesis found that the underlying hydrogeology was found to have relatively little impact on the surface eco-hydrology and this was due to the raised nature of the bog and the fact that the bog is underlain by shell marl, particularly the north-eastern section of the bog adjacent to the application site. Thus, the surface eco-hydrology was more strongly controlled by local topography. In addition, due to the fact that there are no surface water connections between Abbeyleix Bog and the proposed site, no significant effects on Abbeyleix Bog can occur.

The petrifying springs and bog woodland, which are both water dependent habitats, are located down-gradient of the application site in terms of groundwater flow. The application site is located within the groundwater catchment. Based on the groundwater level monitoring completed, only the most southerly end of the proposed application site is located in the recharge area of the spring area. However, there is no proposed extraction in the area of the proposed site that is located within the groundwater catchment to the spring area. The proposed extraction area is located further to the north of any groundwater flowpaths that potentially feed the petrifying spring area from the east.

The assessment concluded that there will be no impact on groundwater flow volumes/quantity to the springs/wet woodland as the proposed development will have no effect on groundwater levels and no significant effect on groundwater recharge at the application site. There will also be no alteration to the surface water flowpaths/drainage around the wet woodland. A number of measures are proposed to ensure the drainage regime at the site is maintained.

The assessment concluded that provided that mitigation measures are adhered to no significant effects on surface water and groundwater quality and local groundwater wells is expected.

8.0 CLIMATE

The Irish climate is subject to strong maritime influences, the effects decreasing with increasing distance from the Atlantic coast. The climate of the study area is typical of the Irish climate, which is temperate maritime. The operation of plant and vehicles associated with the removal of vegetation and overburden, extraction, processing and transport of material will generate exhaust emissions (e.g. C02 and N20) which cannot be eliminated as in order for products to be produced, plant and vehicles need to operate. Emissions associated with this activity are assessed as having a slight localised impact over a long term period.

The proposed development will result in an overall reduction of emissions associated vehicles transporting materials to and from the manufacturing facility as material will sourced closer to the facility rather than transporting over long distances from pits located at a greater distance away than the application site. Mitigation measures will be practiced at the proposed development to limit the effects of the development on the local and regional climate.

9.0 AIR QUALITY

In order to assess the dust deposition rates, PM10 concentration and PM2.5 concentration associated with the proposed development, air dispersion modelling was undertaken at the land ownership boundary and at sensitive locations beyond the land ownership boundary. Modelling using the United States Environmental Protection Agency (USEPA) developed AERMOD air dispersion model was carried out as recommended by the USEPA.

Dust generation rates were calculated from factors derived from empirical assessment and detailed in the USEPA database entitled "Compilation of Air Pollution Emission Factors", Volume 2, AP-42.

The sources of dust arising from the pit will contribute to background levels of dust. Dust is present naturally in the air from a number of sources including weathering of minerals, and pick-up across open land and dust generated from fires. Background levels of dust deposition and concentration of PM10 and PM2.5 have been determined and included in the dispersion modelling assessment.

The main potential sources of emissions to air are associated with plant and machinery undertaking day to day activities such as extraction and transportation of material and dust blow generated during dry windy conditions. Potential impacts associated with day-to-day activities have been separated into dust deposition and vehicle and plant emissions.

Emissions from the site lead to a dust deposition level averaged over the full year of 6.2 mg/(m2*day) at the boundary to the pit. Based on a worst-case background dust deposition of 39 mg/(m2*day) in the region of the site, the combined dust deposition level peaks at 45.2 mg/(m2*day) which is 13% of the TA Luft Limit Value of 350 mg/(m2*day). However, operational activities from the application site contribute a maximum of 2% of the TA-Luft Limit Value. The impact of dust deposition is considered localised, long-term and not significant.

Predicted PM10 concentrations are significantly lower than the ambient air quality standards at the worst-case residential receptor due to background concentrations and emissions from the application site. For emissions from the application site the predicted 24-hour and annual concentrations (excluding background) at the worst-case off site location peak at 11.2 µg/m3 and 4.1 µg/m3 respectively.

Based on a background PM10 concentration of 12 µg/m3 in the region of the application site, the combined annual PM10 concentration including the site peaks at 16.1 µg/m3. This predicted level equates to at most 40% of the annual limit value of 40 µg/m3. The predicted 24-hour PM10 concentration (including background) peaks at 23.1 µg/m3 which is 46% of the 24-hour limit value of 50 µg/m3 (measured as a 90.4th%ile). Operational activities from the pit contribute a maximum of 10% of the PM10 annual mean limit value. The impact of PM10 is considered slight adverse, localised and long-term.

