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Environmental Impact Assessment Report (EIAR) Volume 2: Main Body

For

Sancom Ltd

Pertaining to

The Development and Operation of a Material Recovery Facility at Graney West, Castledermot, Co. Kildare.

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Table of Contents

Table of Tables

Table of Tables

1. Introduction

1.1 Preamble

Sancom Ltd is a company involved in quarrying of materials for use in the construction industry. Sancom have operated a sand and gravel quarry facility at one of its sites based in Graney West, Castledermot, Co. Kildare. The quarry is no longer operational as all useful materials have been extracted.

Sancom Ltd propose on establishing and operating a Material Recovery Facility at this worked out quarry site situated in Graney West, Co. Kildare. The principal activity will involve the use of imported, uncontaminated soil and stone, sourced from construction sites, to backfill and restore the worked out quarry. It is also proposed to carry out a number of secondary waste recovery activities on-site, namely the recovery of a number of construction and demolition waste streams.

It has been determined that the proposal will need to be subject to an EIA as the proposed waste recovery activity constitutes a class of activity which requires EIA under the Environmental Impact Assessment (EIA) Directive (Directive 2011/92/eu amended by 2014/52/eu) and transposing legislation.

1.2 Purpose of the EIAR

The purpose of the Environmental Impact Assessment (EIA) process is to identify and describe the likely, significant impacts of a project on the environment. The main purpose of an Environmental Impact Assessment Report (EIAR) is to present the assessment of the likely, significant impacts in written form.

The EIAR developed has considered likely, significant environmental impacts associated with the proposed activity at the applicant's site at Graney West, Castledermot, Co. Kildare. An evaluation of likely, significant effects of the proposed activity upon the receiving baseline environment has taken place and, where necessary, mitigation measures have been proposed to prevent the occurrence of significant, adverse environment impacts.

1.3 The Site

1.3.1 Site Location

The application site is located in the townland of Graney West, approximately 2 kilometres from the town of Castledermot and 12 kilometres from the town of Balltinglass, in Co. Kildare. There is an established but disused sand and gravel pit at the subject site. The site is located in rural area that is characterized by one off housing and dominated by agricultural activity. A number of historic sand and gravel extraction sites are situated in the broader area. There are a small number residential developments in the vicinity of the site, mainly to the east, north and south of the application site.

Site Location Maps (Drawing Ref: DWG No. 003/A and 004/A) giving an overview of the site and the local area adjoin this Planning Application.

The site is not in or adjacent to any Natural Heritage Area, Proposed Natural Heritage Area, Special Area of Conservation or Special Protection Area. No part of the site is situated in or adjacent to areas which would be defined or designated as wetlands, coastal zones, mountain and forest areas, nature reserves and parks, or densely populated areas.

1.3.2 Site Description

The application site covers an area of 19.2 hectares. An existing residential dwelling and its curtilage, two portakabin offices and a number of existing farm buildings used in connection with agricultural activities on-site and in adjoining lands, are situated in a cluster south west of where the existing access road meets the site from the L8100 local road. An existing concreted yard area surrounds these buildings present on-site. Plant and equipment used in connection with pre-existing quarrying activities are also situated in this area and immediately south of the area.

Large areas of the site consist of worked out quarry void areas where quarrying activities previously took place. Sand and gravel soils in these areas have previously been extracted, leaving mineral sub-soil/rock exposed at the ground surface. Ground levels across the existing quarry facility have been significantly disturbed and lowered by previous quarrying activities. The original ground levels around the quarry typically fall from around 95 m OD to 81 m OD on. Existing quarry floor levels typically vary from 79 m OD to 86.7 m OD.

Pockets of tree groves and vegetative growth occur sporadically throughout the site, with hedgerows existing along sections of the site boundary.

A series of settlement lagoons are located on-site for the purposes of managing surface water run-off.

Further information on the Existing Development present on the application site is provided in Section 5.1.

Site Layout Plans showing the layout of existing development on-site adjoin this Planning Applications (Drawing Ref. 002B1-B4).

1.4 The Applicant

Sancom Ltd is the applicant in this instance. Sancom Ltd is involved in the quarrying of soil and stone for use in the construction industry and operates a number of quarries in the region. The company was established in the year 2000. The registered address of the company is Graney West, Castledermot, Co. Kildare. The company registration number is 317865. The company Director is one Stephen Hudziak.

Although Sancom Limited's principal business interest is in material extraction, the company plans on establishing a Material Recovery Facility at its quarry in Graney West and carrying out the restoration of the quarry through backfilling of uncontaminated soil and stone. The company also plans on operating the site as a C&D waste recovery facility and accepting and recovering other uncontaminated C&D waste streams on-site.

Sancom Ltd propose on operating the proposed Material Recovery Facility in line with best environmental practice. It aims to establish suitable mitigation measures to prevent and reduce adverse environmental effects associated with the proposed activity. The company aims to ensure that it is compliant with all Irish and EU legislative environmental requirements as well as requirements prescribed in planning/environmental permits and licences the company operates under. The company proposes on establishing and implementing an ISO14001 accredited Environmental Management System at its facility in Graney West to ensure good environmental performance at the facility.

1.5 Land Ownership

The owner of the site in question at Graney West is Stephen Hudziak, who is the Director of Sancom Ltd. A letter of consent has been obtained from Stephen Hudziak permitting the applicant to make this Planning Application and use the land under his ownership at Graney West, Castledermot, Co. Kildare as a Material Recovery Facility.

The proposed site access road, which runs from the site southward to the L4015, traverses the property of a third-party landowner. A letter of consent has been obtained from the third-party landowner permitting the applicant to make this Planning Application and develop and use the land under their ownership at Graney West, Castledermot, Co. Kildare as a site access road.

1.6 Consultants Involved in the Preparation of the EIAR

Environmental Efficiency Consultants has been commissioned by the applicant to complete the Planning Application submission and coordinate and complete the adjoining Environmental Impact Assessment Report. Third party consultants have been procured where additional knowledge and expertise in relation to certain environmental areas is required. Table 1-1 below details the consultants involved in the preparation of the EIAR, their qualifications, competencies and the EIAR tasks they carried out.

Table 1-1 Consultants involved in the preparation of the EIAR

Company	Name	Relevant Qualifications	Competencies	EIAR Tasks
Environmental Efficiency Consultants	Bob Sutcliffe, Managing Director and Chartered Engineer.	CEng, MIMechE, MIEI, CMIWM	Bob is a Chartered Engineer since 1980, a Member of the Institution of Mechanical Engineers, a Certified Energy Manager under the UK and Irish registers, and also a member of Engineers Ireland. Bob formed Environmental Efficiency Consultants as a broad focus environmental consultancy in 1996. As such, Bob has a vast amount of experience in Environmental Consultancy. In particular, Bob has extensive experience and in-depth knowledge and expertise when it comes to overseeing the completion of EPA Licence Applications and EIS's/EIAR's for industries and sectors.	Overview and project sign off.
	Richard Deeney, Senior Planning and Environmental Consultant.	B.Sc. Environmental Management, PIEMA, Adv. Dip. Planning and Environmental Law	Richard is a Senior Environmental Consultant with Environmental Efficiency Consultants who holds a B.Sc. in Environmental Management, as well as an Advanced Diploma in Planning and Environmental Law with the Kings Inns. He has been with the company for seven years at the time of writing. In this role Richard has provided technical advice and services to clients in the areas of broad base Environmental Consultancy, Industrial Emission Licensing, EIA and Planning, among other areas. Richard has extensive experience scoping, planning, coordinating and executing EIS's/EIAR's for various types of industry, including metal processing facilities, waste facilities and wind farm development. Richard has a wide and in-depth knowledge of a broad range of environmental topics as well as a robust understanding of EIA Legislation.	Coordination and completion of the EIAR. Completion of EIAR Scoping Completion of 'Planning and Policy Context' Chapter Completion of 'Examination of Alternatives' chapter. Completion of 'Description of the Proposed Development' Chapter Completion of the 'Population and Human Health' chapter. Completion of the 'Material Assets' chapter.

Company	Name	Relevant Qualifications	Competencies	EIAR Tasks
				Completion of the 'Interactions' chapter.
	George Byrne, Senior Environmental Consultant and Air Quality Specialists.	M.Sc. Biosystems Engineering, Cert in AERMOD/CALPUFF	George is Senior Consultant with Environmental Efficiency Consultants with academic qualifications as a Bachelor of Agricultural Science and a Master of Science in Biosystems Engineering. Serving as a senior environmental consultant in Environmental Efficiency's 'monitoring and analysis' group, George's responsibilities cover the monitoring of all environmental emissions (noise, water, air) plus occupational noise and indoor air quality. George is also a Certified AERMOD and CALPUFF dispersion modeller responsible for Environmental Efficiency's air dispersion modelling work and has extensive experience in this regard. In addition to this George has extensive experience in scoping, planning and executing Air and Climate chapters of EIS's/EIAR's for various types of project.	Completion of the 'Air and Climate' chapter.
	Ronan Sutcliffe, Senior Environmental Consultant and Noise Specialist.	Dip. Environmental Protection, Environmental Noise Certificate Institute of Acoustics	Ronan is a Senior Environmental Consultant who has focused on environmental and health and safety monitoring auditing for over 16 consecutive years (2002-2018). Ronan specializes in Environmental and Occupational noise monitoring as well as Noise Prediction modelling. Ronan has extensive experience conducting Noise Prediction Modelling and Noise Impact Assessment for the purposes of EIA for various types of development including wind farms, waste facilities and quarries. Ronan also has experience acting as an Expert Witness in a number of Noise Pollution related Court Cases in Ireland.	Completion of 'Noise and Vibration' Chapter
Bluerock Environmental	Niall Mitchell, Hydrogeologist & Chartered Engineer.	BE, MSc, CEng MIEI, PGeo		Completion of the 'Land and Soils' chapter.
				Completion of 'Water' chapter.
JBA Consulting	Bernadette O' Connell, Environmental	BA (Hons) MSc CMLI	Bernadette is a chartered Landscape Architect and a technical director with JBA specialising in landscape design and visual assessment of Infrastructure projects. She has worked in engineering consultancy for 29 years in Ireland,	Completion of the 'Landscape' chapter.

Company	Name	Relevant Qualifications	Competencies	EIAR Tasks
	Consultant and Landscape Architect		UK and Asia and has assisted in the delivery of projects from Tender, Feasibility and through the Statutory Processes. Bernadette has carried out Landscape and Visual Impact Assessments for many Irish projects and has acted as an Expert Witness on LVIA aspects at 6 Oral Hearings.	
	Elena Sorbo Assistant Landscape Architect	M.Arch	Elena is an assistant Landscape architect and a qualified architect. She has gained experience in assisting with public realm and urban design aspects of residential, industrial and commercial projects and in the production of hard landscape details, soft planting design including planting schedule and technical details. Elena is also working providing supervision of tree protection works for planning compliance on site during the construction of a large industrial unit in Dublin.	
	Niamh Burke, Principal Ecologist	BSc PhD MCIEEM	An environmental scientist with 10 years' experience in ecological work and is a full member and organising committee member of the CIEEM (Chartered Institute of Ecological and Environmental Management) and is a Chartered Environmentalist with the Society for the Environment. Niamh has authored numerous Appropriate Assessment screenings, Natura Impact Statements, Ecological Impact Assessments and EIS Biodiversity (Flora and Fauna) chapters. She is also fully adept at invasive plant species field identification and generation of IAS management plans. Most recently, Niamh has carried out Appropriate Assessment screenings for Sligo County Council and Kildare County Council as well as NIS stage 2 assessments and authored an EIS chapter for Kildare County Council.	Completion of the 'Biodiversity' chapter.
	Malin Lundberg Ecologist	BSc MSc	Malin joined JBA after completing her MSc studies at Stockholm University in Landscape Ecology, the MSc thesis was carried out at UCD Dublin, where she looked at vegetation in an urban landscape using GIS. She has a range of ecological survey experience for different species and habitats, such as general land cover identification, woodlands and grassland species identification. Malin has worked on the 2018 field surveys for the EU commissioned LUCAS project in Ireland, which focuses on land use and land cover in the landscape and how it changes over time. Further, she has been co-ordinating the ecological walkover surveys in the Arterial Drainage	

Company	Name	Relevant Qualifications	Competencies	EIAR Tasks
			Schemes project for the OPW, carried out habitat surveys, winter mammal surveys with focus on badgers and otters, and authored two Natura Impact Statement reports for the same project. She has also supported the ecology team with producing maps in GIS and recently she has authored Appropriate Assessment Screening reports for private developers.	
	William Mulville Assistant Ecologist	BSc (Hons),	William is an ecologist with training in zoology, GIS software and ecological habitat and mammal surveying. He has gained a wealth of knowledge in relation to protected and invasive species in Ireland, as well as a firm grasp on ecological surveying and GIS software through his BSc (Hons) and MSc degrees. William has conducted Appropriate Assessment Screenings, Natura Impact Statements and Preliminary Ecological Appraisals (PEAs); as well as numerous Badger, Otter, Bat (roost suitability) and habitat surveys. William is currently under review for a Graduate Membership with the Chartered Institute of Ecological and Environmental Management (CIEEM).	
Transport Insights	Eoin Munn, Transport Planner and Associate Director (Project Manager)	BSc, MSc	8 years' experience working within Transport Planning and Engineering, including project management of a variety of small to large sized projects from feasibility to detailed design stage. Recent EIAR experience includes preparing Traffic and Transport Chapters for a Biopharmaceutical Development in West Dublin, for an aluminium plant in County Limerick, and for an industrial development at Athy, Co. Kildare.	Completion of the 'Traffic and Transport' chapter.
	Ciaran McKeon, Transport Planner and Managing Director (Project Director)	BE (Hons), P. Grad. Dip	Transport consultant with over 20 years' experience having advised a range of public and private sector clients, including central government, local government, transport agencies, transport operators and developers. He has extensive experience of developing transport projects, plans and programmes; public transport network and service planning; development planning; and EIA reports and stakeholder engagement. Recent experience of EIA reports includes acting as Project Director for preparation of Traffic and Transport Chapters for a Biopharmaceutical Development in West Dublin, a proposed film studios' development in	

Company	Name	Relevant Qualifications	Competencies	EIAR Tasks
			County Wicklow, and for a commercial development at Castledermot, County Kildare.	
	Gabriela Iha, Graduate Transport Planner	BSc	1 years' experience working within Transport Planning and Engineering, on a variety of public and private sector projects including traffic engineering support for a Medical Technology Development in Enniscorthy, County Wexford and a Quarry Development at Redcross, County Wicklow. Gabriela is currently preparing a road design for a national road in Athy, County Kildare.	
Irish Archaeological Consultancy	Faith Bailey, Senior Archaeologist & Cultural Heritage Consultant	MA, BA (Hons), MCIfA	Faith Bailey (16 years of experience) Qualifications and Memberships: • MA, Cultural Landscape Management (Archaeology & Built Heritage), University of Wales, Lampeter (2003). • BA (Hons) Archaeology, University of Wales, Lampeter (2001). • Member of the Chartered Institute of Field Archaeologists. • Member of the Institute of Archaeologists of Ireland. • Licence eligible archaeologist.	Completion of the 'Cultural Heritage' chapter.

1.7 Difficulties in Compiling the EIAR

No difficulties were encountered during the carrying out of the Environmental Impact Assessment of the preparation of this EIAR.

1.8 Layout of the EIAR

The EIAR comprises three Volumes consisting of the following:

- Volume 1: EIAR Non-technical Summary
- Volume 2: EIAR Main Body
- Volume 3: EIAR Appendices

The Non-technical summary of the EIAR presents a synopsis of the main body of the EIAR and includes an outline of the proposed activity and an outline, in clear, understandable and succinct language, of the direct and indirect environmental effects of the proposed activity.

The main body of the EIAR provides detailed, comprehensive information on the background to the proposal, the need, purpose and scope of the EIAR, the characteristics of the proposed activity and potential, direct, indirect and cumulative environmental effects of the proposed activity.

Having regard to the Scoping Assessment undertaken and the EPA Guidelines on Information to be contained in EIAR's (2017) (Draft), it was decided to format the main body of the EIAR in the following manner:

1. Preamble
2. Scoping
3. Planning and Policy Context
4. Examination of Alternatives
5. Description of the Proposed Development
6. Population and Human Health
7. Biodiversity
8. Land and Soils
9. Water
10. Air and Climate
11. Noise
12. Material Assets
13. Traffic and Transport
14. Cultural Heritage
15. Landscape
16. Indirect Impacts, Cumulative Impacts and Interactions

Sections 5 to 16 of the main body of the EIAR comprise the Environmental Topic Chapters. These chapters have been laid out in the following manner:

- Introduction
- Assessment Methodology
- Baseline Environment
- Impact Assessment
- Mitigation Measures
- Residual Impacts

Certain environmental topics have been 'scoped out' of the EIAR due to the nature and characteristics of the proposed activity. Where an environmental topic pertaining to a prescribed environmental factor has been scoped out of the EIAR, an explanation of the reasons for scoping out such environmental topics are provided in the relevant chapter.

The EIAR Scoping Report provides a synopsis of the EIA Scoping Assessment undertaken. This was undertaken for the purpose of identifying significant environmental effects which are likely to occur as a result of the proposed activity and scoping out environmental topics which are not deemed to be relevant considering the nature and characteristics of the proposed activity, the characteristics of the existing environment and sensitive receptors, and the overall significance of said environmental topics.

An EIAR Appendices was developed in order to collate all supporting and supplementary information. This Appendices is cross referenced throughout the main body of the EIAR as appropriate.

1.9 Assessment Criteria

Impact Assessment Criteria have been established in order to accurately assess and characterize the environmental impacts of the proposed activity. The following criteria have been considered when describing environmental effects:

- Magnitude and spatial extent of the effects
- Nature of the effects
- Transboundary nature of the effects
- Intensity and complexity of the effects
- Probability of the effects
- Expected onset, duration, frequency and reversibility of the effects
- Cumulation of the effects with the effects of other existing and/or approved projects
- Possibility of effectively reducing the effects.

Detailed criteria for describing effects is shown in the table below. These criteria have been established by the EPA and is detailed in their Guidance Document *Guidelines on the Information to be contained in Environmental Impact Assessment Report.*

Table 1-2 Descriptions of Effects

Quality of Effects	**Positive Effects** A change which improves the quality of the environment
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/adverse Effects A change which reduces the quality of the environment
Describing the Significance of Effects	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not significant An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics
Describing the Extent and Context of Effects	**Extent** Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions
Describing the Probability of Effects	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Duration and Frequency of Effects	**Momentary Effects** Effects lasting from seconds to minutes
	Brief Effects Effects lasting less than a day
	Temporary Effects Effects lasting less than a year

	Short-term Effects Effects lasting one to seven years.
	Medium-term Effects Effects lasting seven to fifteen years.
	Long-term Effects Effects lasting fifteen to sixty years
	Permanent Effects Effects lasting over sixty years
	Reversible Effects Effects that can be undone, for example through remediation or restoration
	Frequency of Effects Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
Describing the Types of Effects	**Indirect Effects (a.k.a. Secondary Effects)** Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative Effects The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	'Do-Nothing Effects' The environment as it would be in the future should the subject project not be carried out.
	`Worst case' Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects When the full consequences of a change in the environment cannot be described.
	Irreversible Effects When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents

For certain Environmental Topics other Impact Assessment Criteria may be used to describe the environmental impacts of the proposed activity (e.g. Landscape and Visual Impacts may be described differently). Where this is the case, Impact Assessment Criteria are explained in detail in the relevant chapter within the EIAR.

2. EIAR Screening and Scoping

The start of the EIA process involves deciding whether an EIA needs to be undertaken or not. This stage is known as the EIA Screening Stage. Through consultation with the Planning Authority (Kildare County Council), it has been determined that the Proposed Development will need to be subject to an EIA as it constitutes a class of activity which requires EIA under the EIA Directive, namely the intake and disposal of material classed as waste in quantities greater than 25,000 tonnes per annum.

Following the Screening Stage, a Scoping Assessment is carried out in order to identify likely, significant impacts associated with the proposed activity and to 'scope out' environmental topics that do not need to be addressed within the EIAR. This stage is known as the Scoping Stage. The Scoping Assessment Methodology for the EIAR involved the following steps:

1. The Planning Authority (Kildare County Council) and a number of relevant stakeholders were consulted with during the Scoping Phase of the EIAR in order to comprehensively identify important environmental topics and potential environmental impacts that must be addressed during the EIA process. Pre-application consultation meetings were held separately with the Planning Authority Kildare County Council (KCC) and the EPA. An EIA Scoping Opinion Request was made to the KCC. KCC consulted with relevant statutory consultees and issued a Written Scoping Opinion on the 5th of November 2018 on the information to be contained in the EIAR for the Proposed Development.

2. A Review of the Planning Context and the Environmental and Waste Management Policy Context, encompassing a review of Kildare County Council's Development Plan, took place in order to identify and evaluate relevant planning and policy objectives which apply to the proposed development.

3. A review of Environmental Protection Agency (EPA) Guidance Documents including the *EPA BAT Guidance Notes for the Waste Sector* (Landfills and Material Transfer and Recovery) and *EPA Guidelines on Environmental Management in the Extractive Industry* took place in order to determine relevant and appropriate Environmental Management requirements and obligations pertaining to the Proposed Development.

4. A Planning Application for the establishment of a Material Recovery Facility at the subject site was submitted in February 2018 to KCC (Planning Ref. 18/196). This was for a less intensive development. KCC issued a Request for Further Information in relation to the Planning Application. This Request for Further Information was reviewed to ascertain further planning and environmental issues of concern from the Planning Authorities perspective. (Note: This Planning Application was ultimately withdrawn).

5. Planning Application Files, Waste Licence Application Files and EIAR's for similar projects or for projects situated in the same geographic area as the proposed development were examined to identify important environmental topics and potential environmental impacts that may be relevant or that may arise as a result of the nature, location and/or characteristics of the proposed development.

6. A Scoping Assessment Exercise was carried out. The proposed development and the receiving environment were assessed and characterized in order to identify project elements and processes, baseline environmental sensitivities, key emissions or threats, likely and potential environmental pathways, interactions between the proposed development and the receiving environment and potential, likely, significant effects on the environment. Databases reviewed when characterizing the baseline environment included the GSI's web mapping database, the EPA's web mapping database and the NPWS's web mapping database. Methods for evaluating and assessing potential environmental impacts in the EIAR were then identified. In carrying out the Scoping Exercise regard was had to all consultation undertaken with KCC, the EPA and other relevant stakeholders, as well as all output from the previous steps listed above.

Regard was had to the following guidance documents in completing the scoping exercise:

- EPA Guidelines on Information to be contained in EIAR's (2017) (Draft)
- EPA Advice Notes for preparing Environmental Impact Statements (2015)
- European Commission Guidance on EIA Scoping, June 2001.

A Scoping Report detailing the output from the Scoping Assessment undertaken by Environmental Efficiency Consultants was then developed.

3. Planning and Policy Context

3.1 Planning History

The site has been in use historically as a quarry facility. Sancom Ltd registered this sand and gravel pit in accordance with Section 261 of the Planning and Development Act 2000. Permission for the continued operation of the sand and gravel pit and all associated processing works was obtained in 2009 (Planning Reference: 06/2802). The quarry is no longer operational. A vernacular cottage as well agricultural outbuildings are also present on-site.

On 26/02/2018, Phoenix Sand Ltd, which is also owned by Stephen Hudziak, applied for planning permission to develop a Material Recovery Facility at the site (Planning Reference 18/196). The principal development activity in this instance was the deposition of waste soil and stone at a quarry void for the purposes of backfilling and land restoration. The quantity of such material to be accepted and infilled was expected to be less than 17,500 tonnes per annum, and, overall, was expected to be approximately 100,000 tonnes throughout the operational phase of the proposed activity.

Kildare County Council reviewed the Planning Application discussed above and issued a Further Information Request on 20/04/2018. In response to this, Stephen Hudziak, owner of both Phoenix Sand Ltd and Sancom Ltd, decided to withdraw this Planning Application and make a new Planning Application on behalf of Sancom Ltd. It was decided to seek permission to backfill a significantly greater amount of soil and stone on-site in order to make the project economically viable. It was decided to address all items listed on Kildare County Council's previous Further Information Request in this new application.

The table below provides an overview of the Planning History for the subject site.

Planning Reference	Description	Decision	Date
06/2802	The continued operation for the extraction of sand & gravel & all associated processing works	Permission	02/06/2009
18/196	Development of a waste recovery facility	Withdrawn	27/06/2018

3.2 Planning and Policy Context

3.2.1 Planning Context

The main body of application site is located in the townland of Graney West approximately 2 km south east of the town of Castledermot, Co. Kildare. The application site is currently accessed from the L8100 local road. It is proposed to construct a new site entrance to the south of the site which will allow the site to be accessed from the L4015 road. The new access road will traverse the townland of Coltstown.

A number of existing one off houses are situated in the local area surrounding the site. The nearest residential property ca. 124 metres north east of the main site. Ten other residences are situated within 500 metres of the application site.

There are no designated European or national nature or habitat conservation sites on, adjacent to or in close proximity to the application site. The nearest such site is the River Barrow and River Nore SAC which is situated 2km north east of the application site.

There are no recorded monuments situated on the application site. There are five recorded monuments within the study area, the closest consists of a ringfort (KD040-012), c. 10m east of the proposed access road in the townland of Coltstown.

There are no buildings identified on the National Inventory of Architectural Heritage in the immediate vicinity of the application site.

A review of the OPW's Catchment Flood Risk Assessment and Management programme took place to assess flood risk. There is an area along the River Graney approximately 900 -1,000 metres to the west of the site where there is a risk of flooding. Water levels during a 0.1% AEP Flood Event at the nearest node point in the flood risk area on the Graney River are anticipated to be 77.76 OD. The lowest point recorded on-site during the recent topographical survey was at one of the settlement ponds and was 79.183 OD. The lowest point on the existing quarry floor is 79.2 m (OD). Given the elevation of the site relative to the expected elevation of potential flood events, given the distance from the areas at risk on the Graney River and the site and given the subject site is well drained and permeable in nature, it has been concluded that there is a negligible risk the site would flood.

3.2.2 Policy Context

The proposed development is considered to align with the planning policy objectives defined for the region in the Kildare County Development Plan 2017 - 2023, and in particular, the following planning policy objectives defined:

- WM 1 Implement European Union, National and Regional waste related environmental policy, legislation, guidance and codes of practice to improve management of material resources and wastes.

- WM 5 Provide, promote and facilitate high quality sustainable waste recovery and disposal infrastructure and technology in keeping with the EU waste hierarchy and to adequately cater for a growing residential population and business sector.

- WM 10 Encourage waste prevention, minimization, reuse, recycling and recovery as methods of managing waste. Where waste management is not being carried out properly, the Waste Management Act 1996 as amended, will be used as a means of ensuring specific national policies.

- WM 15 Support and facilitate the separation of waste at source into organic and non-organic streams or other waste management systems that divert waste from landfill and maximize the potential for each waste type to be reused and recycled or composted and divert organic waste from landfill, in accordance with the 'National Strategy on Biodegradable Waste 2006 and the Eastern – Midlands Region Waste Management Plan 2015-2021.