Predicted PM2.5 concentrations at the worst-case receptor are significantly lower than the limit value of 25 µg/m3. The predicted annual concentration (excluding background) at the worst-case off-site location at 3.5µg/m3. Based on a background PM2.5 concentration of 7.2 µg/m3 in the region of the site, the annual PM2.5 concentration including the operations peaks at 10.7 µg/m3. This peak level equates to 43% of the annual limit value for PM2.5. The impact of PM2.5 is considered slight adverse, localised and long-term.

10.0 NOISE AND VIBRATION

Quarrying activity by its nature will generate noise and vibration on an ongoing basis, the level of emissions will depend on the nature of activity being undertaken. Day to day activities associated with the extraction and transport of material have the potential to contribute to background noise levels in the area.

A baseline noise survey was carried out at some of the nearest receptors to the proposed development. Two noise monitors were set up to run continuously between 11th and 13th November 2019.

Noise levels were predicted at receptor locations in the vicinity of the pit based on the various scenarios associated with the plant and machinery operating including removal of topsoil, construction of berms and extraction of material. The proposed berm along the western boundary will act as both a visual and aural barrier.

The calculated levels were below that recommended by the EPA Environmental Management Guidelines-Environmental Management in Extractive Industry (Non-Scheduled Minerals). Therefore, activity associated with the operation of the pit is unlikely to impact on noise levels at nearest sensitive receptors.

The road traffic flow is calculated as an average of 2 lorries per hour (4 movements) based on current demand / calculated based on tonnage. The development of the pit will not increase traffic flow on the local road and will lead to a decrease in the traffic flow on the north-west section of the local road (flow towards the town and through the town) as currently, all material to the Booth manufacturing plant access the plant via Abbeyleix.

A number of mitigation measures are proposed to ensure that noise levels are kept to a minimum. Noise monitoring will be undertaken to ensure that levels associated day to day activities are within the recommended guideline values.

11.0 TRAFFIC

This Traffic and Transportation Assessment identifies and assesses the potential environmental impacts associated with traffic during the operational phase of a proposed sand and gravel pit located at Ballymullen, Abbeyleix, Co. Laois.

The applicant is applying for permission to extract sand and gravel material and transport the material to the applicants existing manufacturing facility located approximately 1.3km to the south of the application site.

The applicant is seeking a 10-year permission as part of the application which will ensure that the available resources are extracted, and the site is restored in line with the landscape and restoration plan.

The proposed development will only require a new wheel wash facility as all other welfare facilities are provided at the existing facility. The access to the quarry shall be via a direct access onto the local road, the L-5731-25.

As determined by scoping with the Local Authority, the proposed junction to the quarry and the existing staggered junction on the N77 with the L-5731-25/ L-5731 have been assessed for the quarry's operation phase.

The expected year of opening (2021) and assessment year of 2031 (i.e. 10-year permission) were assessed. The baseflow traffic volumes have been seasonally adjusted, forecasted to assessment years and include proposed development operational traffic. The proposed direct access and existing staggered junction are currently operating well within capacity and are expected to continue to operate well within capacity up to and including the design year of 2031.

Traffic flows associated with the construction phase and decommissioning phase of the proposed quarry are not significant in comparison to the operational phase. Hence, no mitigation is proposed as traffic generation associated with these phases are deemed to be of a low volume and of short duration in comparison to the Operational Phase of the Project.

12.0 LANDSCAPE

A landscaping assessment was undertaken to assess the impact of the 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.

The application site is located in the Lowland Agricultural Areas Landscape Character Type (LCT) which covers the largest proportion of County Laois. In terms of land use, it is comprised primarily of pastoral and tillage agriculture. The application site is not located in the vicinity of any designated views as detailed in the current *Development Plan*.

The proposal seeks to remove the existing trees and vegetation and to extract the available resource from the application site in order to supply the applicant's needs. Based on the field survey and reference to the *Development Plan* and its Appendix 6 Landscape Character Assessment, the landscape value of the study area has been given a rating of 'Medium'. While the extraction of material will alter the landform and vegetation cover, the magnitude of change as a result of the proposed development has been assessed as 'Medium'. The significance of landscape impacts of the development is assessed as 'Moderate'. The impacts associated with extraction of material will be mitigated by the proposed landscape and restoration plan for the application site.

The proposed development will not result in a significant increase in visibility of the application site at the majority of locations. The active pit face will be visible from the western boundary during the operational phase. The visual impact significance associated with the proposed development has been assessed as being Slight/Moderate to Moderate at locations where the development site is visible.

It is proposed to extract material from the application site over an eight-phase extraction plan with each phase corresponding to approximately 12 months. This will ensure that phases are extracted then restored on a rolling basis with only a minimum area of the site subject to activity.

It is proposed to remove the existing hedgerow along the western boundary and plant a new boundary hedgerow set back from the existing boundary to improve site lines. The new boundary hedgerow will consist of native trees and shrubs. When the trees and shrubs mature they will provide additional screening of the pit.