- EN 10 Promote and increase the amount of waste reused and recycled consistent with the Eastern Midlands Region Waste Management Plan and Waste Hierarchy and facilitate recycling of waste through adequate provision of facilities and good design in new developments.

- EI12 Ensure that all existing workings are rehabilitated to suitable land-uses and that extraction activities allow for future rehabilitation and proper land-use management.

In addition, the proposed development conforms to the principals, policies and objectives relating to the promotion of the circular economy, resource efficiency and the reduction of waste to landfill defined the Eastern-Midlands Regional Waste Management Plan (WMP) 2015-2021, Regional Planning Guidelines for the Greater Dublin Area 2010-2022, the national Waste Management Act and the European Union Waste Framework Directive.

3.3 The Need for the Proposed Development

The proposed development will involve the carrying out of a number of waste recovery activities. The proposed development is considered beneficial to the wider community and wider society as it contributes to the promotion of a circular economy and resource efficiency. All waste materials entering the site will be recovered and ultimately reused.

With the increase in construction activities in the surrounding region, it is deemed that there is a significant necessity for the development and provision of construction and demolition waste management services in the region, in particular, soil removal and recovery services.

RPS Consultants, independent of Sancom Ltd, have defined the need for the development of soil recovery facilities due to shortfalls in Soil Recovery Capacities detailed in RPS's Review of Soil Waste Management in the Greater Dublin Region, Market Analysis Report, (August 2016) and in RPS's Soil Recovery Market Analysis Report for the Eastern Midlands Region / Connacht Ulster Region / Southern Region, (August 2016).

The proposed development has the potential to create employment in the locality, generating two to five jobs depending on its success.

The proposed development will be for the purposes of achieving the improvement and development of land and the restoration of the site and will be in accordance with Condition 3 (a) of the planning permission for the quarry which requires that quarried areas be restored in the interests of visual and residential amenity and the proper planning and sustainable development of the area. It is considered that the proposed development proceeding and being completed will ultimately improve visual amenity in the local area.

4. Examination of Alternatives

4.1 Alternative Locations

No alternative locations were considered for the development in question. The site was previously operated as a quarry facility. Past quarry operations, namely the extraction and processing of materials on-site and the haulage of materials off-site, were granted permission in 2009 (Planning Ref: 06/2802). These operations were carried out in accordance with the prescribed conditions contained in that planning permission and did not cause or create any significant, adverse environmental effects. Considering this, the site in question is considered ideal for the backfilling and C&D waste recovery operations proposed.

4.2 Alternative Site Design/Layout

On 26/02/2018, Phoenix Sand Ltd, which is also owned by Stephen Hudziak, applied for planning permission to develop a Material Recovery Facility at the site (Planning Reference 18/196). The principal development activity in this instance was the deposition of waste soil and stone at a quarry void for the purposes of backfilling and land restoration. The quantity of such material to be accepted and infilled was expected to be less than 17,500 tonnes per annum, and, overall, was expected to be approximately 100,000 tonnes throughout the operational phase of the proposed activity.

Kildare County Council reviewed the Planning Application discussed above and issued a Further Information Request on 20/04/2018. In response to this, Stephen Hudziak, owner of both Phoenix Sand Ltd and Sancom Ltd, decided to withdraw this Planning Application and make a new Planning Application on behalf of Sancom Ltd. It was decided to seek permission to backfill a significantly greater amount of soil and stone over a substantially larger fill area in order to make the project economically viable.

In the previous application it was proposed to utilize an existing site entrance connecting the L8100 local road to the site. The Planning Authority voiced concerns however with the lack of passing bays situated along this road. It was decided by the applicant in this new application to develop a new site access to the south of the site connecting the site to the L4015 Castledermot to Baltinglass regional road. This alleviates the need to develop passing bays on the L8100 and ensure a suitable regional road is used for HGV's accessing the site. Consent from a landowner who owns land to the south of the site has been obtained to develop this site access road. The new site access junction will be splayed and appropriate road signage and markings will be provided.

The proposed C&D Recovery activities, the proposed drainage systems and the layout of plant and equipment has remained broadly the same from one planning application to the next. It is now proposed to surround the concrete crusher with cantilever walls to minimize noise and dust impacts. Internal circulation routes have been amended slightly considering the new site access point for incoming HGV's. The waste inspection/quarantine area and the car parking area have been re-located to a location in close proximity to the new proposed site entrance. A wheel wash has been re-located along the new proposed site access road. This wheel wash will be closer to the site entrance than before. To minimize visual impacts, it is now also proposed it is proposed to erect screening mounds and tall trees along the northern, eastern and southern site boundaries.

4.3 Alternative Processes

No alternative processes were considered during the design and planning process

4.4 The 'Do Nothing' Scenario

A 'Do Nothing' scenario would see the quarry voids on-site continue to be a component part of the local area and landscape. Quarry related operations will continue on-site under existing planning permission

Land restoration activities will not take place on-site and the prescribed condition in the planning permission for the quarry (Planning Ref: 06/2802, Condition 3 (a), requiring the improvement and development of land and the restoration of the site in the interest of visual and residential amenity and the proper planning and sustainable development of the area, would not be fulfilled.

A 'Do Nothing' scenario may also negatively affect the market for soil and sub-soil removal services for the construction and demolition sector in the region.

5. Description of the Proposed Development

5.1 Existing Development On-site

The site has been in use as a quarry historically. Permission for the continued operation of the sand and gravel pit and all associated processing works was obtained in 2009 (Planning Reference: 06/2802). The planning permission set as a condition the restoration of the quarry voids by backfilling using imported inert naturally occurring materials, principally excess soil, stones and/or broken rock from construction and development sites. Quarrying activities have ceased within the application site as full extraction of materials has occurred. Quarrying activities will continue to take place in an adjacent field to the north of the site outside the application site boundary in accordance with the existing planning permission (Ref. 06/2802). Agricultural activities in support of the raising and grazing of livestock in other fields outside the boundary of the subject site are also carried out on-site.

The following buildings, facilities, services and infrastructure, utilized in connection with the pre-existing quarry activity and farming activities, are currently present on-site:

- Site offices (2 x portable cabins)
- Washing plant and ancillary equipment
- Stockpiling areas and existing retaining walls
- Existing site access road to the east of the site
- Internal haul routes
- Covered, bunded fuel tanks
- Non-permeable concrete area (surrounding residence and farm buildings/structures)
- Covered, slatted effluent storage tank
- Site boundary trees and vegetation
- SW/foul drainage infrastructure; existing SW/foul drains, pump house, septic tank, soak hole and settlement lagoons (x 3).
- Dwelling house and its curtilage
- Various agricultural buildings and structures used in connection with farming activity, including; cattle shed (with effluent storage tank), outhouse and horse boxes, horse paddock, silage pit, farm store and racking area.
- Large quarry void area (13.65 ha) (fill area), with proposed retaining wall for materials.

It is proposed to utilize pre-existing plant and, in addition, install further plant on-site to be used in connection with the proposed development activity (as detailed in Section 0).

The location and spatial extent of existing development is shown in Site Layout Plans which adjoin the Planning Application (Drawing Ref: 002/B1-B4). Existing contours of the fill area are shown in existing contours drawings which adjoin the Planning Application (Drawing Ref: 002/D1-002/D4).

5.2 Proposed Development

Sancom Ltd propose on establishing and operating a Material Recovery Facility at a worked out quarry situated in Graney West, Co. Kildare. The principal activity will involve the use of imported, uncontaminated soil and stone, sourced from construction sites, to backfill and restore the worked out quarry. Sancom Ltd intend on accepting a maximum of approximately 1.8 million tonnes of soil and stone material on-site for backfilling over the course of 10 to 25 years, depending on market demand for disposal services.[1]

The proposed activity above will be for the purposes of recovering said materials through land deposition, and to achieve the improvement and development of land and site restoration and will be in accordance with Condition 3 (a) of the planning permission for the existing quarry (Planning Ref. 06/2802) which requires that restoration operations shall be carried out in a progressive manner throughout the life of the proposed development to control the scale of development and in the interests of visual and residential amenity and the proper planning and sustainable development of the area.

The material accepted on-site for backfilling will be inert and will comprise subsoil, clay, gravels, topsoil, stone and mixtures of such. These materials will be sourced from construction sites in the Greater Dublin Area. The exact sites of sourcing are not yet known.

The proposed activity will include the placement of cover soils and seeding and return to use as agricultural grassland as prescribed for in the existing planning permission for the site (Planning Ref. 06/2802 Condition 12).

In addition to the principal waste activity described above, it is proposed to carry out the following Construction and Demolition waste recovery activities on-site:

- Intake of top-soil, screening at existing screening plant and resale of such material,
- Intake of gravel and sands, washing at existing washing plant and resale of such materials,
- Intake of concrete, concrete crushing using concrete crushing equipment, mixing with sand and gravel before being fed to the washing plant to form aggregate, and resale of such material, and;
- Intake of garden waste, shredding and composting of this waste for use for agricultural land spreading.

A maximum of 99,500 tonnes of construction and demolition related waste material will be accepted on-site per annum. The total area of the application site is 19.2 hectares inclusive of site access roads. The fill area is 13.65 hectares in size. The Construction and Demolition Material Recovery Area is 4.4 hectares in size. A Waste Licence will be obtained for the proposed waste recovery activities under the Waste Management Act, as amended.

[1] Considering a fill area volume of ca. 1,054,949 m3 and assuming an average imported soil density of 1.8 t/m3.

As part of the Proposed Development it is proposed to construct a new site access road running south of the site to the L4015 Castledermot to Baltinglass Road and a new site entrance onto this road designed to appropriate standards. It is also proposed to install/develop the following on-site: a weighbridge, a wheel wash, a stockpile and sorting area, the appropriate material recovery plant and equipment, a waste inspection and quarantine area, surface water treatment infrastructure and external lighting. Existing plant, equipment, site infrastructure and settlement ponds situated on-site will be utilized for proposed site activities. A Bunded Fuel Storage area currently present on-site will be upgraded.

The location and spatial extent of the proposed development is shown in Site Layout Plans which adjoin the Planning Application (Drawing Ref: DWG Nos. 002/C1-C4). Proposed contours of the fill area are shown in proposed contours drawings which adjoin the Planning Application (Drawing Ref: 002/E2-E3). Details of the proposed landscaping works and the Landscape Restoration Plan for site adjoin the Planning Application (Drawing Ref: 1467-002). Further details on site infrastructure, site preparation works and operations and processes are shown in Sections 5.3, 5.4 and 5.5.

5.3 Site Infrastructure

5.3.1 Site Access

An existing access road to the east of the site connects the site with a local third class road. It is not proposed to use this route as a haul route. This route will only be used for staff and visitors driving to and from the site. No HGV's will use this route.

It is proposed to construct a new site access road to the south of the site connecting the site directly to the L4015 (Castledermot to Baltinglass regional road). Details on the design of the new site access road and junction, as well as proposed upgrades to the public road at the proposed entrance location are in drawings adjoining the Planning Application (Drawing Ref: 2017 C271_1 v1.1)(Drawing Ref: G1210-01, G1210-02, G1210-03).

Aside from the access roads discussed above, the property boundary is closed off by post and wire fencing and/or hedgerow. Security gates will be present at both site access roads. There is no other access into the quarry complex.

5.3.2 Traffic Management Infrastructure

It is proposed to erect direction signs, warning notices and speed restriction signs internally on-site along the site access roads and internal circulation routes.

The existing site access road will only be used by staff and visitors. No HGV's will use this access road. It is proposed to construct a passing point along the existing access road to the east of the site for staff and visitors to utilize where necessary.

The proposed site access road to the south of the site will be used by HGV's entering and leaving the site. The site access junction here will be splayed, with good sight distance in both directions allowing for the safe entering and exiting of vehicles to and from the site. The site entrance gate will be set back from the public road edge in order to avoid queuing on the local road network. The splayed access will allow for safe passing of vehicles with ease. Proposed sightlines are sufficient in both directions for vehicles approaching the site access junction from the L4015, and for vehicles exiting the site. The first 100 metres of the site access road from the L4015 and the junction between the site access road and the L4015 will have a road pavement overlay of either tarmac, asphalt, or concrete (to be decided). The rest of the road will be gravelled. It is proposed to have a wheel wash with an integrated silt tank, rattle bars and oil interceptor 100 metres in from the site entrance. A passing point will be developed 100 metres back from the site entrance adjoining the proposed wheel wash. The site access road will be 7 metres in width.

It is proposed to install a stop sign at the junction between the new site access road and the L4015. It is proposed to have proposed warning markings (M106) on the L4015 on approach to the junction. It is proposed to have the new site access road slightly elevated and graded in such a manner that surface water run-off will drain naturally into surrounding drainage ditches bordering adjacent fields. Details on the design of the new site access road and junction, as well as proposed upgrades to the public road at the proposed entrance location are shown in drawings adjoining the Planning Application (Drawing Ref: 2017 C271_1 v1.1)(Drawing Ref: G1210-01, G1210-02, G1210-03).

No pedestrians will be allowed in working areas on-site. Pedestrian movements will only take place around the garage area. If staff are engaged in processing operations they will be in mobile plant.

5.3.3 Site Roads, Parking and Hardstanding Areas

Internal circulation routes for goods in, goods being processed internally, goods out and personnel access have been designed and are delineated in Site Layout Plans which adjoin the Planning Application (Drawing Ref: DWG Nos. 002/C1-C4). Internal circulation routes will comprise gravel roads. Access roads and internal haul routes will be inspected and swept periodically to prevent the build-up of litter, debris and mud. These routes will be re-gravelled where there is evidence of deterioration or the excessive building up of mud or moisture.

It is proposed to provide employee and visitor car parking at a permeable car parking area adjacent to the eastern boundary of the site and south of where the existing access road meets the site. Separately, it is proposed to provide five parking spaces for HGV's on-site. This HGV parking area will be for Sancom vehicles only. There will be no HGV parking spaces for incoming HGV's as they will arrive on-site, deposit their load, pick up a load, if necessary, and then make their way immediately off-site. Truck queuing areas are provided within the main body of the site for truck arriving on-site waiting to deposit their load.

Rain falling across unpaved surfaces will percolate to ground or run-off towards existing settlement ponds. There are also extensive non-permeable concrete areas surrounding residential and agricultural buildings situated south west of the existing site access road. It is proposed to extend this concrete apron northward. Rain falling across these surfaces will drain via the existing drainage network towards on-site settlement ponds. Overflow from the last of these ponds is via a 300 mm diameter concrete pipe to a ditch which runs to the Graney River south of the site. A hard-standing refuelling area will be developed adjacent to the fuel bund on-site. This area will be served by a silt trap and oil interceptor/separator. A 10,000 litre Klargester FS Forecourt Separator will be situated on-site to serve the refuelling area. This will be required for when fuel tankers re-fill the fuel storage tanks on-site. One cell of a fuel tanker will hold 7,700 litres of fuel therefore the proposed separator will be sufficient in size and capabilities for containing any accidental fuel tanker oil spills/releases.

5.3.4 Weighbridge

It is proposed to install a weighbridge on-site to weigh waste accepted on-site. An unmanned surface mounted weighbridge will be installed adjacent to where the site access road to the south meets the main body of the site (Gravitation Weighbridge – Model No. E1530CLC-OG).

5.3.5 Wheelwash

In order to prevent the tracking of soil and mud out of the recovery facility onto the public roads, it is proposed to install a wheelwash facility along the proposed site access road to the south of the site. This wheel wash will have an integrated silt tank, oil interceptor and rattle bars. It is proposed to situate the wheel wash approximately 100 metres back from the site entrance in order to allow excess water to be removed from the vehicles prior to reaching the public road, with the 100 metre stretch being hard surface. The location of the wheelwash is shown in the site layout plan (Drawing Ref: 002/A1).

5.3.6 Stockpile and Sorting Area

Materials being accepted on-site will firstly be transferred to the stockpiling and sorting area on-site. Material will be separated out in the sorting area before being transferred to the relevant unprocessed material stockpile.

Stockpiles on-site will be managed in accordance with EPA guidance on stockpiles contained in their guidance document *Environmental Management in the Extractive Industry Guidelines* (2006) and the HSA's *Guidelines on the Management of Tips and Stockpiles* contained in Part 6 of their Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations (2008).

Materials will only be accepted and processed on-site when there is a market demand for the end product. Unprocessed materials will be kept at a maximum level of 7 metres in height. Processed materials will be immediately removed from the site for transfer to customer sites following processing. This will prevent the excessive built up of material stockpiles. In particular, processed material stockpiles will be small and temporary in nature.

5.3.7 Fuel and Oil Storage

Fuel for plant and equipment used at the facility will be stored at existing covered bunded fuel tanks situated on-site.

The bunded area has been designed in accordance with EPA Guidance IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities, taking into account criteria for bund requirements (e.g. 110% of the capacity of the largest tank or drum within the bunded area; or 25% of the total volume of substance which could be stored within the bunded area, whichever is greater).

Due to the current condition of the fuel bund, improvement works will take place at the bund, namely the plastering and sealing of the bund, in order to ensure the bund is fit for purpose and water tight. Testing of bund integrity shall be conducted upon commencement of site operations and every three years thereafter in accordance with good practice to verify the water tightness and integrity of bunds on-site. Where bund testing fails, a programme of works shall be established by a Qualified Engineer to fix the bund and ensure its water tightness and integrity.

Good hazardous material storage practices will be observed on-site. Fuel and oil tanks and containers will be labelled. Fuel pumps and attachments shall be located within bunded areas. The bunded area is covered to prevent rainwater accumulating in bunds.

Re-fuelling of mobile plant shall take place at a proposed hardstanding re-fuelling area which drains to a silt trap (proposed) and oil interceptor (proposed)(10,000 litre Klargester FS Forecourt Separator) to protect against the spillage and run-off of hazardous substances. There will be no refuelling of HGV's on-site. This will be done at off-site third-party petrol stations. Oil and lubricant changes and servicing of mobile plant is undertaken at the existing farm store. Oils and lubricants will be stored within sump pallets in this store.

Error! Reference source not found. below outlines the hazardous liquid material stored on s ite and the method of storage.

Table 5-1 Fuel/Oil Storage On-site

Fuels	Capacity (litres)	Storage facilities on site
White diesel tank	5,000	Covered, bunded storage area
Agricultural Diesel tank	5,000	Covered, bunded storage area
Hydraulic oil	20	Sump Pallet in Farm Store
Engine oil	20	Sump Pallet in Farm Store
3 x grades of oil	20 (x 3)	Sump Pallet in Farm Store

5.3.8 Material Recovery Infrastructure

The following processing machinery will be situated on-site for use in connection with the proposed development activity:

- Mobile Loading Machinery
  - Volvo 180 E wheel loader
  - 2 x Hitachi excavators 360
  - Kamatsu D65 E bulldozer (for filling)
- Macgen 250 kva Diesel Generator (existing)
- Soil Screening Plant – Soil and Stone Powerscreen MK II (proposed)
- Sand and Gravel Plant (existing)
  - 10 x 5 Powerscreen washing head
  - 10 x 5 Powerscreen commander
  - CDE size cyclone
  - Trident Mark 2 dewatering plant
  - Powerscreen 800 log washing
- Jaw Crusher Pegasus 600 x 12 (for concrete crushing) (proposed)
- Green Waste Shredder – Untha RS30/40 Shredder

Material recovery activities will take place in open air on-site. Mobile loading machinery will be used for material handling, transporting materials internally on-site and for the purposes of backfilling and land restoration at the fill area. Soil Screening Plant/Sand and Gravel Washing Plant and Concrete Crushing Plant will be situated in open air on permeable ground to the east of the site, south of existing residential/farm buildings and adjacent to the stockpile and sorting areas. The Green Waste Shredding Plant will be situated on a concrete pad adjacent to the existing cattleshed. Composting piles will also be located on this pad. This pad will drain to an effluent storage tank.

The location of the plant to be used in connection with the proposed development activity on-site is depicted on the Site Layout Plans which adjoin the Planning Application (Drawing Ref: DWG Nos. 002/C1, 002/C2, 002/C3 and 002/C4).

5.3.9 Waste Inspection and Quarantine Area

Any imported waste material which, it is suspected, may not comply with waste acceptance criteria for the material recovery facility will be transferred to a Waste Inspection/Quarantine Area. This area is situated to the east of the site, south of the stockpile and sorting area and on the left of the point at which the proposed site access road meets the site. The area will consist of two bays; one for inspection and one for quarantine. These bays will be covered and separated by a retaining wall. Both the waste inspection area and waste quarantine area will be sealed by a 100 mm thick reinforced concrete slab over 150 mm of granular sub-base and shall be bunded, to prevent the release of contaminants.

5.3.10 Equipment Storage

Mobile Plant and Equipment shall be stored on non-permeable concrete areas at the centre of the site. Any plant or equipment that is need of servicing or repair is taken to the farm store.

5.3.11 Wastewater and Surface Water Management

5.3.11.1 Wastewater Management

There is an existing septic tank system on-site into which all-domestic effluent from the staff toilet drains. This system drains to a soak hole on-site.

In addition, existing planning approved primary and secondary settling lagoons are situated on-site for the treatment of water used in the washing plant.

It is proposed to utilize an existing effluent storage tank on-site (180,000 litres capacity) which underlies the proposed composting area to serve this area. Floor plans and Elevation drawings of this underground effluent storage tank adjoin the Planning Application.

5.3.11.2 Surface Water Management

The majority of surface water which arises on-site leaves the site by percolation through gravels to ground and underlying groundwater.

In the event of substantial rainfall and the build-up of surface water run-off, most surface water runoff from the site will be directed to the existing settling lagoons currently present in at the quarry site by the natural topography of the site.

The settlement lagoons present on-site allow for the settlement of all settleable solids contained in surface water run-off. Where necessary, the water in the last of the lagoons located at the centre of the site is pumped back to the washing plant via a pump house and recycled within the process. Overflow from the last of the lagoons situated to the south west of the site is via a 300 mm diameter concrete pipe to a ditch which runs to the Graney River south of the site. It is only anticipated water will overflow from the site on rare occasions during exceptional heavy rainfall periods. A drawing showing the location, design and size of the settling lagoons on-site is shown below. This drawing is from 2007 however gives an accurate portrayal of how surface water run-off traverses the site and is directed to settlement lagoons.

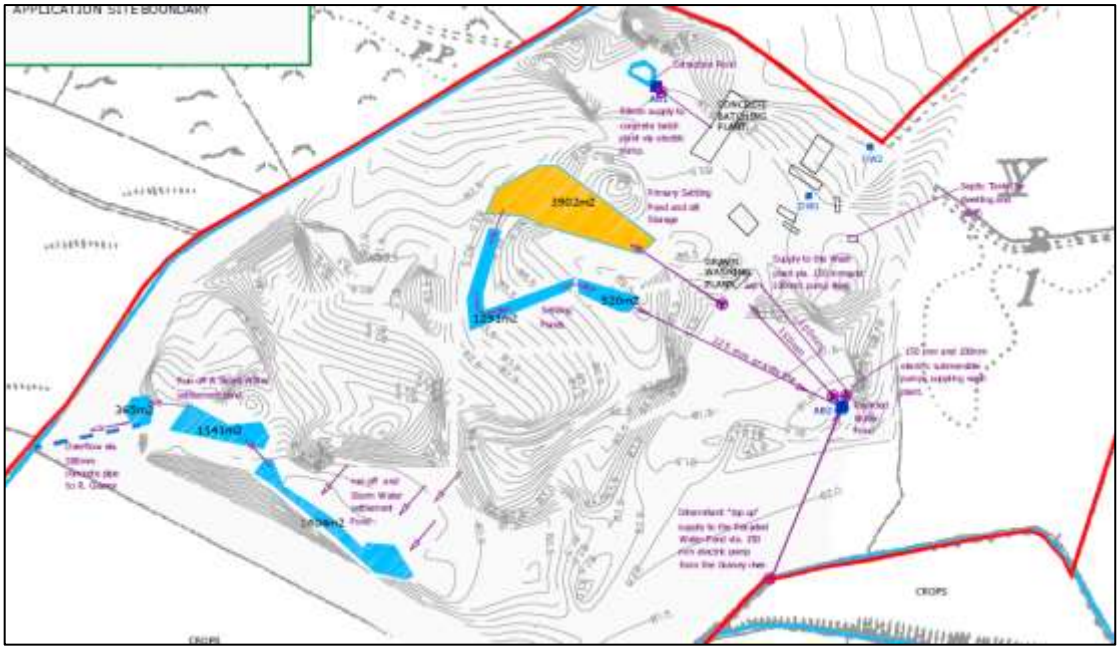


Figure 5-1 Details of Surface Water Management On-site

Surface water run-off arising on existing and proposed non permeable areas will be directed via topography toward a drain east of the dwelling on-site which in turn will direct this water to the pond to the south east of the site.

A separate drainage system serving the proposed re-fuelling area is proposed. Surface water arising in the re-fuelling area will be captured by this drainage system and directed to a silt-trap (Klargester CST1H silt trap), an oil interceptor (10,000 litre Klargester FS Forecourt Separator) and a soakaway (which meets design specifications prescribed by BRE's Digest 365).

An oil interceptor serving the proposed visitor and staff car park will also be installed. This will drain to the pond to the south east of the site. This will be a Klargester NSBP003 bypass separator.

The silt trap, oil interceptors and settlement ponds present on-site will be cleaned and serviced annually or at shorter intervals where necessary in order to ensure proper functionality.

Settlement lagoons will gradually be filled in as Land Restoration progresses. Re-contouring of the site will take place as Land Restoration progresses to ensure that any stormwater run-off generated on-site will be directed towards a drainage ditch along the western boundary of the site. Temporary settlement ponds will be used as the land restoration project progresses to protect against run-off of sediments to this ditch/the River Graney. Re-seeding of filled areas will also take place as soon as possible to minimize the run-off of sediment on-site.

The layout and operation of the site drainage system is displayed in Site Layout Plans which adjoin the Planning Application (Drawing Ref: DWG Nos. 002/C1, 002/C2, 002/C3, 002/C4).

The proposed site access road will be elevated at a greater height than existing land, will have soft margins and will have a down camber on one side. Drainage ditches exist either side of the proposed site access road. Run-off on this road will drain naturally on the down camber side to a drainage ditch. A heavy duty ACO Drain and 600 mm pipe will be present at the site entrance to direct run-off here to the drainage ditches either side of the site access road. Surface water management details at the proposed site access road are shown in drawings which adjoin the Planning Application (Drawing Ref: G1210-01, G1210-02, G1210-03).

5.3.12 Site Offices

All administrative and management activities will be carried out in one of two portacabins used as offices. These portacabins are situated to the east of the site adjacent to residential and farm buildings.

5.3.13 Site Services

A 110 kV electricity power line running from Stratford to Carlow runs to the east of the site. The subject site sources its electricity from this line by way of lower voltage local lines. Mains electricity will be used for lighting and electrical heating in offices. A 250 kva diesel generator will be utilized to power processing plant on-site to ensure no excessive demands are placed on the local electricity supply network.

Site staff overseeing C&D waste recovery operations at the application site are contactable by mobile phone.

An outside toilet is provided in this area for staff and visitors. It is anticipated that only 2 part-time staff will work at the facility.

There is no public water supply to the site. The water requirement for site activities will mainly be for the washing of sand and gravels. Water is sourced for these purposes from a lagoon present on-site.

Water for use in the sand and gravel washing plant is drawn from the recycled water pond to the south east of the site via two supply lines. A 150 mm diameter line feeds the main washing plant and a 100 mm diameter line supplies the sand cyclone; both are driven by submersible electric pumps. After use in the washing plant the water is piped by gravity to primary and secondary settling ponds west of the application site for treatment, before returning to the recycled water pond via a 225 mm diameter gravity line. The primary settling pond is large with ample space for maintenance and silt storage. Make up or top up water is supplied from the Graney River via a 150 mm diameter line and submersible electric pump delivering into the recycled water pond. This supply is not continuous; being controlled by a water level device in the recycled water pond.

Water will also be sourced from the groundwater abstraction point on-site for use in dust suppression and the on-site wheel wash (which will recycle water).

5.3.14 Lighting

The site operating hours will be between 07:00 - 18:00 Monday to Friday and 08:00 - 16:00 Saturday. During winter, operating activities may be carried out in dark conditions during dusk. Exterior lighting will be provided on-site to ensure traffic enters and leaves the site safely and operating activities on-site are carried out safely. It is proposed to install 48 x 6 metre high lights and 12 x 16 metre high lights on-site. This exterior lighting will provide light to site entrances, site access roads and the Material Recovery Area on-site during darker conditions.

An Exterior Lighting Plans showing where light is planned to fall on-site during dark conditions and Lighting Calculations for determining lighting requirements for proposed lighting adjoin the Planning Application No permanent exterior lighting will be provided in fill areas around the quarry site. Operations on-site will be timed to ensure that minimal operating activities take place in the fill areas during darker conditions in Winter. Temporary lighting will be provided however whenever operating activities take place in the fill area during darker conditions.

5.4 Site Preparation Works

5.4.1 General

Site Preparation Works will be needed in order to prepare the site for the proposed backfilling and C&D waste recovery activities. An overview of Site preparation Works is shown in the Sections below. These activities/works constitute the Construction Phase of the Proposed Development. It is estimate site preparation works will take between 6 - 9 months.

5.4.2 Material Processing Area

No significant works will be required to prepare the stockpiling and sorting area other than the possible re-grading of the ground surface.

An unmanned surface mounted weighbridge will be installed adjacent to where the site access road to the south meets the main body of the site.

An extended concrete apron area will be laid north of the buildings on-site, extending the existing non-permeable concrete area surrounding the buildings. HGV Parking will be provided on a section of this extended concrete area.

Due to the current condition of the fuel bund, improvement works will take place at the bund, namely the plastering and sealing of the bund, in order to ensure the bund is fit for purpose and water tight.

It is proposed to lay a concrete pad to be used for re-fuelling adjacent to the bunded fuel storage area on-site. A silt trap, an oil interceptor and a soakaway (which meets design specifications prescribed by BRE's Digest 365) will be developed to serve this re-fuelling pad. This will involve excavation works, pipe laying and the burial and covering of the treatment systems.

A hardcore permeable paved car parking area will be developed at the eastern boundary of the site. This area will be graded and laid with hardcore and line marking will be applied to delineate parking spaces.

A bunded waste inspection/quarantine area shall be developed on-site to the left of where the proposed site access road enters the site. The area will consist of two bays; one for inspection and one for quarantine. Both the waste inspection area and waste quarantine area will be sealed by a 100 mm thick reinforced concrete slab over 150 mm of granular sub-base. It is intended to erect a retaining wall in between both bays and a shed covering the area.

It is then proposed to place the various plant and equipment used for processing materials on-site. The Concrete Crusher will be placed adjacent to the stockpile and sorting areas. The Soil Screening/Sand and Gravel Washing plant, which was previously used during quarrying activities on-site, is currently situated in this area. This plant and equipment will be situated behind stockpiles in order to minimize visual impacts on off-site receptors. A cantilever wall will be erected around concrete crushing equipment to minimize noise emanating from this machine. A Green Waste Shredder will be situated to the north east of the site adjacent to the existing cattle shed.

To further minimize visual impacts upon sensitive receptors during site preparation works, it is proposed to erect screening mounds and tall trees along the northern, eastern and southern site boundaries. Mounds will be erected using previously stripped and excavated overburden soils. It is proposed to plant evergreen vegetation on these mounds. A mitigation plan showing the location of this visual screening is shown in a drawing adjoining this application (DWG Ref: 1467-001)

5.4.3 Fill Area

Soil in this area has previously been extracted, leaving mineral sub-soil/rock exposed at the ground surface. Pockets of vegetative growth occur sporadically throughout the fill area. The fill area will be backfilled on a phased basis. Section by section, pockets of vegetative growth in the fill area will be stripped and the area backfilled with imported materials. A retaining wall will be erected to the east of the fill area for the temporary storage of imported material to be backfilled.

5.4.4 Internal Circulation Routes and Site Access Junction and Roads

It is proposed to develop a 7 metre wide site access road running from the L4501 road to the south of the site. Vegetation and soil along this route will be stripped. The route will then be graded and gravelled. Post and wire fencing will be erected to border this access road on both sides.

It is proposed to lay hot rolled asphalt at the proposed site access road junction with the L4501 road, 30 metres either side of the junction along the L4501 road. It is proposed to upgrade and strengthen the L4501 further by laying dense bitumen macadam extending the rest of 300 metres either side of the site entrance. It is proposed to lay tarmac, asphalt or concrete (to be decided) along the proposed site access road 100 metres in from the junction. Warning signs and markings will then be erected at the junction, prior to commencement of operations.

It is also proposed to grade and gravel internal circulation routes on-site and re-gravel the existing site access road to the east of the site, which will only be used by staff and visitors.

Both site access road junctions will be designed to ensure sufficient sightlines exist in accordance with relevant standards.

5.5 Waste Operations and Processes

5.5.1 Overview of the Waste Activity

Sancom Ltd propose on establishing and operating a Material Recovery Facility at a worked out quarry situated in Graney West, Co. Kildare.

The principal activity will involve the use of imported, uncontaminated soil and stone, sourced from construction and demolition sites, to backfill and restore the worked out quarry.

Sancom Ltd intend on accepting a maximum of approximately 1.8 million tonnes of soil and stone material on-site for backfilling over the course of 25 years. This equates to a maximum of 72,000 tonnes of soil and stone material per annum over 25 years in the ideal scenario for the applicant.[2]

In addition to the principal waste activity described above, it is proposed to carry out the following secondary waste recovery activities:

- Intake of top-soil, screening at existing screening plant and resale of such material,
- Intake of gravel and sands, washing at existing washing plant and resale of such materials,
- Intake of concrete, concrete crushing using concrete crushing equipment, mixing with sand and gravel before being fed to the washing plant to form aggregate, and resale of such material, and;
- Intake of garden waste, shredding and composting of this waste for use for agricultural land spreading.

The total maximum amount of waste to be accepted on-site will be 99,500 tonnes per annum. Only non-hazardous materials will be accepted on-site. Table 5-2 summarizes the waste activity detailing: the types of waste to be accepted at the facility, processing methods, the destination of recovered materials, the classes of activity under the fourth schedule of the Waste Management Act which will be undertaken on-site, and proposed maximum intake tonnages per annum.

It is proposed to operate the facility under a Waste Licence from the Environmental Protection Agency (EPA).

[2] In identifying, assessing and characterizing impacts this EIAR considered the maximum tonnage that could be brought on-site over a 10 year life cycle (i.e. assessing worst case scenario impacts on the receiving environment).

Table 5-2 Overview of the Proposed Waste Activity

EWC Code	EWC Code Description	Waste Type (Ordinary description)	Processing Method	Destination	WM Act R/D Code	Amount of waste proposed to be accepted at the facility per annum (tonnes)
17 05 04	Soil and stones other than those mentioned in 17 05 03	Sub-soil and overburden	Backfilling	Infilled on-site	R10	72,000 Note 1
		Top-soil	Screening at soil screener	Recovery and resale	R5	1,500
		Sand and Gravel	Washing / Screening at washing plant	Recovery and resale	R5	12,500
17 01 01	Concrete	Various types of concrete and cement	Concrete crushing at crushing plant	Recovery and resale	R5	12,500
20 02 01	Biodegradable waste	Garden waste	Shredding and composting	Recovery and landspreading	R3	1,000
					Total	99,500

5.5.2 Proposed Haul Routes

The majority of traffic accessing and egressing the site is anticipated to originate from the west of the site and use the extensive regional and national road network located in that direction (R418, R448 and M9). To a lesser extent, some traffic will be anticipated to access the site from the east, utilising the N81 national road. Indicative haul routes to/ from the site from the regional and national road network are presented in the following Figure 13-5.

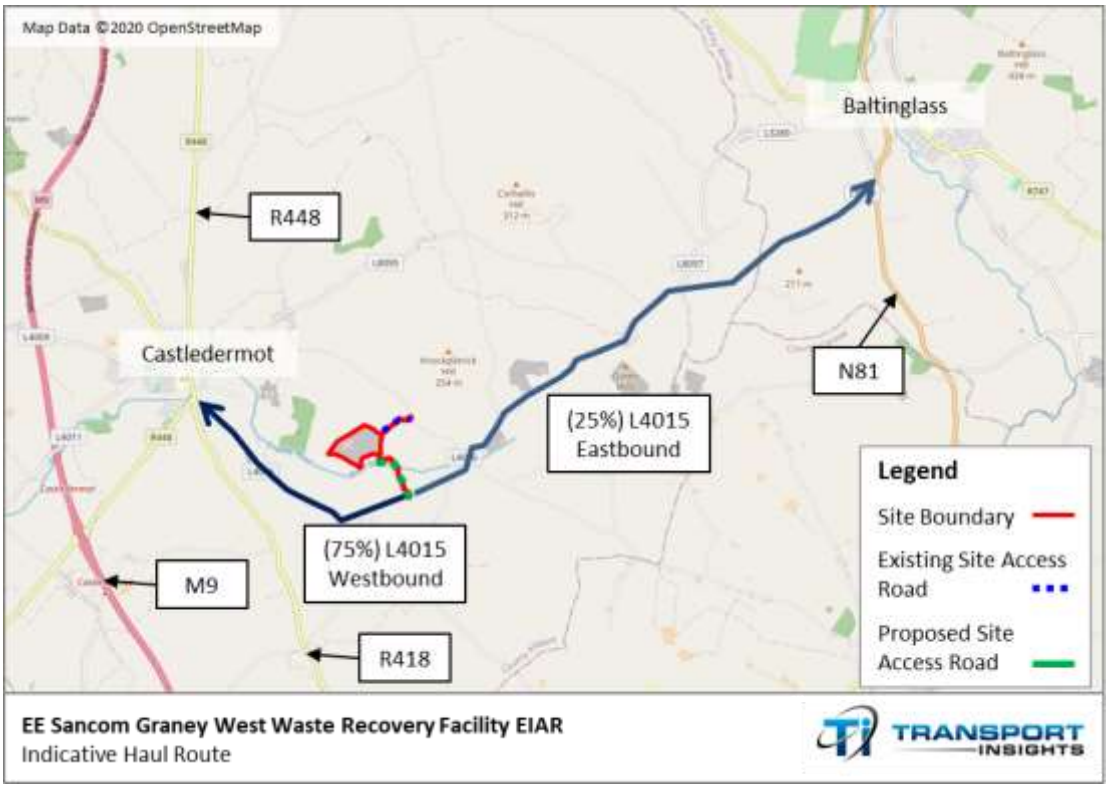


Figure 5-2 Haul Route to Site

5.5.3 Description of the Waste Activity and Processing Methods

5.5.3.1 General

Site Layout Plans adjoining the Planning Application (Drawing Ref: DWG Nos. 002/C1, 002/C2, 002/C3, 002/C4) depict the proposed layout of the site and the proposed waste activity.

A depiction of the proposed waste activities is shown in a process flow diagram in Figure 5-3 below.

Waste materials will be brought on-site on HGVs via the proposed site access road which links the L4501 road to the site. Waste Acceptance Procedures will be in place to ensure unauthorized wastes are not accepted on-site (detailed in Section 5.5.4). Waste materials will be brought via an internal haul road to a stockpiling and sorting area situated to the east of the site. Here, waste materials will be inspected and separated into the following waste streams using mobile machinery:

- Sub-soil and overburden (EWC Code 17 05 04)
- Top-soil (EWC Code 17 05 04)
- Sand and Gravel (EWC Code 17 05 04)
- Concrete (EWC Code 17 01 01)
- Biodegradable garden waste (EWC Code 20 02 01)

Sub-soil and overburden material will then be brought via internal haul routes to the proposed fill area for backfilling.

Sand and Gravel will be brought to an adjacent sand and gravel stockpiling area for storage prior to processing at an adjacent, pre-existing sand and gravel wash plant.

Top-soil will be directed to the soil screening plant situated adjacent to the stockpiling and sorting area for processing.

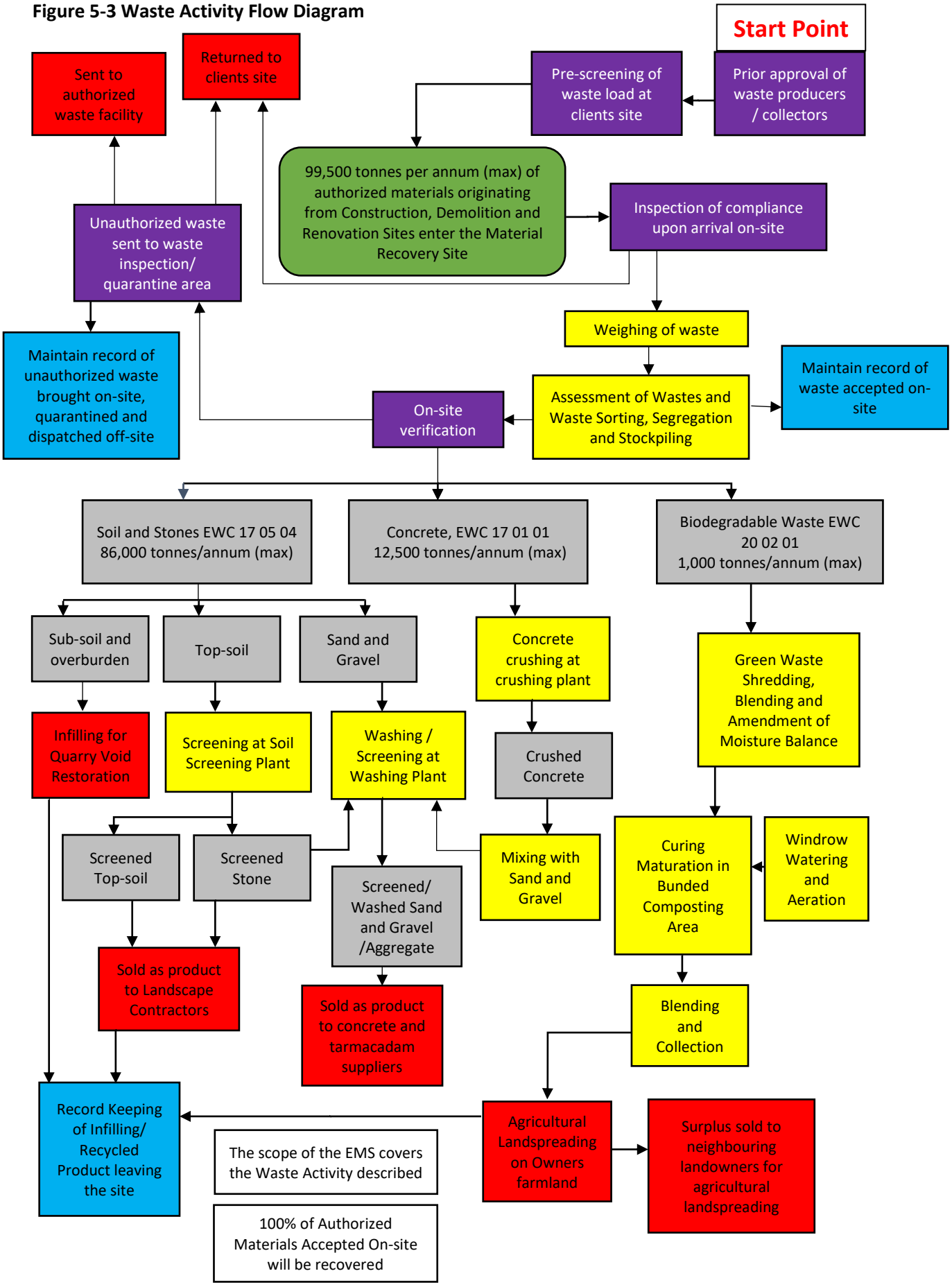
Concrete will be directed to the concrete jaw crusher plant situated adjacent to the stockpiling and sorting area for processing prior to being mixed with sand and gravel before being fed to the washing plant to form aggregate.

Biodegradable garden waste will be directed to a hard standing concrete area to the north of the site where it will await processing in a green waste shredder proposed to be situated in this area, prior to being dispatched for storage and decomposition at a hardstanding, impervious, hard-standing composting area situated adjacent to the shredder.

It is expected there will be a negligible quantity of residual waste generated when carrying out any of the above waste activities.

Internal haulage routes for goods in, goods processed and goods out are displayed in Site Layout Plans (Drawing Ref: DWG Nos. 002/C1, 002/C2, 002/C3, 002/C4) and are considered in-depth in the Traffic Impact Assessment completed by Transport Insights considered in Section 13 of this EIAR.

Figure 5-3 Waste Activity Flow Diagram



5.5.3.2 Infilling of Sub-soil and Overburden

Sancom Ltd intend on reinstating the designated fill area through infilling. The boundary of the fill area is defined in existing contours drawings adjoining the Planning Application (Drawing Ref 002/D1 002/D2, 002/D3, 002/D4). The footprint of proposed area to backfill is 13.65 hectares in size. The reinstated area will be covered with top-soil and reseeded. The restored area will be subsequently used for agricultural purposes, with some evergreen planting along site boundaries. The final reclaimed contours of the fill area is shown in proposed contour drawings adjoining the Planning Application (Drawing Ref 002/E2, 002/E3).

The proposed quantity of such material to be imported and infilled would be a maximum of 72,000 tonnes per annum and overall is expected to be approximately 1.8 million tonnes over the life-time of the facility, (Considering a fill area volume of ca. 1,054,949 m3 and assuming an average imported soil density of 1.8 t/m3.), throughout the operational phase of the proposed infilling activity (25 years)

For more information regarding the infilling activity and volume and dimensions of material to be infilled refer to the aforementioned existing and proposed contour plans and the cross-referenced longitudinal sections (Drawing Ref. 002/F0-F8, 002/G0-G9) adjoining the Planning Application

Inert waste in the form of sub-soil and overburden brought on-site will be directed for infilling in the proposed fill area. Sub-soil and overburden will firstly be inspected then sorted and stockpiled in the stockpiling and sorting area to the east of the site before being transferred to the fill area and unloaded from trucks at the backfilling face. A Kamatsu Bulldozer will be used for spreading and compaction of filled material.

5.5.3.3 Screening of Top-soil

Top-soil taken from client's sites will be brought on-site, inspected and unloaded in the stockpiling and sorting area to the east of the site. Top-soil will be directed to designated unprocessed material stockpiles nearby to await processing in adjacent proposed soil screening plant (Soil and Stone Powerscreen mkii).

Unprocessed top-soil will be unloaded in a controlled and commensurate manner into the plant feed hopper by a loader and then directed to screening equipment by way of a conveyor. Material will be separated through screening into stone and soil which will in turn be transferred to temporary, small processed material stockpiles. Processed top-soil will be sold as product to local landscape contractors as per demand. Stone from the process will be directed toward the washing plant for processing prior to being sold to concrete and tarmacadam suppliers as per demand. Soil and stone material being sold to third parties will loaded into HGV's using mobile loading machinery before being taken off-site and brought to customer premises.

5.5.3.4 Sand and Gravel Washing

Sand and Gravel originating from clients sites will be brought on-site, inspected and then unloaded and segregated as necessary in the stockpiling and sorting area to the east of the site, before being transferred to the sand and gravel stockpiling area situated adjacent to the pre-existing sand and gravel washing plant on-site.

A conveyor belt draws materials from a stockpile built up next to the plant and conveys it to the plant, where it is firstly washed to remove unwanted clay. The sand/gravel is then passed over a series of screens that sieve the materials into different sizes. The material that comes off the coarsest screen is washed in a log washer before it is further screened. The larger gravel particles are separated out and screened into different sizes. Sometimes crushed concrete is mixed with sands and gravels prior to being fed through the washing plant to form aggregate. Processed materials will be sold to concrete and tarmacadam suppliers as per demand. Aggregate material being sold to third parties will be loaded into HGV's using mobile loading machinery before being taken off-site and brought to customer premises.

The washing of the gravel during processing generates wash water that is directed to a series of three settlement lagoons in order to settle particulates. Clean water from lagoons are then recycled back to the washing processes using a pumping station.

5.5.3.5 Concrete Crushing

Concrete waste material in the form of building rubble, cement products, concrete blocks and concrete floor tiles will be brought on-site from client's sites. Concrete material coming on-site will firstly be inspected then unloaded and segregated in the stockpiling and sorting area to the east of the site.

Concrete will then be hauled and deposited at unprocessed material stockpiles nearby to await processing in an adjacent proposed concrete jaw crusher. Concrete will be unloaded into the concrete jaw crusher using a front end loader for processing. Crushed concrete will then be temporarily stored in a small processed material stockpile. Processed, crushed concrete will then be mixed with sand and gravel before being fed to the washing plant to form aggregate which will be sold to concrete and tarmacadam suppliers as per demand.

5.5.3.6 Composting of Biodegradable Garden Waste

Composting is defined as the autothermic and thermophilic biological decomposition of separately collected biowaste, including organic sludges of biological origin, in the presence of oxygen and under controlled conditions in order to produce compost.

The physical composting process is relatively simple with limited engineering infrastructure. It is proposed to undertake composting on-site in accordance with the aforementioned EPA BAT Guidance Note and in particular having regard to the Scottish EPA's Technical Guidance BAT for Composting (Note: there is no specific Irish EPA BAT Guidance Note for Composting).

Biodegradable garden waste arising at construction, renovation and demolition sites will be accepted on-site, inspected, segregated and promptly transferred directly to a bunded, impervious concrete area to the north of the site designated for composting. Here, biodegradable waste will be shredded in a Green Waste Shredder. Following this, shredded biodegradable materials will be blended and the amendment of the materials moisture balance will take place, as needed. The material will then be transferred to a composting stockpile directly adjacent to the shredder. This stockpile will be situated over a bunded area.

The hardstanding, impervious, bunded composting area will drain to an underlying 180,000 litre effluent storage tank. This effluent storage tank shall be periodically emptied by an authorized waste contractor and the contents will be disposed of at an appropriately licensed site. As such there will be no discharges to the environment from the composting area.

The next stage of the process is the curing/maturation stage. Source material deposited in the windrows in the composting area will be mixed and formed into narrow piles. Windrow watering and aeration will take place periodically to ensure compostable materials have appropriate levels of moisture and aeration. Following the curing/maturation period, finished compost will then be blended and collected prior to being applied to agricultural land in ownership of the site operator to improve soil quality. Any surplus compost will be resold to local farm owners. This compost material will be loaded into HGVs using mobile loading machinery before being transferred to third party sites.

Only biodegradable garden waste will be accepted on-site for composting. No malodorous waste such as manure, slurries, sludges or food waste will be accepted on-site for composting. Upstream auditing of clients sites will take place to verify the nature and types of waste to be accepted at the facility, and to ensure such malodourous waste is not accepted on-site. In addition, Waste Acceptance Procedures will be in place to prevent unauthorized wastes being accepted on-site (See Section 5.5.4).

5.5.4 Waste Acceptance Procedures

Sancom Ltd shall implement strict Waste Acceptance Procedures to ensure only the following wastes are accepted on-site:

Table 5-3 Waste to be accepted on-site

EWC Code	EWC Code Description	Waste Type (Ordinary description)	Waste Classification
17 05 04	Soil and stones other than those mentioned in 17 05 03	Sub-soil and overburden	Inert
		Top-soil	Inert
		Sand and Gravel	Inert
17 01 01	Concrete	Various types of concrete and cement	Inert
20 02 01	Biodegradable waste	Garden waste	Non-hazardous

The purpose of having Waste Acceptance Procedures in place shall be to ensure:

- That only waste that is suitable for waste processing activities is accepted on-site,
- That only waste permitted by the Waste Licence is accepted on-site and;
- That wastes accepted on-site do not cause environmental contamination or pollution.

Waste that does not comply with the above criteria will be deemed Unauthorized Waste. Only inert waste belonging to the EWC Code 17 05 04 will be accepted on-site for the infilling activity.

Waste Acceptance Procedures are in accordance with provisions of the Landfill Directive and Council Decision 2003/33/EC on Waste acceptance criteria in landfills and the EPA's Guidance Document on '*Waste Acceptance Criteria and Development of Soil Trigger Values for EPA Licensed Soil Recovery Facilities*.' These procedures are detailed below:

5.5.4.1 Prior Approval of Waste Producers/Collectors

Waste shall only be accepted from waste producers and/or collectors who have been pre-approved by the Sancom Ltd. Approval to import waste to the facility shall only be issued to waste producers and/or waste collectors who can demonstrate that they have a valid waste collection permit and have a proven track record in the construction, waste management and/or haulage sectors.

Upstream auditing of client's sites will take place to verify the nature and types of waste to be accepted at the facility. It is expected that Senior Management shall attend and conduct a visual inspection and site walkover of all client sites to identify whether sites are greenfield sites or brownfield sites, whether there's an exceptional risk of contaminated waste arising at the site and to ascertain the nature and type of wastes which will be accepted from these sites. With a view to ensuring that only uncontaminated soil and stone is accepted at the facility, the site operator will ensure strict compliance with guidelines on accepting soil for backfilling detailed in the EPA's Guidance Document on '*Waste Acceptance Criteria and Development of Soil Trigger Values for EPA Licensed Soil Recovery Facilities.'*

5.5.4.2 Basic Characterisation

Prior to accepting waste on-site, Sancom Ltd will require waste producers/collectors to undertake a Basic Characterisation of waste to determine the following:

i. Source and origin of the waste
ii. Information on processes producing the waste (excavation, demolition etc.)
iii. Composition and consistency of the waste
iv. Physical appearance of the waste (smell, colour, physical form)
v. EWC code according to European waste list

The producer of the waste and/or the waste collector will be responsible for ensuring that the basic characterisation information provided is correct.

5.5.4.3 Inspection of Compliance upon Arrival On-site

All waste brought on-site will be visually inspected by personnel when being collected at the client's site. Any unsuitable waste materials identified will be required to be removed from the waste load and the load will not be taken until the unsuitable waste has been removed.