A berm will be constructed along the western boundary of the pit to screen the pit from the local road. Overburden and sand and gravel material removed from Phase 1 of the development will be used to construct the berm. Wild flower seed will be spread on the berm to stimulate growth.

When the sand and gravel extraction is completed within each phase, the newly created embankment will be graded for stability and topsoil will be re-laid onto the new surface to create a growing medium for the planned replacement planting. The newly re-landscaped side slope and strip of land left intact along the edge of the quarry cutting will be planted up with a mix of tree species during the winter dormant season that follows the completion of the quarrying works.

A landscape and restoration plan has been devised for the pit which proposes landscaping and restoration works to be undertaken on a phased basis during the operational phase, which will reduce the impact associated with the extraction stages of the development. Landscape work and planting as part of the overall process will serve to reduce the long-term visual impact of the development. The landscaping measures have been designed to conceal the pit as much as possible screening it from outside views.

13.0 MATERIAL ASSETS

Material assets comprise the physical resources in the environment, which may be of human or natural origin. The material assets that have been identified within the application site and in the surrounding landscape are listed below:

- Residential Buildings
- Geological Resource
- Land Resource
- Roads & Traffic
- Public Utilities
- Groundwater and Water Supplies
- Scenic Routes
- Tourism
- Archaeology
- Waste

The potential impacts on residences associated with the proposed development are in relation to landscape, noise, dust and traffic as a result of the day to day activities. The proposed development will not result in an increase in traffic on the local road. Proposed management measures in relation to day to day activities are listed in various sections of the EIAR. Environmental monitoring will including water, noise and dust monitoring which will be undertaken in order to ensure that the pit is compliant in relation to levels set.

14.0 ARCHAEOLOGY & CULTURAL HERITAGE

This chapter assesses the impacts of the proposed development on the known and potential cultural heritage resource (including archaeological monuments and artefacts, architectural heritage, folklore and tradition) concerning the integrity, continuity and context of same for future generations. Furthermore, the chapter identifies appropriate mitigation strategies therein.

The archaeological component consisted of a paper survey and fieldwork was carried out in June 2019. A wide variety of paper, cartographic, photographic and archival sources were consulted. All areas impacted by the development were visually inspected. There are no items of cultural heritage, monuments or buildings of heritage interest known from the application area.

A detailed gradiometer survey was conducted under licence No. 22R0258 issued by the Department of Housing, Local Government and Heritage by J. M. Leigh Surveys Ltd. in July 2022 (Leigh 2022). The survey identified 12 anomalies in total. Four of the anomalies are probably relict agricultural divisions (several of which appear on Ordnance Survey historical mapping). One anomaly is a series of farm-tracks visible on aerial imagery. The remaining seven anomalies are curvilinear trends and either clustered or isolated responses that have the potential to be of archaeological significance (anomalies 2, 3, 4, 5, 10, 11, and 12). It is recommended that anomalies 2, 3, 4, 5, 10, 11, and 12 be further investigated by licenced archaeological test excavation.

There are no other known direct or indirect impacts on any other known items of cultural heritage, archaeology or buildings of heritage interest in the application area or the vicinity.

15.0 INTERACTIONS AND CUMULATIVE IMPACTS

In examining the interactions of the impacts for the development one must investigate the combined physical, environment, visual and socio-economic impacts of the development on the receiving environment. Table 15.1 below illustrates the interaction of impacts assessed for the development.

Table 15.1: Interactions

	Pop. & Human Health		Biodiversity		Land, Soils & Geology		Water		Climate		Air		Noise		Traffic		Landscape		Material Assets		Cultural Heritage	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Pop. & Human Health																						
Biodiversity																						
Land, Soils & Geology			✓	✓																		
Water	✓	✓	✓	✓	✓	✓																
Climate	✓	✓																				
Air	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓												
Noise	✓	✓	✓	✓																		
Traffic	✓	✓									✓	✓	✓	✓								
Landscape	✓	✓	✓	✓	✓	✓																
Material Assets	✓	✓			✓	✓											✓	✓				
Cultural Heritage																						

Weak Interaction = ✓ Some Interaction = ✓ Strong Interaction = ✓

16.0 MITIGATION AND MONITORING

Mitigation and monitoring measures are detailed in the various chapters of the EIAR. A complete list of all mitigation and monitoring measures is also contained within Chapter 16 of the EIAR. These measures will ensure that any identified potential significant impact is avoided / reduced to an acceptable level.

17.0 DIFFICULTIES ENCOUNTERED IN COMPILING ANY SPECIFIED INFORMATION

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.

References to published sources of information are acknowledged in the text. A list of all consultants involved in the compilation of information for this Assessment Report is provided in Chapter 1.

The full impact analysis was carried out by experienced consultants and the best available methods were employed to forecast environmental effects.