Following this, waste will be inspected again upon arrival to the facility at a designated Waste Inspection Area. All accompanying waste documentation will be checked and verified. The waste will be accepted on-site if the waste is confirmed to be one of the waste types listed in Table 5-3, and if the waste being brought on-site is the same as that described in the accompanying documentation. Waste shall not be accepted if:

- The waste producer/collector is not approved and cannot provide their Waste Collection Permit.
- Basic characterisation of waste has not taken place.

- The waste is inconsistent with the basic characterisation information provided
- If, upon visual inspection, there is a suspicion that waste is contaminated or that unauthorized wastes are mixed in with acceptable wastes.

If the above applies the waste consignment shall be rejected and returned to the producer. A record of the rejection of the waste consignment will be made in the Site Rejects Book. In such cases the site operator will record the name of the delivery contractor, the driver, the registration number of the vehicle and the nature and origin of the material. Records of any such incidents will be maintained on-site.

If records indicate that consignments from a particular waste producer and/or waste collector are being repeatedly rejected, Sancom Ltd will review whether or not to withdraw approval for its continued use of the facility. If contamination is identified the waste producer/collector will be advised that material from the relevant source will no longer be accepted at the facility.

Regardless of basic characterisation information provided to Sancom Ltd, periodic Waste Acceptance Criteria compliance testing shall be carried out to for every 2,000 tonnes of non-greenfield soil and stone received at the facility for backfilling in order to verify that soil and stone waste brought on-site is inert, complies with established EPA Soil Trigger Values and is appropriate for infilling. An increase in WAC testing frequency may be necessary if accepting waste from higher risk source sites.

5.5.4.4 On-site Verification

Waste will then be manually and mechanically sorted and stockpiled as needed, and throughout this process it will be re-inspected by site personnel. If contamination or unauthorized waste is identified at this stage, the unacceptable waste will be re-loaded onto a lorry and transferred to the waste quarantine area on-site, prior to being returned to the producer in the case of serious non-compliance, or dispatch to an appropriately authorized waste facility.

Should minor quantities of non-inert waste (principally metal, timber, PVC pipes and plastic) be inadvertently imported amongst the soil and stones destined for infilling, it shall be separated out (mechanically or by hand, as appropriate) and temporarily stored in skips at the waste quarantine area prior to removal off-site to an appropriately authorized waste facility.

In the unlikely event that waste contamination or unauthorized wastes are identified at a later stage during the carrying out of site processing methods, this waste will be separated and stored in the waste quarantine area prior to removal off-site to an appropriately authorized waste facility.

5.5.4.5 Waste Inspection/Quarantine Area

Any suspect or unauthorized waste identified during waste sorting, stockpiling or processing will be re-loaded onto trucks and re-directed to the waste inspection area for closer examination and inspection. Detailed records of all such inspections will be kept. Should examinations identify waste material which cannot be accepted and processed on-site, the waste in question will be segregated and stored in containers in the quarantine area pending removal off-site by authorized waste collectors to an authorized waste disposal or recovery facility within 24 hours.

5.5.4.6 Weighing of Waste

An unmanned surface mounted weighbridge will be installed adjacent to where the site access road to the south meets the main body of the site (Gravitation Weighbridge – Model No. E1530CLC-OG). All waste material arriving on-site will be weighed upon arrival at this weighbridge. This weighbridge will be calibrated and serviced periodically in accordance with manufacturer specifications.

5.5.4.7 Record keeping and Reporting

The site operator will maintain a Register of Waste to record the following information:

- The quantities and composition of wastes received at the site including EWC Codes.
- The quantities and composition of wastes rejected at the site as not meeting waste acceptance criteria, and details of where these wastes were forwarded.
- The dates and times of all waste deliveries to the site.
- The names and carriers, the vehicle registration numbers and their Waste Collection Permit Numbers, and type of vehicle or containers, and the volume of the vehicle/containers.
- The origin of each delivery of waste.

An Annual Environmental Report (AER) summarizing the above information for the calendar year, detailing the management and staffing of the facility, and detailing any environmental incidents or complaints will be prepared and submitted to EPA.

5.5.5 End of Waste Criteria for Materials to be Resold

All waste brought on-site for processing will be resold. Prior to the selling of these materials it is intended to ensure these waste meet end of waste status as defined by the EPA. The applicant intends on applying to EPA to determine whether wastes have ceased to constitute waste in accordance with Article 28 of European Communities (Waste Directive) Regulations, 2011. General criteria for a waste meeting end of waste status is as follows:

- The substance or object is commonly used for specific purposes;
- A market or demand exists for such a substance or object
- The substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products; and
- The use of the substance or object will not lead to overall adverse environmental or human health impacts.

With regards to the materials to be processed on-site and resold, all materials are commonly used for specific purposes and market demand currently exists for all materials. This market demand has motivated the applicant to submit this planning application.

All materials will meet certain specified criteria (e.g. IS EN 13242: Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction.'). The applicant intends on establishing a Quality Management System to maintain Quality Assurance and ensure that this is the case.

Lastly, Waste Acceptance Procedures have been established to ensure all waste materials processed and recovered on-site are non-hazardous in nature, and the re-use of such will not lead over adverse environmental or human health impacts.

5.6 Site Management

5.6.1 General

The facility will employ between 2 and 5 people depending on demand. The site operating hours will be between 07:00 - 18:00 Monday to Friday and 08:00 - 16:00 Saturday. No activity will take place outside these hours. A designated Site Manager will have responsibility for directing incoming vehicles to relevant HGV queuing areas and material deposition areas. This Site Manager will also be responsible for directing and managing on-site staff to carry out their material handling, backfilling and processing related duties.

5.6.2 Environmental Management

An Environmental Management System will be operated for the facility and will cover the following areas:

- Environmental Policy
- Environmental Compliance Obligations
- Environmental Objectives and Targets and Environmental Management Programmes
- Waste Acceptance Procedures
- Operational Control and Mitigation Measures
- Waste Record Keeping and Environmental Reporting
- Environmental Monitoring
- Emergency Response Procedures
- Operational and Environmental Staff Training Programme
- Environmental Register summarizing environmental incidents, complaints, non-conformances and corrective/preventative actions

The Environmental Management System will focus on continual environmental monitoring and improvement.

An Environmental Policy for Sancom Ltd has been established and reads as follows:

'Sancom Ltd is committed to reducing its impact on its surrounding environment at its site in Graney West, Castledermot. The guiding principles of our environmental policy are:

- *Ensure continued compliance with all Irish and EU legislative environmental requirements, requirements prescribed in planning/environmental permits and licences the company operates under, and other requirements to which the company subscribes.*
- *Continually assess company activities and improve environmental performance with the specific goal of preventing pollution and minimising and reducing the environmental impact of backfilling and material recovery activities on-site thereby protecting the environment.*
- *Ensure that environmental policy objectives and targets are continually achieved through an implementation programme and have equality with other business interests.*
- *Ensure that its employees have the training, knowledge and resources to implement these guiding principles.*
- *Communicate the Environmental Policy to employees, suppliers, visitors and interested parties.*

Commitment to this policy involves every aspect of the company's business and employees and resources shall be made available to implement it. This environmental policy shall be publicised to all employees, external contractors and interested parties.'

5.6.3 Waste Management

An overview of the wastes that will be generated on-site and how these wastes will be managed is shown in the table below:

Table 5-4 Waste Generated On-site

List of Waste (LoW) Code entry	Applicant's description of waste generated at the facility or installation	Estimate or, for a licence review, actual tonnes generated per annum	Is the waste recovered or disposed on-site or is it dispatched off-site to a waste facility?	Describe the disposal or recovery treatment technique	Disposal / Recovery Code
20 03 01	Mixed Municipal Waste from offices on-site (Non-recyclable)	<0.5	Off-site	Consigned to a Material Recovery Facility	R12
20 03 01	Mixed Municipal Waste from offices on-site (Mixed Dry Recyclables)	<0.5	Off-site	Consigned to a Material Recovery Facility	R12
13 05 03*	Interceptor Sludge	1.0	Off-site	Consigned to a Hazardous Waste Treatment Facility	R9
15 02 02*	Absorbents, wiping cloths, protective clothing contaminated by dangerous substances (from vehicle maintenance activities)	<1.0	Off-site	Consigned to a Hazardous Waste Treatment Facility	R9

5.6.4 Emergency Preparedness and Response

The applicant will identify and plan for potential emergency situations that may occur on-site having regard to hazards and risk present on-site.

A procedure will be developed to deal with potential emergency situations and potential accidents that can have an impact on the environment and how the company will deal with them. The procedure covers action in the event of fire and other emergency situations. The procedure will also incorporate spill response training for dealing with hazardous liquid spills that may pose a threat to the environment.

Fire drills will be carried out every 6 months. The emergency preparedness and response procedure will be reviewed at a minimum every 12 months and will be revised in light of issues arising after the occurrence of accidents or emergency situations.

A programme of inspection and preventative maintenance for equipment that poses a fire risk will be established and implemented on an ongoing basis at the facility. Flammable liquids will be stored on-site in designated bunded storage areas away from heat sources.

Training in the emergency preparedness and response procedure will be provided to all employees.

5.6.5 Closure Plan

Once land restoration on-site has taken place, a Closure Plan for the facility will be implemented. The Closure Plan will be reviewed prior to its implementation to verify and validate the schedule of works to be carried out. Broadly, the Closure Plan will involve the following steps:

- Stage 1: Consultation
- Stage 2: Removal of all waste on site
- Stage 3: Removal of Raw Materials
- Stage 4: Removal of all buildings, equipment and vehicles.
- Stage 5: Safety of the site
- Stage 6: Independent Closure Audit

These stages are described in further detail in the table below:

Table 5-5 Closure Plan

Site Closure Procedure	
Stage 1: Consultation	Engage with Environmental Consultants on the development and implementation of a final Closure Plan in accordance with EPA requirements.
Stage 2: Removal of all waste on site	All wastes onsite at the time of closure will be identified and classified as hazardous or non-hazardous (e.g. Empty drums. Tanks, redundant machinery). These wastes will then be managed in accordance with the Waste Framework Directive hierarchy of waste management i.e. re-used (sold to other companies), recycled, or disposed. All wastes will be removed from the site via an authorised waste contractor. Records of waste volumes/tonnages and their ultimate destination e.g. recycling/disposal will be kept with particular attention paid to hazardous wastes which require specific detailed documentation recording movement and ultimate recovery/disposal.
Stage 3: Removal of Raw Materials	An inventory of raw materials on site to be made redundant by the cessation of activities will be drawn up. All raw materials would be sold to other companies or returned to suppliers if possible. Raw materials will include redundant machinery onsite/ diesel tanks.
Stage 4: Removal of all buildings, equipment and vehicles.	All equipment /vehicles on site will be sold to other companies if possible. The working sheds will be removed or retained on site if they are required for further end uses (e.g. agricultural uses). The ultimate decision to remove sheds/buildings will depend on the proposed future use of the site. All processing equipment will be removed and the site will be tidied to prevent adverse visual impacts.
Stage 5: Safety of the site	The primary objective of the company when activities cease is to leave the site safe and secure with No risk to human health or the environment in the area. Therefore, upon decommissioning, the on-site lagoons will be infilled and the boundary around the quarry will be fenced with appropriate barriers to ensure the safety of the public. Sloped areas will be planted with evergreen bushes. Evergreen bushes will also be planted around the site border to minimize visual impact. Any planting will be of native shrub species to encourage rehabilitation of native fauna & flora.
Stage 6: Independent Closure Audit/Licence Surrender	Engage an Environmental Consultant to carry out an Independent Closure Audit and complete licence surrender in accordance with EPA requirements

5.7 Emission and Environmental Control and Mitigation

5.7.1 General

The carrying out of backfilling and C&D Recovery operations on-site will require the adoption and implementation of various emission and environmental control and mitigation measures in order to eliminate and minimize potential environmental impacts upon the receiving environment and sensitive receptors.

Going forward, it is proposed to regulate backfilling and C&D Recovery operations by way of an EPA Waste Licence. An application is currently being made to the EPA for a Waste Licence for the waste recovery activities.

An outline of proposed emission and environmental control measures is provided below. These measures may be expanded upon and additional environmental Mitigation Measures deemed necessary may also be detailed under each Environmental Topic Chapter in this EIAR. The applicant also endeavours to adopt and implement any additional measures over and above the measures detailed below required by any planning permission conditions or waste licence conditions.

5.7.2 Dust Control

In dry, windy weather conditions, the backfilling and C&D waste recovery activities may give rise to airborne dust. The following measures will be implemented to control dust on-site and prevent dust impacts upon sensitive receptors:

- Tall trees will be planted along the northern, eastern and south western boundaries of the site in order to minimize dust impacts and minimize the generation of wind-blown dust on-site. Existing vegetation along the western boundary of the site will also be retained. These trees will remain in place for the duration of the operational phase and will remain a part of the restored site as semi-mature trees.
- The maintenance of significant separation distances between material handling, storage and processing areas and surrounding sensitive receptors will significantly minimize the potential for any airborne dust associated with site activities to impact upon such receptors. It is proposed to locate dust generating activities such as unloading, sorting, stockpiling, soil screening, concrete crushing and sand and gravel washing at significant distances away from the application site boundary.
- The carrying out of operations at deeper than ground level within the fill area and behind earth mounds, quarry faces and natural raised topography will minimize potential dust impacts upon sensitive receptors. These topographical features as well as landscaping situated along the norther, eastern and southern site perimeter in the form of raised mounds and high treelines will minimize wind impacts on-site and reduce the potential for airborne dust.
- All waste material accepted on-site and all materials being transported off-site will be in sealed or covered vehicles only to prevent dust emissions on local roads and internally on-site.
- Roadsweeping will be carried out to ensure the access road to the site, internal haul roads and public roads are kept clean from dusty materials.
- Water spraying using water bowsers will take place on haul roads and stockpiles to dampen dust and prevent airborne dust generation, particularly during summer months where dry conditions potentially result in increased dust generation.

- A wheel wash will be installed on the site access road 100 metres from the site entrance to prevent tracking of dusty material and mud along the proposed site access road and public roads. The first 100 metres of the proposed site access road will be layed with asphalt.
- Long term exposed surfaces e.g. top soil and overburden storage mounds will be vegetated/planted to reduce dust emissions.
- A speed limit of 10 kph will be strictly enforced on-site to prevent the turning up of dust associated with traffic movements on-site.

5.7.3 Noise Control

The following noise control measures will be implemented on-site to eliminate and minimize potential noise impacts upon sensitive receptors:

- Site operations will be restricted to between 07:00 - 18:00 Monday to Friday and 08:00 - 16:00 Saturday. No activity will take place outside these hours. The facility will operate under an EPA Waste Licence which will prescribe noise limit values to adhere to.
- Raised mounds and high treelines will be situated along the northern, eastern and southern site boundaries which will serve to attenuate noise emanating from site operations.
- Soil Screening Plant/Sand and Gravel Washing Plant and Concrete Crushing Plant will be situated centrally on-site and away from any sensitive receptors. The above plant and equipment will be situated behind material stockpiles in order to minimize noise emanating from plant operations toward sensitive receptors. The Green waste shredder will be situated to the north of the site, however this equipment, which will be used on hire, will operate infrequently.
- The concrete crushing plant will be enclosed by cantilever walls to minimize noise emanating from the operation of this plant.
- A Machinery Maintenance Programme will be in place to prevent noise being emitted from inefficient or faulty plant and equipment. A maintenance log will be developed, maintained and available for inspection on site.

5.7.4 Nuisance Control

5.7.4.1 Odour Control

The vast majority of waste brought on-site will be inert construction and demolition waste. Such waste is unreactive both biologically and chemically, and will not cause any odour. Biodegradable garden waste will be accepted on-site for composting. This type of waste is not malodourous in nature. This waste sill be transferred without delay to a bunded composting area on-site for curing/maturation.

Strictly no food waste or slurries will be accepted on-site for composting purposes. Waste Acceptance Procedures are in place to prevent the acceptance and processing of any malodorous, waste such as food waste or slurries. In the unlikely event that any putrescible waste is identified among imported materials, it shall be immediately transferred to the waste quarantine area pending removal off-site to a licenced waste disposal or recovery facility.

Given that garden waste is being composted it is not envisaged that the composting windrows will be particularly odorous. Proper windrow aeration and moisture application will take place to prevent anaerobic conditions or the excessive generation of leachate which may give rise to odours. The nearest sensitive receptor is 120 metres north east of the site boundary so it is not expected there will be any noticeable odour impact on sensitive receptors.

Daily olfactory inspections will take place to ensure odours emanating from windrows are negligible. Odour incidents or complaints will be recorded and corrective/preventative actions will be planned and implemented, where necessary, although it is considered unlikely that incidents/complaints would occur.

Malodourous waste identified upon arrival to the site or on-site will be transferred to the waste quarantine area before being dispatched to an authorized waste facility within 24 hours.

5.7.4.2 Litter Control

Given the nature of waste materials being brought on-site, it is considered that the potential for wind-blown litter is minimal. Waste materials will be brought on-site in enclosed or covered HGV's. Waste handling, storage and processing will take place at good setback distances from the site boundary.

Any litter (i.e. plastic or paper) which may arrive on site within consignments will be removed on reception, or when identified during handling and sorting, and will be sent to a skip container in the waste quarantine area and thereafter will be sent to an authorized waste facility for disposal/treatment.

Perimeter landscaping will be in place to minimize the impact of wind on-site and the potential for wind-blown litter and debris. In addition, processes will take place in sheltered locations either deeper than ground level or behind earth mounds or stockpiles. Good housekeeping in the form of daily site and access road inspections and sweeping will take place to minimize the potential for strewn litter and debris.

5.7.4.3 Control of Mud

A wheel wash facility is proposed to be situated at the site access road 100 metres in from the entrance junction to prevent mud generation caused by vehicle tyres collecting and tracking mud. Waste tipping areas will be kept clean and free of loose waste materials to prevent materials forming into mud and being picked up by vehicle tyres. Access roads and internal haul routes will be inspected daily and swept as necessary to prevent the build-up of matter and mud. These routes will be re-gravelled where there is evidence of deterioration or the excessive building up of mud or moisture.

5.7.4.4 Vermin Control

Predominantly, waste brought on-site will be inert and inorganic and will not attract vermin. Garden waste will be brought on-site for composting. Although composting windrows can be attractive to rats, windrows comprised of materials derived from garden waste are not particularly attractive due to the lack of food. Strictly no putrescible (food/kitchen) waste will be accepted on-site. In the unlikely event that any putrescible waste is identified among imported materials, it shall be immediately transferred to the waste quarantine area pending removal off-site to a licenced waste disposal or recovery facility.

Composting windrows will be regularly turned and moistened during processing which will deter vermin from habituating within the windrows for warmth. Pest control specialists and bait boxing will be employed on-site and in particular around the composting area to prevent vermin. Strict cleanliness practices will be adhered to and the site will be regularly inspected for the presence of vermin. The presence of vermin on-site will be recorded and where necessary corrective/preventative action implemented to eradicate such vermin.

5.7.5 Protection of Waters

The following measures will be in place at the facility in order to ensure the protection of surface waters and groundwater:

- A series of settlement lagoons are situated on-site for the treatment of site surface water run-off containing elevated levels of particles. These settling lagoons will be cleaned and dredged as necessary.
- Fuel will be stored in fuel tanks situated in an existing bunded, roofed storage area. This area has been designed in accordance with EPA Guidance IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities, taking into account criteria for bund requirements (e.g. 110% of the capacity of the largest tank or drum within the bunded area; or 25% of the total volume of substance which could be stored within the bunded area, whichever is greater)
- Oils and lubricants will be stored within sump pallets in a farm store on-site.
- Testing of bund/sump pallet integrity shall be conducted upon commencement of site operations and every three years thereafter in accordance with good practice to verify the water tightness and integrity of bunds on-site. Where bund testing fails a programme of works shall be established by a Chartered Engineer to fix the bund and ensure its water tightness and integrity.
- Good hazardous material practice on-site will be observed. Fuel, oil, chemical storage tanks and drums shall be labelled. Fuel pumps and attachments shall be located within bunded areas. Bunded areas are roofed to prevent rainwater accumulating in bunds.
- Re-fuelling shall take place in a designated, roofed hardstanding re-fuelling area which drains to a silt trap and an oil interceptor to protect against oil spills.
- The wheel wash unit will be served by an integrated silt tank and oil interceptor. The wheel wash unit on-site will be a self-contained unit that utilizes recycled water originating from a GW abstraction point (by way of bowser). The silt tank/oil interceptor will be in place for when excessive rainfall causes overflow from the system. The wheel wash system will be desludged and cleaned ca. every 6 months at a minimum or as needed by an appropriate provider. Waste sludge from the unit will be dispatched to an appropriate authorized destination waste facility.
- Emergency Response Procedures will be in place to ensure the prompt and thorough response to any spills of hazardous materials. Spill kits will be present on-site for this purpose.
- An interceptor maintenance and inspection programme will be implemented - the interceptors on-site should be inspected every 6 months by suitably qualified persons and should be cleaned and serviced regularly as necessary
- Composting curing/maturation will take place on a hard-standing area which drains to an 180,000 litre slatted effluent storage tank to prevent the discharge to the environment of potentially polluting materials associated with this process. This effluent storage tank will be regularly inspected and emptied, cleaned and serviced when necessary.
- Waste Acceptance Procedures will be in place to ensure that hazardous waste or putrescible waste are prevented from arriving on-site and, were found to be present on-site, temporarily stored in a bunded waste quarantine area prior to being dispatched off-site to an authorized waste facility within 24 hours.
- A surface water drainage inspection, maintenance and monitoring programme should be established and surface water emanating from the site shall be tested periodically.

5.7.6 Control of Visual Impacts

The following measures will be implemented to eliminate and minimize visual impact and protect landscape:

- 2m high raised mounding along the eastern boundary of the development site where the site is visible from residential properties; and semi mature tree planting on the northern, western and eastern (double row) boundaries to supplement retention of existing boundary hedgerow around the entire perimeter of the site.
- During all phases of restoration, plant and equipment will be situated in areas which are well screened from areas outside the site boundary by raised topography, earth mounding and material stockpiles.

5.7.7 Fire Control

As the material being accepted, stored and processed at the facility is largely free of combustibles (with the exception of some garden waste to be brought on-site) and completely free of flammable materials it is not envisaged there will be a significant fire risk posed by site operations. The following operational practices will be implemented however in order to prevent fire at the facility:

- Smoking on-site is strictly prohibited.
- Any flammable materials which are imported on-site accidentally are immediately transferred to the waste quarantine area pending removal off-site to an authorised waste disposal or recovery facility.
- Plant and equipment is shut down and properly serviced maintained or removed from the site as the case may be if it exhibits signs of overheating.
- Fire extinguishers (water and foam) are provided at all offices to deal with any small outbreaks which may occur.
- In the unlikely event that a fire does occur, the local fire station in Carlow will be contacted and emergency response procedures will be implemented.

5.8 Proposed Environmental Monitoring

It is proposed to carry out the following types of environmental monitoring to ensure emissions emanating from the site do not adversely impact off-site environmental and human receptors.

5.8.1 Dust Monitoring

Dust monitoring will be carried out on a Quarterly basis at three site boundary dust monitoring locations as indicated in the Site Layout Plan. The Bergerhoff method will be used to determine dust levels on-site. Dust monitoring results will be compared with the EPA conventional limit value for dust of 350 mg/m2/day in order to assess potential dust emission impacts.

5.8.2 Groundwater Monitoring

Groundwater Monitoring shall be carried out at the three groundwater monitoring points on-site (GW1, GW2 and GW3) in accordance with the schedule detailed below. Groundwater Monitoring results will be compared with Groundwater Threshold Values defined the Groundwater Regulations 2016, or otherwise Interim Guideline Values prescribed by the EPA.

Parameter	Monitoring Frequency
Level	Biannually
pH	Biannually
Conductivity	Biannually
Ammonia (as N)	Biannually
Nitrate	Biannually
Nitrite	Biannually
Orthophosphate (as P)	Biannually
Total Dissolved Solids	Biannually
Dissolved Metals	Biannually
Total Petroleum Hydrocarbons	Biannually
Diesel Range Organics	Biannually
Petrol Range Organics	Biannually
Total Coliforms	Biannually
Faecal Coliforms	Biannually

5.8.1 Surface Water Monitoring

Surface water monitoring will be carried out at the following surface water monitoring points on-site.

Table 5-6 Surface water Monitoring Point Details

Monitoring Point	Comments	Grid Coordinates
SW1	Site Outfall Point	52.901711, -6.810465
SW2	Settlement Lagoon	52.902510, -6.805178
SW3	River Graney Upstream	52.899680, -6.813093
SW4	River Graney Downstream	52.900185, -6.814523

Surface Water monitoring will be carried out in accordance with the schedule below. Surface Water Monitoring Results will be compared with BAT Associated Emission Limits defined in EPA BAT Guidance Notes for the Waste Sector.

Table 5-7 Surface Water Monitoring Schedule

Parameter	Monitoring Frequency
Visual Inspection	Weekly
pH	Quarterly
BOD	Quarterly
Suspended Solids	Quarterly
Ammonia (as N)	Quarterly
Orthophosphate (as P)	Quarterly
Dissolved metals	Quarterly
Total Dissolved Solids	Quarterly
Total Petroleum Hydrocarbons	Quarterly
Diesel Range Organics	Quarterly
Petrol Range Organics	Quarterly

5.8.2 Noise Monitoring

Day-time Environmental Noise Monitoring will be carried out at NSL's in the vicinity of the site annually to ensure relevant noise limits are not breached. The following noise limits should apply on-site:

Limits During Working Hours between 7am to 6pm Monday to Friday, and from 8am to 2pm on Saturdays (Day-time hours as defined by NG4
55dB LAr,T

5.9 Proposed Final Restoration

The principal activity which will be undertaken at the application site is backfilling and restoration of lands within an existing sand and gravel quarry. A cover layer comprising 150 mm of topsoil and approximately 350 mm of subsoil shall be placed over the inert backfilled materials on completion of the backfilling activities. This will then be planted with grass in order to promote stability and minimise soil erosion and dust generation. Thereafter the lands will be progressively returned to use as agricultural grassland.

It is envisaged trees planted during the lifetime of the facility along the northern, eastern and south western boundaries will have reached their semi-mature stage and will be retained. Existing vegetation along the western boundary of the site will also be retained. It is envisaged that trees around the perimeter of the site will promote soil stability and minimize soil erosion around the boundary of the fill area where steeper gradients will be present.

On progression and completion, the final landform will be modified as necessary to ensure that surface water run-off across the site is directed to the boundary ditch along the western border of the site. Existing settlement ponds situated on-site will ultimately be filled in.

On completion, all mobile plant and equipment associated with the waste recovery activities will be removed off-site. Any dedicated temporary site accommodation, infrastructure and/or services will also be progressively decommissioned and/or removed off-site.

A Landscape Restoration Plan detailing the final landscape proposal on-site adjoins the Planning Application (Drawing Ref. 1467-002).

6. Population and Human Health

6.1 Introduction

This section of the EIAR, prepared by Environmental Efficiency Consultants, covers the existence, activities, wellbeing and health and safety of people and addresses the potential impacts of the proposed activity upon the surrounding human environment, communities and individuals.

The proposed activity has the potential to impact human beings in a number of ways and may have impacts upon population, health and safety, tourism, recreation, air quality, noise, traffic and economic activity.

Some aspects related to the human environment are addressed in other sections of this EIAR. These sections are cross referenced in this section where appropriate.

6.2 Assessment Methodology

The study of how the human environment will be impacted by the proposed activity involved carrying out the followings tasks:

1. Conducting a walkover survey of the site and the local area.
2. Carrying out a review of historic and existing mapping and aerial photography for the local area and wider region.
3. Reviewing population information from the Central Statistics Office for the relevant geographical area
4. Reviewing socio-economic information for the local area and wider region contained within Kildare County Council's Development Plan 2016-2022.
5. Evaluation, analyzing and assessing the proposed activity and its impacts upon aspects relating to Population and Human Health.
6. Preparation of a Population and Human Health chapter for the EIAR.

6.3 Baseline Environment

6.3.1 Land Use

The application site is situated in the townland of Graney West approximately 2 km south east of the town of Castledermot, Co. Kildare. The L4015 Castledermot to Baltinglass Road runs approximately 650 metres south of the site.

The site predominantly consists of worked out quarry voids. A residential dwelling and agricultural outbuildings owned by the applicant are situated to the east of the site. The site is surrounded on all sides by agricultural land with sparse one-off housing interspersed. A number of other quarries are found dotted in the wider area.

The site is not located in an area that is zoned for any particular use in the Kildare County Development Plan 2017 – 2023. The site has been used as a quarry historically however.

6.3.2 Potential Receptors

6.3.2.1 Housing

A number of one-off residential dwellings are situated in close proximity to the proposed development site. A total of 12 residential properties are situated within 500 metres of the application site boundary. The nearest sensitive receptor is a one-off house and is approximately 110 metres north east of the main site boundary (Receptor E). The location of all houses within 500 metres of the application site boundary (inclusive of site access roads and site entrances) is shown Figure 6-1 below.

Figure 6-1 Location of Houses within 500 Metres of Application Site Boundary

6.3.2.2 Local Amenities

The area around the application site is predominantly rural in nature. There are no hospitals, churches, schools or retail outlets in the local area around the site.

There are a variety of recreational, social, community and sport facilities within 4 km of the site, mainly situated around the town of Castledermot 2 km to the north west of the site.

Castle Villa football club grounds are situated approximately 1.4 km north west of the site. Castledermot GAA grounds are situated approximately 2.5 km north west of the site, the other side of Castledermot.

Castledermot Community Centre, Scoil Diarmada and Coláiste Lorcáin schools, St James Church Castledermot and Church of the Assumption Castledermot, are situated north west of the site in the town of Castledermot.

The nearest health related facility to the site is Castledermot Health Centre, which is again situated in Castledermot Town.

Retail outlets, pubs and restaurants in the wider area are mainly centred in and around the town of Castledermot. A number of established light enterprise businesses are situated in one off locations in the wider rural area surrounding the site. No heavy industry is situated in the local area. The main economic activity in the surrounding region is agricultural activity an enterprise, namely tillage and grazing. Quarrying is also a significant component of economic activity in the surrounding area.

Two historic landmarks of cultural importance are situated in Castledermot town, Castledermot Abbey and Castledermot Round Tower. Records held by the National monuments Service indicate that there are a number of national monuments within the immediate vicinity of the Graney West site. A bronze age cist is situated directly north east of the site (Ref: KD040-011) and a ringfort can be found approximately 350 metres south east of the site (Ref: KD040-012). There are no recorded monuments found on-site.

The Kildare County Development Plan indicates that the townland of Graney West lies in the Eastern Transition Lands Landscape Character Area, which if of a Medium Sensitivity. There are no protected views or prospects into or out of the application site identified in the Plan, nor are there any designated Special Areas of Conservation, Special Protection Areas or proposed Natural Heritage Areas within or directly adjacent to the site.

6.3.3 Population

The smallest geographical unit distinguished by the CSO in the Republic of Ireland is the Electoral Division. The site lies within the Graney Division in County Kildare. A summary of national, regional and local population data and trends is shown in the table below

Table 6-1 Population Trends

Jurisdiction	2011	2016	Change 2006 – 2011 %
State	4,588,252	4,761,865	3.78%
Kildare	210,312	222,504	5.80%
Graney	735	775	5.44%

It is noted that there has been a noteworthy level of population growth in the local area and region. The population growth rate in the local area is faster than the national growth rate. It is considered that this is due to Kildare being situated within the Greater Dublin Area.

It is expected that population in the local area will grow significantly in the years going forward given that the area is located within Dublin's 'commuter belt.' The Castledermot Small Town Plan 2017 – 2023 envisages residential development on six sites within the town, which could provide for 243 residential units. It is an objective of Kildare County Council to facilitate the development of residential development scheme in Castledermot in new residential zoned sites.

6.3.4 Employment

Data from the Central Statistics Office shows that the number of people on the Live Register in Kildare is 7,970 as of April 2019. This is down from 9,369 in April 2018 and 11,194 in April 2017. This figure is still not as it in April 2006 when prior to the recession, when the figure was 4,840.

A breakdown of employment for the electoral division and county is shown in the table below. Most people in Graney are employed in commerce and trade, with significant numbers employed in Agriculture, manufacturing and professional services. Proportionally, more people in Graney are employed in agriculture than in Kildare generally, which is to be expected given the rural nature of the area.

Table 6-2 Employment by Sector

Sector	Graney		Kildare	
Agriculture, forestry and fishing	44	13.37%	3,190	3.32%
Building and construction	21	6.38%	5,838	6.08%
Manufacturing industries	49	14.89%	11,310	11.79%
Commerce and trade	82	24.92%	25,524	26.60%
Transport and communications	24	7.29%	8,272	8.62%
Public administration	14	4.26%	6,163	6.42%
Professional services	55	16.72%	21,919	22.84%
Other	40	12.16%	13,731	14.31%
Total	329		95,947	

6.4 Impact Assessment

6.4.1 Land Use

The proposed development will result in backfilling operations and C&D waste recovery operations taking place at the subject site during the operational phase. Quarry voids on-site will be backfilled section by section on a phased basis.

Ultimately, backfilling operations will facilitate the restoration of all quarry voids on-site. The fill area on-site will ultimately be restored as agricultural grassland and the site will be used for pastoral farming and associated farm activities upon cessation of proposed development activities.

The restoration of quarry voids on-site and the use of restored land for agricultural benefit will have a long term, positive impact on the local environment.

6.4.2 Residential Amenity

Proposed development activities may have an adverse impact upon surrounding residential receptors. In particular, proposed site activities may result in excessive noise and dust affecting residential amenity, visual impacts upon sensitive receptors and impacts upon traffic in the local area. The intensity of environmental impacts at residential receptors will vary depending on the location of the receptor. The proposed mitigation and monitoring programme and the separation distances between dust generating operations and sensitive receptors will ensure that potential impacts remain within acceptable levels.

Detailed assessments of the potential impacts of the proposed development on air quality and the noise environment are detailed in Sections 10 and 11 of this EIAR respectively. The carrying out of backfilling and C&D waste recovery operations will result in the generation of noise and dust and may potentially affect residential amenity in the local area. Impacts will most likely arise at residential receptors in close proximity to the site. The assessments presented in Sections 10 and 11 conclude that proposed noise and dust related mitigation measures will minimize noise and dust impacts associated with the proposed development ensuring there are no adverse effects on any residential receptor.

The carrying out of proposed development activities, namely backfilling and C&D waste recovery operations, may have a significant, adverse visual impact upon surrounding residential receptors. The impact of the proposed development on landscape and visual amenity is dealt with in detail in Section 15. This assessment concludes that the development of visual impact mitigation measures, in particular the planting of fast growing pioneer trees along the northern and eastern side of the main working areas to mitigate views from visually sensitive residential properties, will ensure the proposed development will not have a significant adverse visual impact upon any sensitive residential receptors. This visual screening will be planted prior to the commencement of development related operations.

The applicant proposes on installing exterior lighting on-site for the purpose of illuminating the site entrance, the site access road and working areas on-site. Potential exists for light spill and glare from this exterior lighting having a slight to moderate adverse impact upon nearby properties. In particular the nearest sensitive receptor, a one off house approximately 110 metres north east of the main site boundary, may be impacted by exterior lighting causing nuisance. It is recommended that mitigation measures are incorporated into the design of lighting systems on-site in order to minimize light spill and glare emanating from proposed lighting to be developed in connection with the proposed development.

6.4.3 Local Amenity

The site is surrounded on all sides by agricultural land interspersed with one off housing. There are no areas of significant amenity value within the local environs of the site. Given this and given the proposed mitigation measures that will be implemented on-site, in particular plans for visual mitigation using fast growing pioneer trees along the northern and eastern boundaries of the site, it is not anticipated the proposed development will have an adverse impact on local amenity value.

It is not anticipated the proposed development will have any impact on the town of Castledermot given the lengthy distance between the site and settlement in Castledermot (ca. 1.75 km) and given the presence of numerous areas of dense tree lining and vegetation between the site and the town.

It is anticipated the ultimate restoration of the fill area and transformation of this area into agricultural grassland will have a long-term slight to moderate positive impact on local amenity.

6.4.4 Traffic

The proposed development will result in the generation of significant levels of HGV's coming to and from the site. It is proposed to design a new site access road and site entrance to the south of the site. The site entrance will be splayed and suitable sight lines will be provided in accordance with relevant design standards (visibility from junction 300 metres in either direction). Staff and visitors will use and the existing site access road to the east of the site to access and leave the site and therefore will be kept segregated from HGV movements on-site. A Traffic Impact Assessment (TIA) which considers the impacts of HGV traffic associated with the proposed development is considered in Section 13 of this EIAR. A Road Safety Audit was carried out in conjunction with this TIA. Th assessments indicate that the nature and increase in HGV traffic movements as a result of the proposed development will not have a significant adverse impact on traffic safety or on the capacity of roads and junctions surrounding the Graney West quarry complex considering the proposed design.

Given established land uses in the local area, existing traffic levels on local roads and the applicants intention to develop a new site access road connecting the site directly to the L4015 Castledermot to Baltinglass road, it is considered that the increased HGV traffic movements generated by the proposed development will a long-term but only slight to moderate impact upon the local road network or the residential amenity of properties in the local area. It is not anticipated that such effects will be significant.

6.4.5 Human Health Impacts

The following activities associated with the proposed development may create human health impacts:

- Dust emissions from operating activities.
- Noise emission from operating activities.
- HGV movements to and from the site.
- On-site operational phase activities on-site;
  - Internal HGV, plant and machinery movements on-site
  - Backfilling operations on-site
  - C&D recovery operations on-site; material handling activities and plant operation.

The impact of Dust emissions associated with vehicle movements, backfilling operations and C&D recovery activities on surrounding sensitive receptors is addressed in Section 10. Mitigation measures to address Dust impacts are detailed in Section 10.5.

The impact of Noise emissions associated with vehicles movements and the operation of plant and machinery on surrounding sensitive receptors is addressed in Section 11. Mitigation measures to address Noise impacts are detailed in Section 11.6.

As discussed above, a Traffic Impact Assessment and Road Safety Audit carried out, which consider proposed vehicle movements to and from the site and within the site, the proposed design of the site, site access road and site entrance and the existing local road network, have determined that the proposed development will not create any unacceptable risk to human health on-site or on local roads.

Backfilling operations and C&D Recovery operations, in particular the operation of plant and machinery, may create health and safety risks for site operatives. A small number of operatives will work on-site in connection with the proposed development. All site staff are suitably qualified and trained and have lengthy experience carrying out quarrying operations and operating plant and machinery at this facility or other sister facilities in the region.

A Risk Assessment considering proposed development activities will be carried out and the Safety Statement for the facility will be updated appropriately to ensure risks are identified and controlled. All staff will be made aware of any new risks facing them and given further training where necessary.

Appropriate Personal Protective Equipment suitable to various tasks that will be carried out on-site will be provided to all staff members. Suitable welfare facilities including accommodation for taking meals, shelters, staff toilets and washing facilities are provided on-site for site staff. Emergency response procedures will be developed in order to deal with potential emergency situations on-site that may have human health and safety implications (e.g. fire). Training in the emergency preparedness and response procedure will be provided to all employees. Generally, proposed site activities will be carried out in accordance with the following:

- Safety, Health and Welfare at Work Act 2005 (as amended)
- Safety, Health and Welfare at Work (General Application) Regulations 2007
- Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2008

Given the experience of site operatives as well as proposed health and safety measures which will be in place, it is considered that the proposed development does not create unacceptable health and safety risks to site staff and impacts related to such are minimal.

6.4.6 Population

The facility will only employ between 2 and 5 staff members depending on depending on demand. Considering this, and given the nature of the proposed development, it is not anticipated the proposed development will have any impact on local or regional population trends.

6.4.7 Employment

The proposed development will secure long term employment for up to 5 people in the local area. As such, the proposed development will have a minor but very positive impact locally in this regard.

6.5 Mitigation Measures

The following sections of this EIAR provide detailed assessment of the potential impacts referred to above, and describe existing and /or proposed mitigation measures to ensure that any adverse impacts are eliminated and/or minimised:

- Section 10.5.- Mitigation measures to prevent and control Dust emissions.
- Section 11.6.- Mitigation measures to prevent and control Noise emissions.
- Section 13.5 - Mitigation measures to reduce Traffic and Transport related impacts, promote safety on-site and on local roads and eliminate risks associated with traffic movements.
- Section 15.8- Mitigation measures to prevent and control impacts upon Landscape and Visual Amenity.

The following measures will be in place to promote the protection of human health on-site:

- All site staff are suitably qualified and trained and have lengthy experience carrying out quarrying operations and operating plant and machinery at this facility or other sister facilities in the region.
- A Risk Assessment considering proposed development activities will be carried out and the Safety Statement for the facility will be updated appropriately to ensure risks are identified and controlled. All staff will be made aware of any new risks facing them and given further training where necessary.
- Appropriate Personal Protective Equipment suitable to various tasks that will be carried out on-site will be provided to all staff members.
- Suitable welfare facilities including accommodation for taking meals, shelters, staff toilets and washing facilities are provided on-site for site staff.
- Emergency response procedures will be developed in order to deal with potential emergency situations on-site that may have human health and safety implications (e.g. fire). Training in the emergency preparedness and response procedure will be provided to all employees.
- The following measures are proposed in order to minimize light pollution:
    - Visors will be provided on exterior lighting in order to minimize light spill in sensitive areas. Flat glass type luminaires with full cut off will be provided. There will be no tilt on the luminaires.
    - The site lighting will be switched off doing non-operational hours.
    - Sensor controlled lighting will be provided. Each lighting pole will be fitted with a movement detector and only activated when it detects a hum approaching.
    - Luminaires will be lower intensity LED. A warm white spectrum (less than 2700K) will be used to reduce the blue light component.
    - Lighting on the access road and at the site entrances/junctions with public roads will be dimmable. All fittings will be mounted on poles 6 m or less.

6.6 Residual Impacts

In conclusion, overall, it is not anticipated that the proposed development will have any significant, negative impact on residential amenity, local amenity, traffic or human health having regard to the mitigation measures proposed. It is not anticipated the proposed development will have any impact on local or regional population.

It is anticipated the proposed development, namely the restoration of the existing quarry will have a long-term, slight to moderate positive impact on visual amenity in the local area. It is anticipated that the proposed development will have a minor but very positive impact on employment levels in the locality given that a small number of jobs will be secured in the long term.

6.6.1 Indirect Impacts

Surface water discharges associated with proposed development activities may result in the deterioration of water quality in the receiving water body (The Graney River) and downstream water bodies. This may affect aquatic ecology in these water bodies. In turn, this may impact upon the amenity value of these water bodies for people. The Water Chapter of the EIAR (Section 9) concludes that the proposed activity will have no significant adverse impact on receiving water bodies given mitigation measures in place

6.6.2 Cumulative Impacts

No other significant existing or proposed development has been identified in the area which would result in a significant cumulative impact on population and human health in combination with the subject development.

7. Biodiversity

7.1 Introduction

JBA Consulting has been commissioned by Environmental Efficiency Consultant (Ireland) Ltd, to provide environmental consultancy services in relation to a proposed extension to a proposed soil recovery facility at a worked-out quarry in Graney West, County Kildare. This chapter relates to the potential ecological impacts of the proposed works on the biodiversity of the site and environs. The proposed works require consideration of designated sites, habitats, flora and protected/notable species. The aim of this chapter is to identify the key ecological receptors within the study area, determine their ecological value, assess the potential impacts of the proposed works upon them and propose mitigation to offset any identified impacts.

7.1.1 Relevant Legislation and Policy Context

This assessment has had regard to the following policy documents and legislation:

7.1.1.1 National and International Legislation

- The Planning & Development Act 2000 & the Planning and Development (Amendment) Act, 2010 (as amended) hereafter referred to as the Planning Acts.
- The Wildlife Act 1976 as amended by the Wildlife (Amendment) Act, 2000 (as amended) hereafter referred to as the Wildlife Acts.
- European Communities (Environmental Impact Assessment) Regulations 1989 to 2001.
- European Commission (EC) Habitats Directive 92/43/EEC (as amended).
- EC Birds Directive 2009/147/EC.
- European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) hereafter referred to as the Birds and Habitats Regulations.
- Flora (Protection) Order, 2015.
- Environment (Miscellaneous Provisions) Act 2011.
- The Fisheries (Consolidation) Act 1959.
- The Local Government (Water Pollution) Act, 1977 (as amended by Sections 3 and 24 of the 1990 Act).

7.1.1.2 Relevant Policies and Plans

- National Biodiversity Action Plan 2017-2021
- Ireland's National Strategy for Plant Conservation
- Kildare County Development Plan 2017-2023

7.1.1.3 Relevant Guidance

- Invasive Species in Ireland (NPWS 2004).
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM 2018).
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003).

- Advice Notes for Preparing Environmental Impact Statements (Draft) (EPA 2015a).
- Guidelines on the information to be contained in Environmental Impact Statements (EPA 2002).
- Revised Guidelines on the information to be contained in Environmental Impact Statements (Draft) (EPA 2015b).
- Environmental Impact Assessment of National Road Schemes – A Practical Guide (NRA 2008a).
- Guidelines for Assessment of Ecological Impacts of National Roads Schemes (NRA 2009a).
- Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (NRA 2005a).
- Badgers and development - working today for nature tomorrow (English Nature 2002).
- Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2008b).
- Guidelines for the Treatment of Bats During the Construction of National Road Schemes (NRA 2005b)
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition) (Collins 2016).
- Bats & Lighting Guidance Notes for Planners, engineers, architects and developers (Bat Conservation Ireland 2010).
- Bats in Buildings Guidance Notes for Planners, engineers, architects and developers (Bat Conservation Ireland 2014).
- Bat Mitigation Guidelines for Ireland (Kelleher and Marnell 2006).
- Bat Mitigation Guidelines (English Nature 2004).

7.1.2 Proposed Development

Environmental Efficiency Consultant (Ireland) Ltd commissioned JBA Consulting as a sub-consultant to conduct ecological and environmental services for a proposed soil recovery of a worked-out quarry. The proposed project includes the construction phase of site preparatory works and the operational phase with the principal activity of backfilling a worked-out quarry using uncontaminated soil and stone from construction sites, to backfill and restore existing voids onsite.

Construction Phase

The site preparation works will involve the following:

- Construction of new access road in the south-east, coming off road L4015, to be used by Heavy Goods Vehicles (HGVs). The first 100m of road pavement will be hot rolled asphalt and the rest will be gravelled;
- Wheelwash facility located at the end of the 100m hard surfaced road. This will include a silt tank, petrol interceptor and rattle bars;
- A permeable car park area for employees and visitors, five parking locations for HGVs;
- Re-grading of ground surface in the stockpiling and sorting area;
- Extended concrete apron north of existing buildings on site;

- A concrete pad for re-fuelling of vehicles adjacent to bunded fuel storage area on-site. This will have a separate drainage system with silt trap, oil interceptor and soakaway;
- Bunded waste inspection/quarantine area on-site; and
- Erection of screening mounds and planting of trees along the north, east and south boundaries.

Operation Phase

The backfill operation of the worked-out quarry will accept inert material comprising subsoil, clay, gravels, topsoil, stone and mixtures of such. These materials will be sourced from construction sites in the Greater Dublin Area.

In addition to the principal waste activity described above, it is proposed to carry out the following secondary waste recovery activities:

- Intake of top-soil, screening at proposed screening plant and resale of such material,
- Intake of gravel and sands, washing at existing washing plant and resale of such materials,
- Intake of concrete, concrete crushing using concrete crushing equipment, mixing with sand and gravel before being fed to the washing plant to form aggregate, and resale of such material, and;
- Intake of garden waste, shredding and composting of this waste within a silage pit draining to an underground effluent storage tank, for use for agricultural land spreading.

Waste to be processed on site will be in the following quantities:

- 12,500 tonnes per annum of sand and gravel for processing at the sand and gravel plant;
- 12,500 tonnes per annum of concrete for processing at the concrete crushing plant;
- 1,500 tonnes per annum of topsoil for screening at soil screening plant, and;
- 1,000 tonnes per annum of Garden Waste for shredding and composting.

Water treatment measures on-site are as follows:

- Septic tank will be in place to manage domestic wastewater on-site
- Surface Water Settlement Lagoons will be in place for managing run-off from site and from gravel washing process
- Effluent tank (180,000 litres capacity) will be in place to manage run-off from composting area.
- Silt trap, Class 1 Full Retention Interceptor and Soakaway will be in place to deal with run-off from concrete hard standing areas
- Class 1 Interceptor will be in place serving the car parking area
- Integrated Oil Interceptor and silt trap will serve the wheel wash along the site access road.

Water from the settlement lagoons will be pumped back to the washing plant via a pump house and recycled within the process. Overflow from the last of these lagoons is via a 300 mm diameter concrete pipe to the Graney River. Surface water also leaves the site by percolation through gravels to ground and underlying groundwater.

The site is 19.2 hectares in size and the area to backfill is 13.65 hectares.

Traffic will access the site from the south east via a proposed new access road.

The construction period will take 6-9 months and the operation period is expected to be 10-25 years. The proposed final restoration of the site is to restore it into an agricultural grassland for grazing.

The site is located approximately 2 km east of Castledermot town, Co. Kildare, and approximately 8 km west of Baltinglass village (Figure 7-1). Road L8100 is located north of the site and road L4015 is located to the south. River Graney is running south of the proposed development.

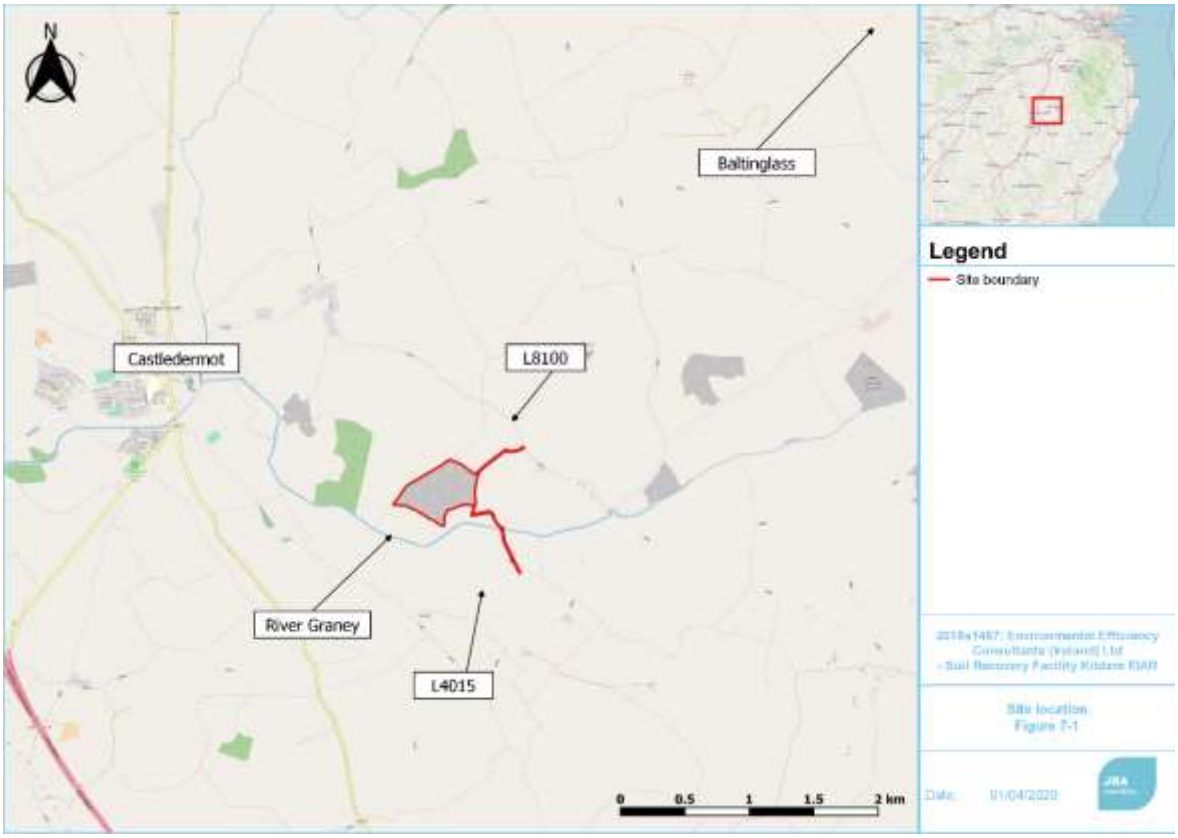


Figure 7-1 Site location (Source: Open Streetmap 2019)

7.2 Assessment Methodology

7.2.1 Desk Study

A number of data sources below were consulted for the desktop study, which include the following:

- NPWS website (www.npws.ie);
- EPA website (https://gis.epa.ie/EPAMaps/);
- National Biodiversity Data Centre (http://www.biodiversityireland.ie/);
- Water Framework Directive Ireland (www.wfdireland.ie);
- Botanical Society of Britain and Ireland (http://bsbidb.org.uk/maps/)

7.2.2 Ecological Surveys

Several surveys have been carried out to inform this report. The first ecological walkover survey was conducted on 15th of January 2019 by JBA ecologist Malin Lundberg. The survey recorded habitats and flora in the area within the development site, and to detect the presence or likely presence of protected species, and the presence of good potential habitat for those species. The study was also concerned with recording habitats suitable for protected habitats and species and identifying the need for further, more specialist surveys where necessary.

A second survey was carried out on 8th of March 2019 by JBA ecologists Malin Lundberg and William Mulville. This survey included a preliminary ground level assessment of bat roost suitability, an Otter survey, a Badger survey, an invasive species survey and a preliminary Sand Martin survey.

A dedicated Sand Martin survey was carried out on 11th June by JBA ecologist Malin Lundberg. The survey focused on potential nests identified during the preliminary survey previously carried out, in order to identify presence or absence of nesting Sand Martins using a direct observation method and recording how many nests were occupied.

Ecological Survey methods were in general accordance with those outlined in the following documents;

- Best Practise Guidance for Habitat Survey and Mapping, 2011 (Heritage Council (Smith et al. 2011)).
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA 2009b).
- Bat Surveys for Professional Ecologists (Collins 2016)
- CBS Manual - Guidelines for Countryside Bird Survey participants (BWI 2012)
- Monitoring the Otter *Lutra lutra* (Chanin 2003)

Aerial photographs and site maps assisted the habitat survey. Habitats have been named and described following A Guide to Habitats in Ireland by Fossitt (2000). Nomenclature for higher plants principally follows that given in Webb's An Irish Flora (Parnell and Curtis 2012).

The first two surveys were undertaken outside of the flowering plant season (typically May-September inclusive).

7.2.3 Designated Nature Conservation Sites

Sites of international importance including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are collectively known as Natura 2000 sites. These sites contain examples of some of the most important natural and semi-natural ecosystems in Europe. Designated sites, which also include Natural Heritage Areas (NHA's) and proposed Natural Heritage Areas (pNHA's), which are national designations, were also identified within the proposed development's area of influence. The designated search area was 15 km from the development for Natura 2000, NHA and pNHA sites. This distance defines the 'Zone of influence' (ZOI) of the soil recovery activity for protected sites.

7.2.3.1 Natura 2000 sites

Three Natura 2000 sites were identified as occurring within 15km of the project:

- River Barrow and River Nore SAC (002162)
- Slaney River Valley SAC (000781)
- Holdenstown Bog SAC (001757)

The proposed site is located outside the boundary of these Natura 2000 sites (Figure 7-2). A separate AA Screening report (JBA 2020a) has been produced which examines the likely pathways and impacts of the proposed works on any of these Natura 2000 sites. The AA Screening identified two of the SAC's (River Barrow and River Nore SAC and Slaney River Valley SAC) to potentially being significantly impacted by the proposed project and as such a Natura Impact Statement (JBA 2020b) has been carried out specifying sources of impact and mitigation measures to mitigate for any adverse effects.

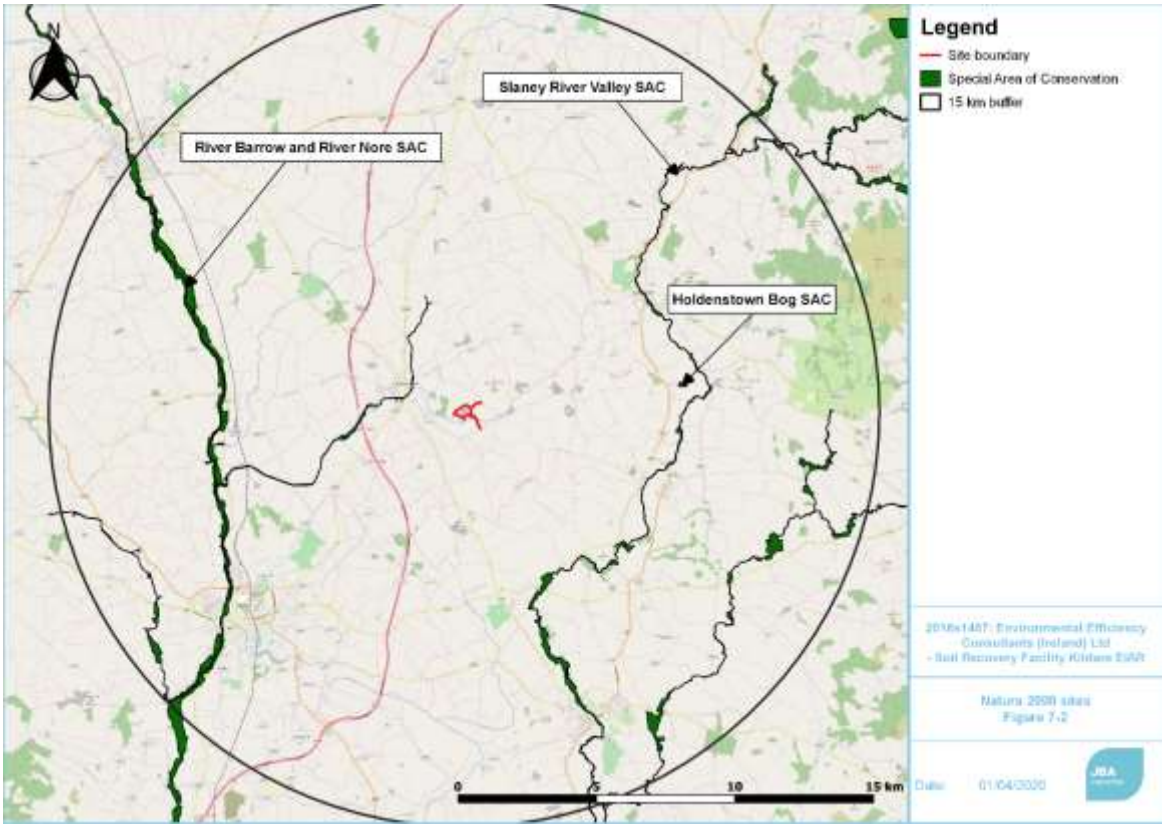


Figure 7-2 Natura 2000 sites and site location (source: NPWS 2019)

7.2.3.2 Natural Heritage Areas

There are 9 pNHAs located within 15 km of the site (Table 6-2 and Figure 7-3) and there are no NHA. Of these 9 sites, three are within a Natura 2000 designated site. These are Barrow Valley At Tankardstown Bridge, Baggot's Wood and Holdenstown Bog, the assessment for these sites is included within the AA Screening for this site (JBA 2020a).

Table 7-1 pNHAs within 15km of the site and requirement for further assessment

pNHA Sitecode	pNHA Site name	Distance from site (km)	Further assessment required
001389	Corballis Hill	3.0	Yes, further assessment below
001764	Lowtown Fen	8.5	Yes, further assessment below
001757	Holdenstown Bog	7.1	No
001751	Ballycore Rath	9.5	Yes, further assessment below
000858	Barrow Valley At Tankardstown Bridge	9.8	**No**
000857	Ballylynan	12.9	No
000810	Oakpark	7.3	Yes, further assessment below
000792	Baggot's Wood	11.7	No
000788	Ardristan Fen	12.8	No

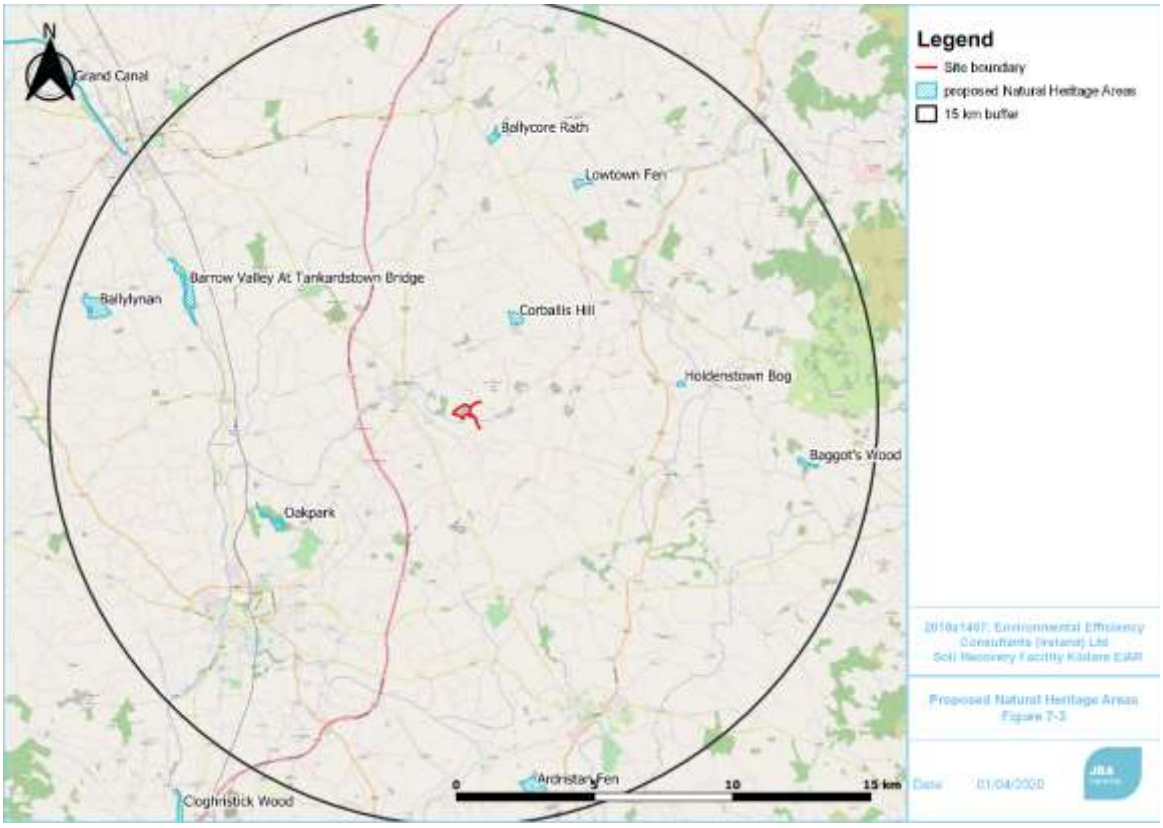


Figure 7-3 Proposed Natural Heritage Areas (pNHA) and site location (Source: NPWS 2019)

The closest pNHA, Corballis Hill, is located within 3 km of the proposed development site on a hill composed of sandstone with drift deposits on lower slopes. The Corballis Hill represents a fairly intact deciduous woodland with species of oak *Quercus* spp., Grey Willow *Salix cinerea* and Hazel *Corylus avellana*, and areas of heath (NPWS 2009a). This site is within the same catchment and groundwater body as the proposed development site, however, Corballis Hill is located upstream and the habitats are not groundwater dependent, therefore they are not considered being impacted via surface water or groundwater. Given the close proximity, the site is within the Zone of Influence to be impacted via land and air pathways. **Therefore, Corballis Hill is considered further in this report.**

Lowtown Fen is located 8.5 km from the proposed development site. The fen has developed fen vegetation, with the wettest part in the centre and becoming drier in the marginal areas (NPWS 2009b). Several species of orchids have been recorded at Lowtown Fen, including Fragrant Orchid *Gymnadenia conopsea,* Frog Orchid *Coeloglossum viride*, two species of marsh-orchid *Dactylorhiza* spp. and the scarce Marsh Helleborine *Epipactis palustris*. Fen habitats are groundwater dependent and the Lowtown Fen is located within the same groundwater body as the proposed development site. However, the bedrock in this area is unproductive and given the distance to the proposed site, Lowtown Fen is not considered to be within the Zone of Influence of the area of the proposed works. Therefore, Lowtown Fen is not considered further in this report.

Ballycore Rath is located 9.5 km from the proposed development site. The site is a steep-sided body of moraine composed of calcicole grassland dominated by Crested Dog's-tail *Cynosurus cristatus* (NPWS 2009c). The scarce Salad Burnet *Sanguisorba minor* is also found here. Ballycore Rath also include a small woodland dominated by Ash *Fraxinus excelsior* and a developed understorey of scrub and ground flora. The site is located within the same groundwater body as the proposed development site. However, these habitats are not groundwater dependent and are not considered to be within the Zone of Influence. Therefore, Ballycore Rath is not considered further in this report.

Oak Park is located 7.3 km from the proposed development site and consists of an artificial pond bounded by woodlands. There are eight small islands with coniferous and deciduous trees (NPWS 2009d). The site is considered to be of regional and local value to birds and supports a variety of breeding and wintering species. Oak Park is within the same catchment of the proposed development site, but in a separate sub-catchment and has no direct surface water connectivity. Given the proximity and the location, the site is within the Zone of Influence to be impacted via land and air pathways. **Therefore, Oak Park is considered further in this report.**

7.2.4 Impact Assessment Method

Habitats and species were assessed in accordance with the guidance contained in the document Guidelines for Ecological Impact Assessment for the United Kingdom and Ireland (CIEEM 2018) which recommends that the value of an ecological resource be determined within a defined geographical context.

Defining importance: The relative importance of each ecological feature has been defined on a geographical scale, from international importance, to having relevance only in the context of the Site boundary. The definitions employed for the basis of the evaluation are presented in

Table 7-3. It should be noted that professional judgement has been employed in the allocation of a level of importance to each feature as it occurs on the Site. In other words, the value of the feature is presented in the context of its actual status within the Site. Therefore, a single individual of a species which is protected under the EU Habitats Directive would not automatically be of European (international) Importance but would be evaluated in the context of its relationship to the overall population.

Defining impact: The impacts to ecological features are defined by their geographical significance in terms of the likely effect and the defined importance of the feature being affected. It is not possible in this system to have an impact greater than the overall geographical importance of the feature (e.g. the maximum possible impact to a feature of regional importance would be one which is of regional significance). Impacts which do not have significance beyond the immediate area (the Site) will be managed through the implementation of construction and habitat management plans. One exception to this is the case of impacts on Protected Species, where any impact would result in the implementation of mitigation measures.

Defining Magnitude of Change: Considering the potential for impacts as defined above, an assessment of the magnitude of change established. This is based on the table below and relies on professional subjective judgement in deciding the level of magnitude of change.

Table 7-2 Criteria for Assessing Magnitude of Change

Impact Level	Description
Severe Impact	Ecological effects of a scale or magnitude which would result in permanent, total loss of an irreplaceable species or habitat of international or national importance (occasionally of local importance), or which would result in the substantial loss of a protected/rare habitat or a population of a protected/rare species. They represent key factors in the decision-making process. Typically, mitigation measures would be unlikely to remove such effects.
Major Impact	These effects are likely to relate to permanent impacts at a regional or local level, or temporary impacts at an international or national level, and could be potential concerns to the project depending upon the relative importance attached to the issue during the decision-making process. The effects are likely to be large in scale or magnitude and result in substantial medium term loss of protected/rare species or habitats. Mitigation and detailed design work are unlikely to eliminate all ecological effects.
Moderate Impact	These effects are usually only at local or regional level, and may be short or medium term only, or temporary impacts on a small part of an international site. However, the cumulative effects of such issues may lead to an increase in the overall effect on ecological features. They represent issues where effects will be experienced, but mitigation measures and detailed design work may ameliorate/enhance some of the consequences upon affected interests, but some residual effects will still arise.
Minor Impact	These effects are likely to be local issues only; or small magnitude impacts at the regional and national level, they are usually temporary, and are unlikely to be of importance in the decision-making process. However, they are of relevance in enhancing the subsequent design of

Impact Level	Description
	the development and consideration of mitigation measures.
Not Significant / No Impact	No perceivable impacts on ecological features (habitat or species). Impacts may be beneath levels of perception, within normal bounds of variation, within the margin of forecasting error, or impacting on exceptionally poor baseline conditions.
Beneficial / Positive Impact	These effects are those, which through implementation, would be anticipated to benefit the ecology of the Site. They may advance the objectives of local, national or international species or habitats.

Outlining mitigation, compensation and enhancement measures: Receptors subject to significant impacts (those which have the potential to affect the ecological resource outside of the immediate Site boundary) are the focus of provision of mitigation measures which have been formulated according to the mitigation hierarchy (avoid, reduce / minimise, compensate). All proposed mitigation measures follow industry best practice. Those for protected species follow the prescribed regulatory protocols.

Defining residual impact: Following the application of mitigation measures, impacts to each ecological feature are reassessed, and any residual impacts are reported.

As stated by the (CIEEM 2018), 'the value or potential value of a feature/receptor should be determined within a defined geographical context'. Accordingly, each feature has been assessed based on the scale described in

Table 7-3 below.

Table 7-3 Criteria for Establishing Receptor Sensitivity/Importance

Importance	Ecological Valuation
International	Sites, habitats or species protected under international legislation e.g. Habitats and Species Directive. These include, amongst others: SAC's, SPA's, Ramsar Sites, Biosphere Reserves, including sites proposed for designation, plus undesignated sites that support populations of internationally important species.
National	Sites, habitats or species protected under national legislation e.g. Wildlife Act 1976 and amendments. Sites include designated and proposed NHAs, Statutory Nature Reserves, National Parks, plus areas supporting resident or regularly occurring populations of species of national importance (e.g. 1% national population) protected under the Wildlife Acts, and rare (Red Data List) species.
Regional	Sites, habitats or species which may have regional importance, but which are not protected under legislation (although Local Plans may specifically identify them) e.g. viable areas or populations of Regional Biodiversity Action Plan habitats or species.
Local/County	Areas supporting resident or regularly occurring populations of protected and red data listed-species of county importance (e.g. 1% of county population), Areas containing Annex I habitats not of international/national importance, County important populations of species of habitats identified in county plans, Areas of special amenity or subject to tree protection constraints.
Local	Areas supporting resident or regularly occurring populations of protected and red data listed-species of local importance (e.g. 1% of local population), Undesignated sites or features which enhance or enrich the local area, Sites containing viable area or populations of local Biodiversity Plan habitats or species, local Red Data List species etc.

7.3 Baseline Environment

7.3.1 Natura 2000 sites

The three Natura 2000 sites identified as occurring within the 15km of the proposed development site are:

- River Barrow and River Nore SAC (002162)
- Slaney River Valley SAC (000781)
- Holdenstown Bog SAC (001757)

Further details on the specific conservation interests of these sites, along with an outline of the potential effects, have been addressed in the accompanying AA Screening report (JBA 2020a) and NIS report (JBA 2020b).

7.3.2 Natural Heritage Areas

There are no Natural Heritage Areas located within the ZoI of the proposed development site. However, two of the proposed Natural Heritage Areas are within the ZoI, which are:

- Corballis Hill (001389)
- Oakpark (000810)

7.3.3 Habitat assessment

This Section describes the site ecological conditions present on site during the time of survey. The site is a brownfield site of a worked-out quarry, which has previously been used for motorcycle racing. The ground is disturbed, consisting mostly of bare, exposed soil mixed with areas of recolonising vegetation. Trees and scrub bound three sides and the existing access road bounds one side. Adjacent land to the site is composed of agricultural fields. The main habitats recorded are listed in

Table 7-4 and shown in Figure 7-4.

Table 7-4 Habitats recorded at the proposed site.

Habitat code	Habitat
WL2	Treelines
ED1	Exposed sand, gravel or till
ED3	Recolonising bare ground
ED1/ED3	Exposed sand, gravel or till/ Recolonising bare ground
WS1	Scrub
WS1/GA1	Scrub/Improved agricultural grassland
FL8	Other artificial lakes and ponds
FS1	Reed and large sedge swamps
FW4	Drainage ditches
FW2	Depositing/lowland rivers
GA1	Improved agricultural grassland
BL3	Buildings and artificial surfaces
BC1	Arable crops

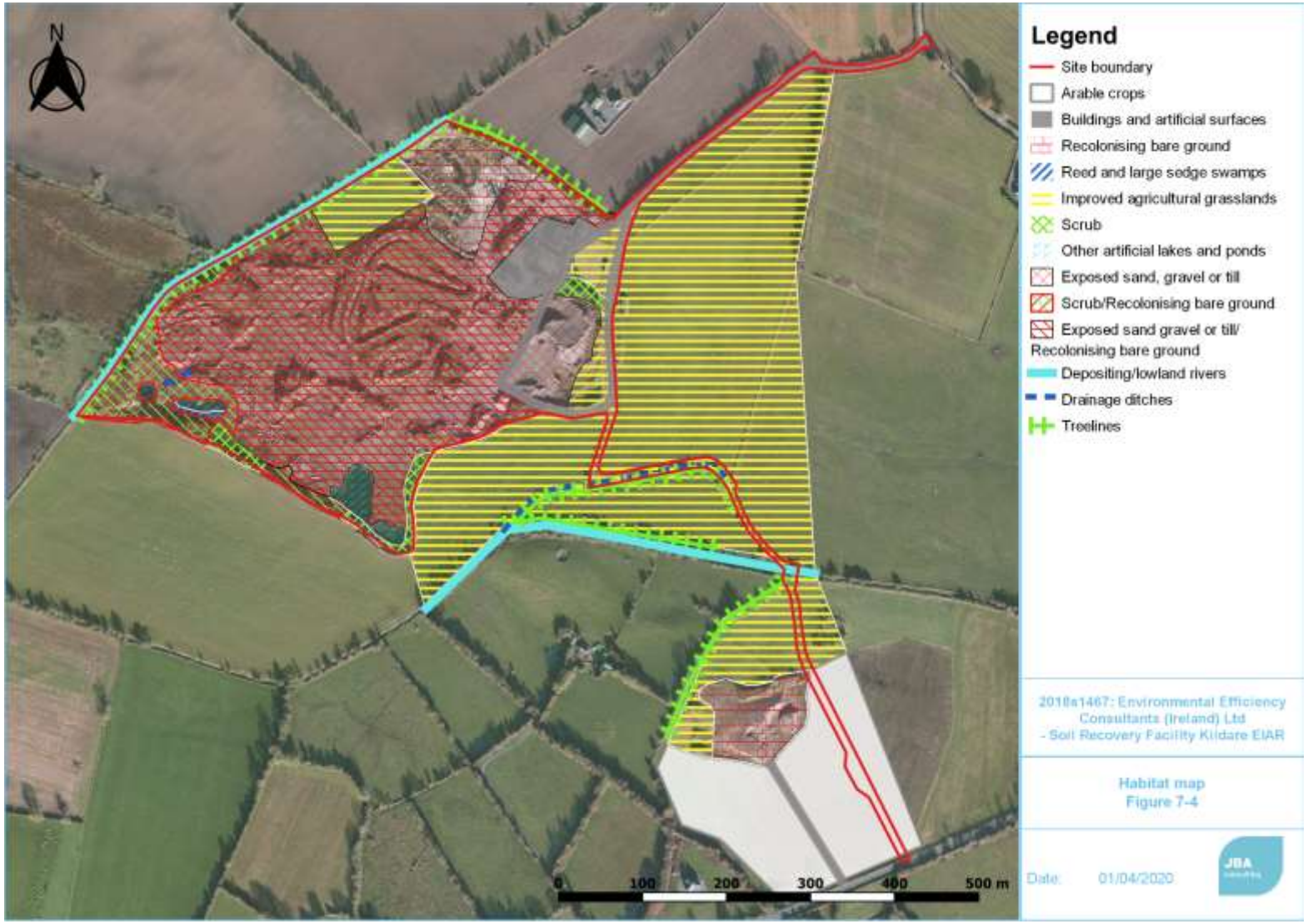


Figure 7-4 Habitats at Graney West quarry

WL2 - Treelines

The north and western site boundaries are defined by treelines (Figure 7-5), located on a higher ground due to the excavations in the quarry. Dominating species are Hawthorn *Crataegus monogyna and* Ash *Fraxinus excelsior* covered with Ivy *Hedera hibernica*, some Willows *Salix* spp., Roses *Rosa* spp. and Brambles *Rubus fruticosus* agg are also present. Some of the trees are mature. Along the western side of the treeline, outside the site boundary, runs an open stream in a north-south direction.

Figure 7-5 Treeline along the western boundary.

ED1 - Exposed sand, gravel or till

In the worked-out quarry there are still areas that are relatively disturbed with no colonising vegetation. The main area is in the east of the site, next to the farmyard where all the machinery is kept. The bare ground is made up of sand and gravel with some larger boulders as well.

ED3 - Recolonising bare ground

The north part of the proposed site, which has also been excavated, is starting to get recolonised by vegetation. Recolonising bare ground is also found in the south east of the worked-out quarry, where excavations have previously been made. Vegetation such as Docks *Rumex* spp., Willowherbs *Epilobium* spp, Thistles *Cirsium* spp., Colt's-foot *Tussilago farfara*, Great Mullein *Verbascum thapsus*, mosses and some dandelions *Taraxacum officinale* agg. are mixed with gravel and stones.

ED1/ED3 - Exposed sand, gravel or till/Recolonising bare ground

The main part of the proposed site is the worked-out quarry itself. The ground has been excavated and the surrounding banks are several meters high. The ground is hilly and there is a matrix of exposed ground and areas being recolonised by vegetation (Figure 7-6). The exposed sand and gravel mainly occur in the tracks from where motorcycle racing has taken place, while vegetation is recolonising the surrounding ground. The vegetation includes Gorse *Ulex europaeus*, Docks and Willowherbs.

Figure 7-6 Exposed sand and patches of recolonising bare ground.

WS1 - Scrub

In the south part of the proposed site a 3-5 m has been left untouched during the excavations of the quarry. An extensive area is dominated by scrub with the potential to support nesting and feeding habitat for birds (Figure 7-7). Dominating species are Gorse and Bramble, but also some Willows and Hawthorn occur. Mammal tracks are visible in the scrub.

Figure 7-7 Scrub in the south end of the site.

WS1/GA1 - Scrub/Improved agricultural grassland

Next to the scrub habitat there is a matrix of scrub and improved grassland as the grassland is transitioning into scrub. There are scattered Gorse and Willows, the field layer includes Docks, Cock's Foot, Dandelions, Ribwort Plantain *Plantago lanceolata*, Germander Speedwell *Veronica chamaedrys*, Red Dead-nettle *Lamium purpureum*, mosses and grasses.

FL8 - Other artificial lakes and ponds

Within the site there are two artificial ponds in the south west corner and there is one more pond located outside the site boundary in the south est. These ponds have been created with relation to the quarry. They have a natural shape and wetland vegetation along the edges, such as Common Reed *Phragmites australis*, Bulrush *Typha latifolia*, Rushes *Juncus spp*. Willows, Alder *Alnus glutinosa* and Birch *Betula pubescens*.

FS1 - Reed and large sedge swamps

There is a small wetland area that is connected to the pond outside the site boundary, just below the bank in the south. Species include Common Reed and Bulrush.

FW4 - Drainage ditches

A drainage ditch of approximately 40 m with running water is feeding into the ponds in the south west (Figure 7-8). In water vegetation consists of Watercress *Rorippa nasturtium-aquatica* and Horsetails *Equisetum* spp. Along the banks there are some Willowherbs and grasses.

Figure 7-8 Drainage ditch.

FW2 - Depositing/lowland rivers

South of the worked-out quarry runs the River Graney, which is a depositing/lowland river with little instream vegetation occurring (**Error! Reference source not found.**), such as Yellow Iris *Iris P seudacorus* and Fool's-water-cress *Apium nodiflorum*, and intermittent treeline of immature Willows and occasional Elder *Sambucus nigra* along the bank.

Figure 7-9 River Graney located south of the worked-out quarry.

GA1 - Improved agricultural grassland

In the north west there is an area of improved grassland bordering to the treeline in the west. The area is fenced off and grazed by horses at the time of the survey. The proposed access route in the south east will run along fields of improved grassland.

BL3 - Buildings and artificial surfaces

There are a couple of farm buildings and a farmyard in the north. The existing access road to the site splits up in two, where one road connects to the farmyard and the other road goes along the north east boundary and enters the site at the middle of the east border.

BC1 - Arable crops

The proposed access route is crossing an arable field in the south east, with an existing agricultural track.

7.3.4 Dedicated Species Surveys

7.3.4.1 Sand Martin

Sand Martin *Riparia riparia* is an amber-listed species in Birds of Conservation Concern in Ireland and protected under the Wildlife Acts, 1976 & Wildlife (Amendment) Act, 2000. Sand Martins form colonies and breed in burrows dug into riverbanks or quarries in rural areas.

Sand Martins have been recorded nesting in the site during a previous survey undertaken in 2006. JBA carried out a preliminary survey on the 8th of March 2019 and potential nesting sites were located at four places in the south end of the quarry where burrows were found in the sand banks (Figure 7-12). A dedicated Sand Martin survey was then carried out on the 11th of June 2019. The survey found that one of the four sites is not suitable for nesting Sand Martins due to erosion and collapsing burrows. The survey confirmed that one of the sites is occupied by nesting Sand Martins. The bank holds 33 potential burrows of which four were identified to be occupied during the time of survey (Figure 7-10).

Several individuals of Sand Martins were observed in flight during the survey.

Figure 7-10 Sand bank with nesting Sand Martins.

7.3.4.2 Bats

All Irish bats species are protected under the Wildlife Act (1976) and Wildlife Amendment Act (2000). Also, the EU Habitats Directive, seeks to protect rare species including bats and their habitats and requires that appropriate monitoring of populations be undertaken. Across Europe, they are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats.

The key locations of importance that bats may use for commuting and foraging along the study area include waterbodies, watercourses, treeline, and hedgerows. Additional habitats include areas of woodland, scrub, scattered trees. Older, mature trees in the area also offer roosting opportunities for bats. Some of these and indeed younger trees also have Ivy cover which may also be used for roosting by bats.

A preliminary ground level daytime assessment of bat roost suitability was carried out on the 8th of March 2019. The survey included the identification of potential roosts and access points on trees within the site boundary from ground level. Eleven trees in the treelines bordering the site in the north and west, and the treeline to the south east bordering the proposed access route, showed a low/moderate bat roost potential. The trees were generally mature Ash and Hawthorne with features including thick Ivy growth and on some of the tree crevices were recorded.

The treelines have a high suitability as commuting and foraging habitats for bats as they are connected to the wider landscape of rivers and treelines/hedgerows.

7.3.4.3 Otter

Otters *Lutra lutra* are protected under the Wildlife Act (1976) and Wildlife Amendment Act (2000) and is also listed on Annexes II and IV of the EU Habitats Directive. Otters are found along watercourses and lakes throughout Ireland.

A dedicated Otter survey was undertaken on 8th March 2019. The survey included identification of suitable habitats and presence of otters in the area (Figure 7-11). There are two watercourses close to the proposed site, River Graney in the south and a tributary of River Graney directly west of the site boundary. Otter spraint was found along River Graney close to the proposed crossing of the access route, indicating that the river is used by otters. River Graney connects to River Lerr which is part of River Barrow and River Nore SAC.

7.3.4.4 Badger

Badgers *Meles meles* are protected under the Wildlife Act (Wildlife Act 1976; Wildlife Amendment Act 2000). Badgers favour agricultural and woodland mosaics but can be found in various habitats. There is evidence of badger present within the proposed development site.

A dedicated badger survey was undertaken on 8th March. As had been noted during the habitat walkover survey in January 2019, badger setts were observed within the south western boundary of the site (Figure 7-11).

Out of seven burrows, two of the sett entrances showed signs of recent activity and snuffle holes were found at various locations along the boundary. Location of the entrances are highlighted in the Figure 7-12.

Figure 7-11 Entrance to badger sett found in the south west corner of the site.

Figure 7-12 Ecological features within the proposed development site.

7.3.5 Aquatic Habitat - On and Off Site Receptors

The River Graney is located approximately 100 m south of the proposed site flowing in an east-west direction. There are several small tributaries to River Graney within the vicinity, of which one runs directly outside the western border to the site. River Graney is feeding into River Lerr which is located approximately 1800 m west of the proposed site, passing through Castledermot town, running in a north-south-west direction feeding into River Barrow and is part of River Barrow and River Nore SAC (EPA 2018a). No aquatic receptors were observed as being present during the surveys, however, connectivity to the River Graney will likely occur during periods of higher flow. At these times, mobile species including Otter, riparian birds and fish may use the River Graney and be subject to any potential impacts that may occur. Figure 7-13 below highlights the site location relative to the water body concerned.

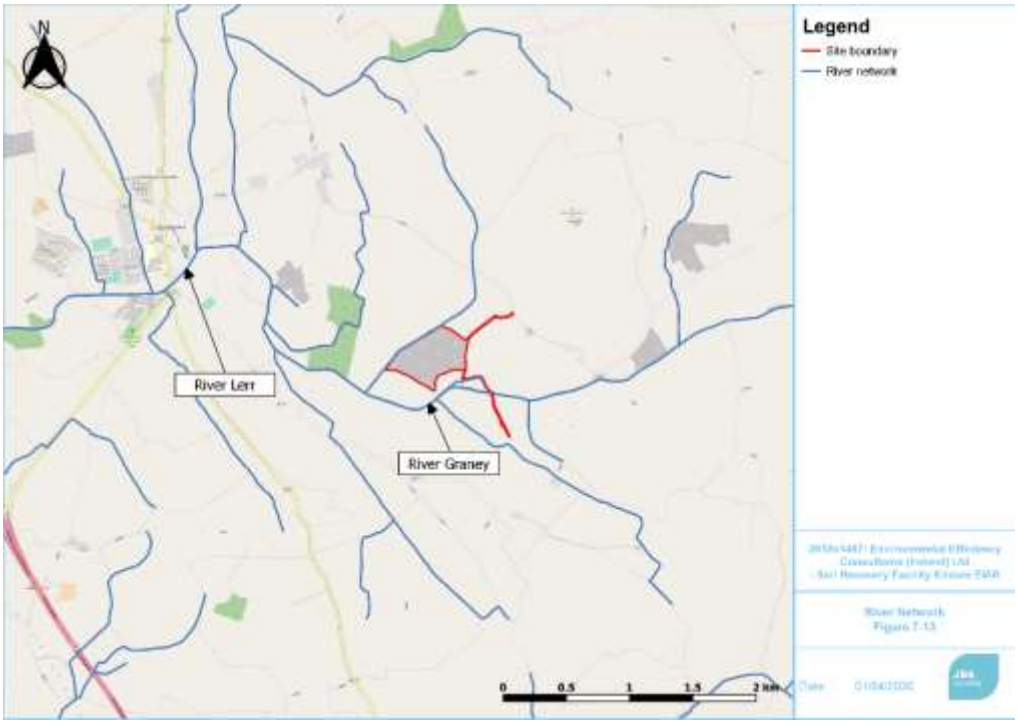


Figure 7-13 Watercourses adjacent to the proposed site (Source: EPA 2018b)

7.3.6 Water Framework Directive

In response to the increasing threat of pollution and the increasing demand from the public for cleaner rivers, lakes and beaches, the EU developed the Water Framework Directive (WFD). This Directive is unique in that, for the first time, it establishes a framework for the protection of all waters including rivers, lakes, estuaries, coastal waters and groundwater, and their dependent wildlife/habitats under one piece of environmental legislation for all European member states.

The WFD (Directive 2000/60/EC) is a substantial piece of EU water legislation that came into force in 2000. The overarching objective of the WFD is for the water bodies in Europe to attain Good or High Ecological Status. The Environment Protection Agency (EPA) is the competent authority in Ireland responsible for delivering the WFD. River Basin Management Plans (RBMP) have been created which set out measures to ensure that water bodies in the country achieve 'Good Ecological Status'.

Good Ecological Quality will depend on the quality of the individual quality elements on which the Ecological status is scored; namely the biological, chemical and morphological condition in a particular water body. Any reduction in any of these elements will result in a reduction of the overall ecological status.

7.3.6.1 Water Framework Status and Objectives

The National cycle 2 (2018-2021) Management Plan for WFD is now in force (DoHPLG 2018). The plans objectives hold the following points as its overarching aims:

- Prevent deterioration and maintain a high status where it already exists;
- Protect, enhance and restore all waters with aim to achieve at least good status by 2015;
- Ensure waters in protected areas meet requirements; and
- Progressively reduce chemical pollution.

Regardless of their current quality, surface waters should be treated the same in terms of the level of protection and mitigation measures employed, i.e. there should be no negative change in status (refer below).

The Application Site is located within the Water Framework Directive (WFD) catchment area for the Barrow, and WFD sub-catchment area Lerr_SC_010 (EPA 2018b).

7.3.6.2 Surface Water Body Status

The water body which runs adjacent to the proposed site is a tributary to the River Graney (WFD waterbody Graney (Lerr)_020), which is currently classified as of 'Moderate' WFD status. Specifically, this water body was classified as Moderate due to the Moderate status of Bio and of Invertebrates. The River Graney is identified as being "At risk" and is one amongst 190 prioritised areas for action where collaboration between the Government and the dairy industry aims to promote best agricultural practice in order to address existing environmental pressures (DoHPLG 2018). The main pressures upon the sub-catchment (Lerr_SC_010) are agriculture (pasture) and channelization of rivers (EPA Catchments Unit 2018).

The proposed works will need to ensure that they can support the WFD aims of status improvement and do not contribute to any reduction in status.

7.3.6.3 Groundwater Body Status

The groundwater body which underlies the proposed site location is the New Ross groundwater body (Code IE_SE_G_152). The New Ross groundwater body underlies the entire site and is described as 'Generally unproductive bedrock except for Local Zones'. Its current WFD status is classed as 'Good'.

The proposed activities will need to ensure that the proposed works will have no negative effect on these water bodies and will support their maintaining 'Good' status into the future.

7.3.7 Flora and Fauna Assessment (Desk Study)

The National Biodiversity Data Centre holds some records of protected and notable species within the desk study search area (2 km grid square S88B and S88C). In terms of protected species, no fauna has been recorded in these grid squares within the last 5 years.

On the 10 km squares (S78 and S88), protected species that have been recorded include Badger Otter, Hedgehog *Erinaceus europaeus*, Common Frog *Rana temporaria* and several species of birds such as Starling *Sturnus vulgaris*, House Sparrow *Passer domesticus*, Mute Swan *Cygnus olor*, Whooper Swan *Cygnus cygnus*, Common Coot *Fulica atra*, Common Kestrel *Falco tinnunculus*, Kingfisher *Alcedo atthis*, Common Linnet *Carduelis cannabina*, Pheasant *Phasianus colchicus*, Swift *Apus apus*, Wood Pigeon *Columba palumbus*, Great Cormorant *Phalacrocorax carbo*, Little Egret *Egretta garzetta*, Spotted Flycatcher *Muscicapa striata*, Water Rail *Rallus aquaticus* and Yellow Hammer *Emberiza citrinella*.

There are no Flora Protection Order Species recorded as being present on the National Biodiversity Data Centre's 2km grid squares for the site.

These freely available desk study results should not be considered definitive data sets for the desk study area. An absence of desk study data does not necessarily indicate that a site is absent of notable flora or fauna.

7.3.8 Flora Assessment

There were no Flora Protection Order (FPO) species recorded during the field survey.

7.3.9 Fauna assessment

The presence, or potential presence, of species on the Site was identified from the desk study and habitat survey. Table 7-5 lists the species which were considered likely to occur within the proposed site, on the basis of the presence of suitable habitat and/or the occurrence of recent records in the vicinity. The species, together with its legislative designation are listed. The source(s) of information relating to each species could include:

- Existing records from desk study;
- Presence of suitable habitat identified during the walkover survey; and / or
- Direct observation during species specific surveys.

For each species with the potential to occur on Site, the final column of Table 7-5 presents a brief summary of the status of the species in relation to the Site itself. If the survey fails to record the species and the habitats are unsuitable, then it is concluded that the species is unlikely to occur, and it is not considered further within the assessment. If a species is confirmed as present, an indication of the likely population size/status within the Site is provided. This information is used in the evaluation presented in Table 7-6

Table 7-5 Status of potential receptors (fauna) at the proposed works site

Species/Group	Status	Source	Summary of status on site
Badger	Wildlife Acts (1976 – 2010)	Survey (Presence confirmed)	The Site periphery is suitable for foraging and the south west corner of the Site hold one confirmed active sett.
Fox	-	Survey (Presence confirmed)	The Site periphery is suitable for foraging and scatt was present at several places within the Site.
Rabbit	-	Survey (suitability)	Potential to occur within the Site.
Irish Hare	Wildlife Acts (1976 – 2010)	Survey (suitability)	Potential to occur within the Site.
Otter	Wildlife Acts (1976 – 2010) – EU Habitat Directive.	Sub-optimal - Survey (suitability)	Unlikely to occur within the Site owing to a lack of aquatic resource for this species. Spraint found along surface water features that crossed by the proposed access road to the Site.
Stoat	Wildlife Acts (1976 – 2010)	Survey (suitability)	Potential to occur within the Site
Hedgehog	Wildlife Acts (1976 – 2010)	Survey (suitability)	Potential to occur within the Site
Red Squirrel	Wildlife Acts (1976 – 2010)	Sub-optimal - Survey (suitability)	No available resource (mixed woodland). Not considered further within this assessment.
Pygmy Shrew	Wildlife Acts (1976 – 2010)	Survey (suitability)	Potential to occur within the Site.
Bats	Wildlife Acts (1976 – 2010) – EU Habitat Directive.	Survey (suitability)	Some good foraging habitat was observed within the Site. Trees on the Site periphery exhibit low-medium (Collins, 2016) bat roosting potential.
Breeding Birds	Wildlife Acts (1976 – 2010), EU Birds Directive,	Survey (suitability) Ecological	Sand Martin are present within the site and are nesting in burrow of a sand bank in the south of

Species/Group	Status	Source	Summary of status on site
	Birds of Conservation Concern (BoCC3, Ireland).	walkover survey (direct observation)	the worked-out quarry, within the area to be backfilled. Breeding birds are also likely to occur in areas of treeline vegetation and scrub within the site boundaries, which provides good cover and foraging opportunity.
Riparian Birds	Wildlife Acts (1976 – 2010), EU Birds Directive, Birds of Conservation Concern (BoCC4, Ireland).	Survey (suitability) Ecological walkover survey (direct observation)	Low suitability of habitat for riparian birds present within the Site. Potential to utilise the artificial ponds in the south part of the Site.
Aquatic Fauna	Salmonids, Wildlife Acts (1976 – 2010) – EU Habitat Directive.	Desk Study	Unlikely to occur within the Site owing to a lack of aquatic resource for these species. Potential to utilise surface water features that are hydrologically connected to the Site.
Other Taxa	Lepidoptera / Odonata	Sub-optimal - Survey (suitability)	Potential to utilise surface water features within the Site, artificial ponds in the south part of the Site.

3 Colhoun, K. & Cummins, S. (2013) Birds of Conservation Concern in Ireland 2014–2019. Irish Birds 9: 523–544.

4 Colhoun, K. & Cummins, S. (2013) Birds of Conservation Concern in Ireland 2014–2019. Irish Birds 9: 523–544.

7.3.10 Invasive Species

An invasive species survey was carried out on the 8th of March. The non-native invasive species Butterfly-bush *Buddleja davidii* was found at several locations within the proposed site during the site surveys. The Butterfly-bush is rated as a Medium Impact invasive species. Japanese Knotweed *Reynoutria japonica* was found at one location within the site, at the north access road to the site, composed of one stand covering an area of approximately 1.5x1.5m. The locations of the invasive species are indicated in Figure 7-12. Japanese Knotweed is a High Impact species and listed in the Third Schedules of the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011) and in Section 52(7) and (8) of the Wildlife Act, 1976, as amended. These legislations make it an offence to plant, disperse or otherwise cause it to grow in a wild state. Thus, an invasive species management control plan needs to be implemented.

No invasive or alien species have been recorded being present in the relevant NBDC 2 km grid squares.

7.3.11 Evaluation

The evaluation of ecological features (habitats and species) which could be affected by the Project proposals are presented in

Table 7-6 and Table 7-7. The tables include:

- Any statutory designated areas, with the exception of Natura 2000 sites, which are situated within 15 km of the Project Site that have potential ecological connection(s) with the Site;
- Any surface or groundwater bodies that have hydrological connectivity with the Site;
- Any habitat type recorded within the Site; and
- Any species of conservation importance which has been confirmed as occurring within the Site.

The value of the feature is defined with reference to the geographical context of the scheme i.e. the specific importance of the scheme to each of the habitats or protected species populations identified as being present within it or making use of it. This assessment of value is based on the condition of the site during the survey period, although, where information is available, reference is made to these. The evaluation takes into account any statutory or non-statutory conservation status, its extent (or population size) within the Site compared to the resource elsewhere and whether it has characteristics which either elevate or depress its importance in comparison with a 'typical' example (for example, whether a habitat is particularly species rich, or depleted in species). Common and widespread species or habitats, therefore, only have a level of importance in respect to the biodiversity of their immediate area (taken in this case to be represented by the boundary of the Site).

Some protected species may, under certain circumstances (such as a single example occurring within the Site, as part of a much larger local population) be considered to only be of importance within the Site itself. Such species, on the basis of legal and planning regulation compliance, are included within the Impact Assessment and, (if necessary) dedicated impact mitigation measures are provided. Table 7-5, Table 7-6 and Table 7-7 presents each feature occurring, together with the rationale for its evaluation.

The following geographic frame of reference (NRA 2009b) has been used when determining value:

- International importance;
- National importance;
- County importance (or vice-county in the case of plant or insect species);
- Local importance (higher value); and
- Local importance (lower value).

Table 7-6 Classifying the Geographical Importance of Key Ecological (Habitat) Features

Key Ecological Features	Importance	Rationale
Treelines	Local	No land take will occur to this habitat. This habitat is of importance for bird species and breeding birds in particular. Additionally, several trees on the site are of low/medium bat roosting potential and should be treated in accordance with statutory guidelines and specific expert recommendation for the site. This feature (habitat) is carried forward into the design mitigation and impact assessment sections.
Exposed sand, gravel or till	Site	Permanent land take will occur to this habitat. The exposed banks in the south of the site provides habitat for the nesting Sand Martin population. This feature (habitat) is carried forward into the design mitigation and impact assessment sections.
Recolonising bare ground	Site	This resource offers negligible biodiversity value. Not considered further in this assessment.
Scrub	Local	Scrub, located on the south border of the development site, provides habitat for the resident badger population and is likely to provide cover for foraging and nesting birds. This feature (habitat) is carried forward into the design mitigation and impact assessment sections.
Other artificial lakes and ponds	Site	Permanent land take will occur to this habitat. This resource in itself is of

Key Ecological Features	Importance	Rationale
		relatively low biodiversity value. The habitat is not considered further in this assessment.
Reed and large sedge swamps	Site	Permanent land take will occur to this habitat. This habitat provides foraging for water birds and cover for aquatic invertebrates. This feature (habitat) is carried forward into the design mitigation and impact assessment sections.
Drainage ditches	Site	This resource in itself is of relatively low biodiversity value. The habitat is not considered further in this assessment.
Improved agricultural grassland	Site	This resource offers negligible biodiversity value. Not considered further in this assessment.
Depositing/lowland rivers	Local	This habitat is of importance for Otters and aquatic fauna. This feature (habitat) is carried forward into the design mitigation and impact assessment sections.

Table 7-7 Classifying the Geographical Importance of Key Ecological (Faunal) Features

Key Ecological Features	Importance	Rationale
Aquatic Fauna	Regional	Hydrological connectivity occurs between the Site and River Barrow catchment. This feature (species group) is thus carried forward into the design mitigation and impact assessment sections.
Otter	Regional	Hydrological connectivity occurs between the Site, The River Graney and the River Lerr. This feature (species) is thus carried forward into the design mitigation and impact assessment sections.
Badger	Site	The Site supports a population of Badgers - chiefly in the south west area. It is considered likely that this species will be affected by unmitigated development activity. This feature (species) is thus carried forward into the design mitigation and impact assessment sections.
Irish Hare	Site	The Site exhibits some sub-optimal foraging and commuting habitat. This feature (species) is carried forward into the design mitigation and impact assessment sections.
Small	Site	The peripheral Site supports suitable foraging and

Mammal Group		commuting habitat. This feature (species group) is carried forward into the design mitigation and impact assessment sections.
Bats	Local	The Site supports suitable foraging and commuting habitat. Some low potential roosting habitat may be available on the Site periphery (mature trees). This feature (species group) is carried forward into the design mitigation and impact assessment sections.
Breeding Birds	Site	A confirmed sand martin colony is present on site. This species is carried forward to the mitigation and impact assessment sections. The Site treelines and scrub are likely to support a number of common and widespread bird species. This species group (breeding birds) is carried forward into the design mitigation and impact assessment sections.

7.4 Impact Assessment

Impacts associated with the proposed development have been defined and their significance assessed in relation to their implications on ecological features, defined in terms of their geographical extent (Table 7-5).

The key construction and operational impacts assessed are:

- Disturbance to habitats and species;
- Habitat loss;
- Species loss; and
- Impacts on water quality and quantity.

Potential direct and indirect impacts from water quality and quantity that are discussed in further detail below include those that may occur to important aquatic habitats and species in the zone of influence of the development site.

7.4.1 Do Nothing Scenario

If the proposed development application to backfill and restore the quarry was not to go ahead, it is likely that the current regime of management of the land will continue as currently.

7.4.2 Construction Phase

7.4.2.1 Proposed National Heritage Area

The potential for ecological impact to the pNHAs Corballis Hill (001389) and Oakpark (000810) may occur via dust release during the construction phase. The works could result in degradation of the following habitats through the dust deposition: deciduous woodland, coniferous and deciduous woodland and wetland.

Characterisation of Unmitigated Impact on the Feature

The characterisation of unmitigated impacts uses the 'worst case' impact magnitude scenario in all cases. Impacts could be direct, indirect and/or cumulative, e.g. dust release from other projects nearby. The proposed works would have a not significant impact on Oakpark pNHA and Corballis Hill pNHA.

Rationale for prediction of effect

The prevailing wind in the area is predominantly south-west. This gives that Oakpark pNHA, which is located in south west, is not likely to receive dust emission from the proposed site. Given the close distance to Corballis Hill pNHA, which is located north of the site, there is a potential for dust emissions to be transported to the pNHA. However, the habitats as Corballis Hill pNHA (mainly deciduous woodland) are not sensitive to dust and any emissions reaching the site would be non-significant.

Effect without Mitigation

The unmitigated effect to this development would result in no significant impacts to habitats of local importance. Therefore, no mitigation measures are needed.

7.4.2.2 Aquatic Fauna and Otter

The potential for ecological impact to receiving surface and groundwater receptors, in the absence of mitigation focuses on the following factors:

- Groundwater effects;
- Surface water effects;
- Direct effects on the adjacent streams south and west of the site, River Graney and River Lerr, including water quality deterioration due to release of discharge from site containing high levels of sediment, or due to accidental spills and possible knock-on effects on aquatic species that are reliant on high water quality.
- Pollution spills – potential oil, fuel or other pollutant spillages may to impact aquatic animal species within receiving waters, causing mortality or other sub-lethal effects such as reduced juvenile recruitment rates and / or juvenile survival;
- Sedimentation - deposition of silt can smother fish eggs, fry and benthic macroinvertebrate communities (food sources for fish and crayfish);
- Other indirect impacts may occur on species that forage in the River such as Otter;
- Otter prey species have specific water quality requirements and any decline in water quality in the River Graney or River Lerr could have indirect impacts on the Otter populations using the area;
- Increased macrophyte and algal growth – oxygen depletion, alteration of invertebrate/fish populations which serve as food sources, vegetation changes causing alterations to fish habitats;
- Impacts of dust and site runoff (sediments, fuel, etc.); and
- Impacts on groundwater from site extraction runoff and runoff at closure.
- Potential Release of Hydrocarbons / Chemicals;
- Potential Release of Cement-Based Products; and
- Groundwater and Surface Water Contamination from Wastewater Disposal.

Accidental spillage during refuelling of plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated freshwater and terrestrial ecosystems. Hydrocarbon compounds are highly toxic to all flora and fauna, including fish, and does not break down readily in the environment. Chemicals such as paints and detergents also pose a threat to the aquatic environment.

Otters are found to be present at River Graney and additional potential ecological impacts that may occur during the construction phase are likely to be due to construction of the new road that will cross River Graney. This could have a negative impact on the otter population, causing habitat fragmentation or mortalities on the road.

Characterisation of Unmitigated Impact on the Feature

The characterisation of unmitigated impacts uses the 'worst case' impact magnitude scenario in all cases. Impacts could be direct, indirect and/or cumulative e.g. release of suspended solids over time. Impacts would potentially be mitigated by dilution e.g. hydrocarbon spills and effects could be considered to be reversible depending on the severity of a pollution incident.

The building of new road could result in fragmentation of otter habitat and direct mortality of individuals. It is considered that this can have a medium to long-term moderate negative impact on otter at a local level.

Rationale for Prediction of Effect

Effects to aquatic species in the absence of mitigation are focused on 'incident events' such as hydrocarbon or cement based pollution issues.

The footprint of the proposed development is considered to be close to good quality habitat, however, within the context of the landscape it forms a minor proportion of available habitats. Though, it is likely that the habitat will be fragmented and direct mortality of Otters to occur, it is considered likely that impacts on Otters due to the proposed site works could negatively affect the conservation status of the local Otter population.

Effect without Mitigation

The unmitigated effect to this development during the construction phase will result in a moderate short-term impact to species of international and regional sensitivity and importance.

7.4.2.3 Small mammal group including bats

The potential for ecological impact to the small mammal group, in the absence of mitigation focuses on the following factors:

- Constructional noise disturbance;
- Vegetation and habitat removal (Scrub, bare ground and grassland)
- Dust deposition and subsequent changes in habitat composition (changes to structural, foraging and commuting habitat).

The small and medium mammal group includes Stoat, Pygmy Shrew, Hedgehog and Irish hare.

Although this group of species are generally mobile, constructional impacts attributed to noise, vegetation removal and dust deposition must be considered. Dust which settles on

plants, can affect the plants' transpiration, respiration and other metabolic activity, by clogging pores and damaging waxy cuticles on the leaves, and by reducing available light. Dust can alter soil and water chemistry, structure and trophic status which may have impacts on the composition of plant and invertebrate communities. Dust can have direct impacts on insect and other invertebrate populations. Impacts on plant and invertebrate communities may result in effects further up the food chain (small mammals).

Bats

Potential ecological impacts to bats that may occur are likely to be through constructional disturbance. Bats that may be present at this location are likely to be accustomed to a certain level of noise and disturbance through the operation of the previously active quarry. Trees present on the site are largely immature, however, there were a few mature trees identified as having bat roost potential. The removal of mature trees would effectively also remove potential bat roosts, however no trees will be removed in relation to the proposed development. Bats are present throughout Ireland and use a variety of habitats for foraging and commuting.

Predicted impacts therefore constitute the following:

- Increased noise and human activity along commuting routes and within foraging habitats.

Characterisation of Unmitigated Impact

It is considered possible that habitat removal or modification would afford a minor negative impact on local small mammal populations. Noise effects associated with the preparation works would be temporary during diurnal parts of the day and no nocturnal noise effects are anticipated.

Rationale for Prediction of Effect (small mammals including bats)

Small mammals

The variable effects associated with constructional noise and potential habitat severance and loss at different distances from the source of disturbance, are very little understood for small to medium mammals. Habitat loss would be likely to afford a level of perceived stress and possible mortality, dependent on species mobility, though this is not certain.

Minor losses of foraging habitat and potential habitat severance is less likely to cause stress to this species group given the availability of other suitable habitat (hedgerow, grassland) within the local setting. On a precautionary basis, it is considered likely that this temporary impact could negatively affect the conservation status of the local small mammal population.

Bats

The rationale for effect to bat species considers that no bat roosts or commuting routes between foraging areas will be affected by the proposed development. The footprint of the proposed development is considered to be good in terms of foraging value however, within the context of the landscape it forms a minor proportion of available habitat and there are many treelines and hedgerows in the areas surrounding the site. It is likely that bats will use alternative foraging routes and there will not be a negative impact to the conservation status of bats in this area.

Effect without Mitigation

The unmitigated effect to this development would result in minor short-term impacts to species of high local sensitivity and importance. Small mammals such as stoat and hare are protected under the Irish Wildlife Acts (1976-2012). All bat species are protected under the Irish Wildlife Acts (1976 – 2012) and they are also listed on the EU Habitats Directive. As such, there is an identified, potential for a breach of relevant legislation.

7.4.2.4 Badger

Potential ecological impacts may occur for this resident species during the constructional phase if impacts to the badger setts or supporting habitat were to occur. Disturbance of badger setts and foraging habitat during the constructional phase could negatively affect the badger population in this area and give rise to a negative impact for the local badger population through the following mechanisms:

- Increased noise and human activity within the site during the construction of the development.

Characterisation of Unmitigated Impact

Badgers occupying the south western areas of the Site are currently active and this part of the Site is considered to hold good quality habitat for the species. It is considered that even if no sett destruction occurs, any effects to the scrub habitat could compromise the habitat quality and foraging resource for the species. Losses of foraging and breeding habitat would likely have a short-term moderate negative effect for badger at the local level.

Rationale for prediction of effect

The footprint of the proposed development is considered to be good for supporting Badger setts, however, within the context of the landscape it forms a minor proportion of available habitat (hedgerow, grassland) in the areas surrounding the site. Though, it is likely that the habitat within the Site will be lost and on a precautionary basis, it is considered likely that impacts on resident Badgers due to the proposed site works could negatively affect the conservation status of the local badger population.

Effect without Mitigation

The unmitigated effect to this feature would result in a minor short-term impact to a species of local sensitivity and importance. Badgers are protected under the Wildlife Act (Wildlife Act 1976; Wildlife Amendment Act 2000).

7.4.2.5 Breeding Birds

The potential for ecological impact to the breeding bird group, in the absence of mitigation focuses on the following factors:

- Species specific impacts on Sand Martin (see paragraph below);
- Constructional noise disturbance;
- Dust deposition and subsequent changes in habitat composition (changes to structural, foraging, breeding and commuting habitat);
- Potential effects to bird species include a negative biophysical effect to vegetation availability which may disturb breeding birds and reduce available forage.

Sand Martin

Sand Martin typically nest in colonies of exposed vertical sand and gravel, building new burrows as old ones collapse. The current quarry boundary walls and sand heaps with vertical banks provide an artificial habitat that is suitable for nest burrowing. One of the sand banks is occupied by Sand Martin currently and the species have been recorded present in the quarry historically. They are migratory species, spending winters in sub-Saharan Africa. Sand Martins in this area are likely accustomed to some level of disturbance through the usage of the quarry. The nesting area is located in the south part of the proposed site and the re-grading of the ground surface during the construction phase will result in loss on nesting habitat. The removal of the foraging habitat is likely to be minor considering the availability of suitable alternative foraging habitats surrounding the proposed development site.

Predicted species specific impacts on Sand Martin, including those general impacts described above, are likely to include:

- Loss of nesting habitat (within the proposed Site);
- Casualties of individuals

Characterisation of Unmitigated Impact

Noise, vibration and increased human presence associated with the construction works is likely to result in a disturbance impact to local breeding bird populations during the breeding season and has the potential to result in reduced breeding bird success of birds.

Sand Martin

Destruction of Sand Martin nesting habitat could result in the loss of individuals, including young of the species, if the re-grading of the surface in this part of the Site were to be carried out during the breeding season (March to September inclusive). The reduction of available nesting sites could also result in decreased breeding success. In the context of the current European-wide decline of this Amber-listed species and the availability of suitable breeding habitat, the impact could be described as long-term moderate negative. Therefore, mitigation for this loss will be required.

Rationale for Prediction of Effect

Effects to Sand Martin burrows in the existing quarry walls will be dependent on the timing of the works. Removal of the habitat adjacent to the nest holes that may occur in winter is not likely to directly impact upon this species. Total removal of this habitat will occur during the constructional phase. The loss of this habitat could result in the loss of individuals and could negatively affect the conservation status of the Sand Martin at a local geographic scale.

The disturbance caused by noise, vibration and increased human presence is unlikely to cause stress to this group, however, on a precautionary basis, it is considered likely that this temporary impact could negatively affect the conservation status of the bird population.

Effect without Mitigation

The unmitigated effect to this feature would result in a minor short to long-term impact to species of low-medium local and international sensitivity and importance. The majority of bird species, including the Amber Listed Sand Martin are protected under the Wildlife Acts (1976 – 2012) where it is an offence to hunt, interfere with or destroy their breeding or resting places unless authority is obtained via statutory licence provision.

7.4.3 Operation Phase

7.4.3.1 Proposed National Heritage Area

The potential for ecological impact to the pNHA Corballis Hill (001389) and Oakpark (000810) may occur via dust release during the operation phase. The works could result in degradation of the following habitats through the dust deposition: deciduous woodland, coniferous and deciduous woodland and wetland.

Characterisation of Unmitigated Impact on the Feature

The characterisation of unmitigated impacts uses the 'worst case' impact magnitude scenario in all cases. Impacts could be direct, indirect and/or cumulative, e.g. dust release from other projects nearby. The proposed works would have a not significant impact on Oakpark pNHA on Corballis Hill pNHA.

Rationale for prediction of effect

The prevailing wind in the area is south -west. This gives that Oakpark pNHA, which is located in south west, is not likely to receive dust emission from the proposed site. Given the close distance to Corballis Hill pNHA, which is located north of the site, there is a potential for dust emissions to be transported to the pNHA. However, the habitats as Corballis Hill pNHA (mainly deciduous woodland) are not sensitive to dust and any emissions reaching the site would be non-significant.

Effect without Mitigation

The unmitigated effect to this development would result in no significant impacts to habitats of local importance. Therefore, no mitigation measures are needed.

7.4.3.2 Aquatic Fauna and Otter

The potential for ecological impact to receiving surface and groundwater receptors, in the absence of mitigation focuses on the following factors:

- Groundwater effects;
- Surface water effects;
- Direct effects on the adjacent stream west of the site, River Graney and River Lerr, including water quality deterioration due to release of discharge from site containing high levels of sediment, or due to accidental spills and possible knock-on effects on aquatic species that are reliant on high water quality.
- Pollution spills – potential oil, fuel or other pollutant spillages may to impact aquatic animal species within receiving waters, causing mortality or other sub-lethal effects such as reduced juvenile recruitment rates and / or juvenile survival;
- Sedimentation - deposition of silt can smother fish eggs, fry and benthic macroinvertebrate communities (food sources for fish and crayfish);
- Other indirect impacts may occur on species that forage in the River such as Otter;
- Otter prey species have specific water quality requirements and any decline in water quality in the River Graney or River Lerr could have indirect impacts on the Otter populations using the area;

- Increased macrophyte and algal growth – oxygen depletion, alteration of invertebrate/fish populations which serve as food sources, vegetation changes causing alterations to fish habitats;
- Impacts of dust and site runoff (sediments, fuel, etc.); and
- Impacts on groundwater from site extraction runoff and runoff at closure.
- Potential Release of Hydrocarbons / Chemicals;
- Potential Release of Cement-Based Products; and
- Groundwater and Surface Water Contamination from Wastewater Disposal.

Accidental spillage during refuelling of plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water and associated freshwater and terrestrial ecosystems. Hydrocarbon compounds are highly toxic to all flora and fauna, including fish, and does not break down readily in the environment. Chemicals such as paints and detergents also pose a threat to the aquatic environment.

Otters are found to be present at River Graney and additional potential ecological impacts that may occur are likely to be during the operation phase through the increase of traffic crossing the river. This could have a negative impact on the otter population, causing habitat fragmentation or mortalities on the road.

Characterisation of Unmitigated Impact on the Feature

The characterisation of unmitigated impacts uses the 'worst case' impact magnitude scenario in all cases. Impacts could be direct, indirect and/or cumulative e.g. release of suspended solids over time. Impacts would potentially be mitigated by dilution e.g. hydrocarbon spills and effects could be considered to be reversible depending on the severity of a pollution incident.

The increased traffic on the new road could result in fragmentation of otter habitat and direct mortality of individuals. It is considered that this can have a medium to long-term moderate negative impact on otter at a local level.

Rationale for Prediction of Effect

Effects to aquatic species in the absence of mitigation are focused on 'incident events' such as hydrocarbon or cement based pollution issues.

The footprint of the proposed development is considered to be close to good quality habitat, however, within the context of the landscape it forms a minor proportion of available habitats. Though, it is likely that the habitat will be fragmented and direct mortality of Otters to occur, it is considered likely that impacts on Otters due to the proposed operations could negatively affect the conservation status of the local Otter population.

Effect without Mitigation

The unmitigated effect to this development during the operation phase will result in a moderate short, medium and potentially long-term (backfill of the quarry) impact to species of international and regional sensitivity and importance.

7.4.3.3 Small mammal group including bats

The potential for ecological impact to the small mammal group, in the absence of mitigation focuses on the following factors:

- Operational noise disturbance;
- Vegetation and habitat removal (scrub, bare ground and grassland)
- Dust deposition and subsequent changes in habitat composition (changes to structural, foraging and commuting habitat).

The small and medium mammal group includes Stoat, Pygmy Shrew, Hedgehog and Irish hare.

Although this group of species are generally mobile, operational impacts attributed to noise, vegetation removal and dust deposition must be considered. Dust which settles on plants, can affect the plants' transpiration, respiration and other metabolic activity, by clogging pores and damaging waxy cuticles on the leaves, and by reducing available light. Dust can alter soil and water chemistry, structure and trophic status which may have impacts on the composition of plant and invertebrate communities. Dust can have direct impacts on insect and other invertebrate populations. Impacts on plant and invertebrate communities may result in effects further up the food chain (small mammals).

Bats

Potential ecological impacts to bats that may occur are likely to be through operational disturbance and lighting disturbance. Bats that may be present at this location are likely to be accustomed to a certain level of noise and disturbance through the operation of the previously active quarry. Bats are present throughout Ireland and use a variety of habitats for foraging and commuting.

Predicted impacts therefore constitute the following:

- Increased noise and human activity along commuting routes and within foraging habitats.
- Lighting could illuminate commuting and foraging habitats.

Characterisation of Unmitigated Impact

It is considered possible that habitat removal or modification would afford a negative impact on local small mammal populations. Lighting during the hours of darkness would further reduce the quality of foraging and roosting habitat for bats and small nocturnal mammals. Noise effects associated with the backfilling of the worked-out quarry would be temporary during diurnal parts of the day and no nocturnal noise effects are anticipated.

Rationale for Prediction of Effect (small mammals including bats)

Small mammals

The variable effects associated with operational noise and potential habitat severance and loss at different distances from the source of disturbance, are very little understood for small to medium mammals. Habitat loss would be likely to afford a level of perceived stress and possible mortality, dependent on species mobility, though this is not certain.

Minor losses of foraging habitat and potential habitat severance is less likely to cause stress to this species group given the availability of other suitable habitat (hedgerow, grassland) within the local setting. On a precautionary basis, it is considered likely that this temporary impact could negatively affect the conservation status of the local small mammal population.

Bats

The rationale for effect to bat species considers that no bat roosts or commuting routes between foraging areas will be affected by the proposed development. The footprint of the proposed development is considered to be good in terms of foraging value however, within the context of the landscape it forms a minor proportion of available habitat and there are many treelines and hedgerows in the areas surrounding the site. It is likely that bats will use alternative foraging routes and there will not be a negative impact to the conservation status of bats in this area. Therefore, mitigation measures are not required.

Temporary lighting required during the infilling process could illuminate previously unlit foraging and commuting habitat making it unsuitable for bats. All proposed lighting units during the backfilling process will be switched off during key hours of emergence and foraging for bats (dusk and night-time).

Effect without Mitigation

The unmitigated effect to this development would result in minor short-term impacts to species of high local sensitivity and importance. Small mammals such as stoat and hare are protected under the Irish Wildlife Acts (1976-2012). All bat species are protected under the Irish Wildlife Acts (1976 – 2012) and they are also listed on the EU Habitats Directive. As such, there is an identified, potential for a breach of relevant legislation.

7.4.3.4 Badger

Potential ecological impacts may occur for this resident species during the operational phase if impacts to the badger setts or supporting habitat were to occur. Disturbance of badger setts and foraging habitat during the operational phase could negatively affect the badger population in this area and give rise to a negative impact for the local badger population through the following mechanisms:

- Increased noise and human activity within the site during the operation of the development.

Characterisation of Unmitigated Impact

Badgers occupying the south western areas of the Site are currently active and this part of the Site is considered to hold good quality habitat for the species. It is considered that even if no sett destruction occurs, any effects to the scrub habitat could compromise the habitat quality and foraging resource for the species. Losses of foraging and breeding habitat would likely have a long-term moderate negative effect for badger at the local level.

Rationale for prediction of effect

The footprint of the proposed development is considered to be good for supporting Badger setts, however, within the context of the landscape it forms a minor proportion of available habitat (hedgerow, grassland) in the areas surrounding the site. Though, it is likely that the habitat within the Site will be lost and on a precautionary basis, it is considered likely that impacts on resident Badgers due to the proposed site works could negatively affect the conservation status of the local badger population.

Effect without Mitigation

The unmitigated effect to this feature would result in a minor medium to long-term impact to a species of local sensitivity and importance. Badgers are protected under the Wildlife Act (Wildlife Act 1976; Wildlife Amendment Act 2000).

7.4.3.5 Breeding Birds

The potential for ecological impact to the breeding bird group, in the absence of mitigation focuses on the following factors:

- Species specific impacts on Sand Martin (see paragraph below);
- Operational noise disturbance including blasting;
- Dust deposition and subsequent changes in habitat composition (changes to structural, foraging, breeding and commuting habitat);
- Potential effects to bird species include a negative biophysical effect to vegetation availability which may disturb breeding birds and reduce available forage.

Sand Martin

The current quarry boundary walls and sand heaps with vertical banks provide an artificial habitat that is suitable for nest burrowing. One of the sand banks is occupied by Sand Martin currently and the species have been recorded present in the quarry historically. Sand Martins in this area are likely accustomed to some level of disturbance through the usage of the quarry. The nesting area in the south part of the proposed site will be removed during the re-grading of the ground during construction, however the boundary walls will still provide potential nesting habitat and the backfill of the worked-out quarry will put the Sand Martin nesting habitat at risk as this part will be restored to the natural ground level. The removal of the foraging habitat is likely to be minor considering the availability of suitable alternative foraging habitats surrounding the proposed development site.

Predicted species specific impacts on Sand Martin, including those general impacts described above are likely to include:

- Loss of alternative nesting habitat (within the proposed Site);

Characterisation of Unmitigated Impact

Noise, vibration and increased human presence associated with the infilling process is likely to result in a disturbance impact to local breeding bird populations during the breeding season and has the potential to result in reduced breeding bird success of birds.

Sand Martin

The reduction of available nesting sites could result in decreased breeding success. In the context of the current European-wide decline of this Amber-listed species and the availability of suitable breeding habitat, the impact could be described as moderate negative. Therefore, mitigation for this loss will be required.

Rationale for Prediction of Effect

Total removal of Sand Martin nesting habitat will occur during the operational phase. The loss of this habitat could result in a reduced breeding success and could negatively affect the conservation status of the Sand Martin at a local geographic scale.

The disturbance caused by noise, vibration and increased human presence is unlikely to cause stress to this group, however, on a precautionary basis, it is considered likely that this temporary impact could negatively affect the conservation status of the bird population.

Effect without Mitigation

The unmitigated effect to this feature would result in a minor short to long-term impact to species of low-medium local and international sensitivity and importance. The majority of bird species, including the Amber Listed Sand Martin are protected under the Wildlife Acts (1976 – 2012) where it is an offence to hunt, interfere with or destroy their breeding or resting places unless authority is obtained via statutory licence provision.

7.5 Mitigation Measures

7.5.1 Do Nothing Scenario

If the proposed works were not to go ahead, it is likely that the current regime of management of the land will continue as currently.

7.5.2 Construction Phase

7.5.2.1 Aquatic Fauna and Otter

In order to protect all surface water during the works of the proposed project, the following relevant legislation and best practice guidance will be adhered to:

- NetRegs Guidance for Pollution Prevention for works and maintenance in or near water (NetRegs, 2017).
- Environment Agency Pollution Prevention Guidelines for construction and demolition sites (EA, 2012).
- Inland Fisheries Ireland Guidance on Protection of Fisheries During Construction Works In and Adjacent to Waters (IFI 2016).
- CIRIA Guidance C515: 'Control of groundwater for temporary works' (Somerville et al., 1986).
- CIRIA Guidance C750D: 'Groundwater control: design and practice' (Preene et al., 2016).

The above best practice mitigations will alleviate the risk associated with accidental spills and runoff events. In particular, the following measures will be implemented:

- No excavation shall take place below the water-table on the Application Site;
- All soil stockpiles shall be covered (i.e. vegetated) to minimise the risk of rain / wind erosion;
- An emergency spill kit (including absorbers) will be available for use in the event of an accidental spill on the quarry floor; and spill training will be provided to staff members;
- Daily checks will be carried out and records kept on a weekly basis and any items that have been repaired/replaced/rejected noted and recorded. Any items of plant machinery found to be defective should be removed from site immediately or positioned in a place of safety until such time that it can be removed;

- Refuelling shall only take place at designated hardstanding area next to bunded fuel storage area.

Additional mitigations for otters to be implemented during construction are incorporation of ledges under the access road where it crosses the River Graney to allow otters to safely cross. The ledges must be at least 500 mm wide, constructed at least 150 mm above the 1 in 5 year flood event and allow at least 600 mm headroom. Adequate access from riverbank shall be secured and a 50-100 m long section along the road where it crosses the river will be fenced with mammal resistant fence to prevent otters from crossing the road.

7.5.2.2 Small mammal group including bats

Small mammal group

The proposed enhancement of boundary treelines will benefit small mammals such as hedgehog, shrew and hare, providing additional cover and foraging resource for these species.

Bats

Additional planting along the boundary treelines will benefit the bats foraging in the area. See planting plan for further details.

7.5.2.3 Badger

The badger sett in the south-west corner will be retained and no disturbance to the sett is planned. However, in order to mitigate for the potential disturbance aspects of the construction phase on badger populations within the site, a protection zone of 30m around the sett will be clearly marked before any works start and planting of dense native shrubs around the sett will be adhered to enhance the long-term protection of the sett.

For the south west boundary, where there are active badger setts, heavy machinery can disturb the tunnel systems if within 30 m of the sett. Therefore, no heavy machinery should be used within 30 m of badger setts (unless carried out under licence). Likewise, lighter machinery (generally wheeled vehicles) should not be used within 20 m of a sett entrance, and light work, such as digging by hand or scrub clearance should not take place within 10 m of sett entrances.

No heavy works or lighter works are planned within the 30m buffer zone. However should any unforeseen works be carried out within this buffer zone, an application for a badger derogation licence should be made by a suitably qualified ecologist to the Wildlife Licencing unit at National Parks and Wildlife Service.

During the breeding season (December to June inclusive), none of the above works should be undertaken within 50 m of active setts nor blasting or pile driving within 150 m of active setts.

7.5.2.4 Breeding Birds - general

Seasonality

Any vegetation clearance works, and site preparatory works will be conducted outside of the bird nesting season (March to September inclusive). If this is not possible, a breeding bird survey by an appropriately qualified ecologist will be undertaken in advance of the works to ensure that there will be no impacts on nesting birds. If nests are found, they will be safeguarded, with an appropriate buffer, until the chicks have successfully fledged.

Vegetation Replacement

The area of scrub and native trees within the marginal area in the south is to be retained and the treelines effectively 'thickened' through the use of supplementary screen, scrub and understorey planting as detailed in the Landscape Masterplan and Planting Plan.

7.5.2.5 Sand Martin

Seasonality

The re-grading of the ground surface in the stockpiling and sorting area where the Sand Martin burrows are located must occur in late autumn or winter, after the migration of the Sand Martin has occurred in order to avoid any potential risk of direct mortality of individuals.

Habitat replacement

Sand Martin are adapted to the loss of a small number of burrows through substrate collapse every year, however, as the whole nesting habitat will be removed, habitat replacement will be required. The artificial bank could be created using hollow concrete blocks and ceramic or clay pipes for the burrows, examples of artificial banks are shown in Figure 7-14. The bank should be 2m high and approximately 10m wide. The pipes should be about 1m in length and spacing between pipes should be 800mm horizontally and 400mm vertically. Detailed information on creating artificial Sand Martin habitat is provided in Best Practice Guidelines Artificial Bank Creation for Sand Martins and Kingfishers (Hopkins 2001).

The artificial bank will be created along the western treeline facing east (Figure 7-15). The location is chosen as it is not directly adjacent to the Badger sett and there will be no tall vegetation (trees and scrub) in front of the bank which otherwise could obstruct flight.

Figure 7-14 Example of artificial bank with Sand Martin nests (source: Hopkins 2001).

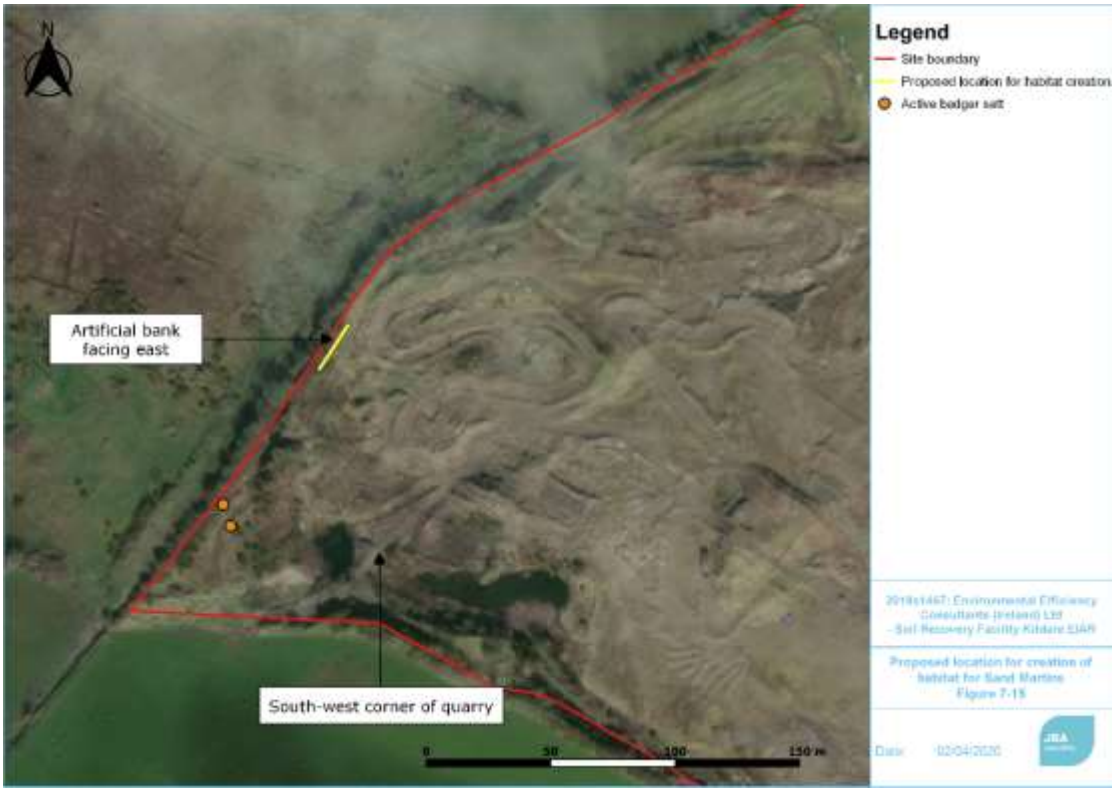


Figure 7-15 Proposed location for creation of habitat for Sand Martins.

7.5.2.6 Non-native invasive species

The Non-native invasive species Japanese Knotweed and Butterfly-bush were observed within the development site. Japanese Knotweed is a High Impact species and listed in the Third Schedules of the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011) and in Section 52(7) and (8) of the Wildlife Act, 1976, as amended. It is a legal requirement to eradicate the species prior to works commence, thus an **Invasive Alien Species Management Plan (IASMP) report** should be provided.

When the presence of Japanese Knotweed is in a restricted area, the best option to treat the plant is by spraying with herbicide (glyphosate). Herbicide treatment can be carried out May to October, with the optimum time of application being late season (August to October). Herbicide treatment of Japanese Knotweed can take three years or more, with monitoring and follow up control for up to five years.

Another option is physical removal of the plant, however this will include below ground removal as their rhizomes can extend over several meter and excavations should be to 3m below the surface if removing Japanese Knotweed from the site. Disposal of Japanese Knotweed can be carried out on-site and off-site. On-site disposal must be to a depth of at least 5m, root membrane barriers must be used and laid under expert supervision. Off-site disposal must be at a suitably licenced waste management site and the licensed waste manager must be informed that the material is Japanese Knotweed.

Further information can be found here:

- Invasive Species Ireland (https://invasivespeciesireland.com/invasive-plant-management/);
- Best Practice Management Guidelines Japanese Knotweed Fallopia Japonica. Prepared for NIEA and NPWS as part of Invasive Species Ireland (Kelly et al., 2015)

7.5.3 Operation Phase

7.5.3.1 Design Mitigation

This section describes the mitigation measures that were incorporated at the design stage. A number of measures which follow generic best practice are proposed to mitigate the impacts of the proposed development on the ecological environment at the Site:

Dust Mitigation

- Plant will be situated towards the centre of the site
- Site access road will be surfaced (e.g. asphalt, tarmac) for the first 100 metres from the public road to prevent dust being tracked out.
- Wheel Wash will be situated on-site
- Dusty plant will be located in enclosed areas (e.g. behind quarry face, behind berms, sound barriers)

Preventing Polluting Discharges to Water

- Bunds for hazardous materials (e.g. fuels and oils). Covered to minimize rainwater ingress
- Refuelling pad surrounding refuelling area. Served by Oil Interceptor and Silt trap
- Run-off from the site will be directed toward settlement lagoons for removing suspended solids. The water will be recycled within the process.
- Where necessary, drainage channels will be dug around working areas on a phased basis to divert run-off away from these areas towards the settlement lagoons.
- Aim to minimize obstruction of run-off through inappropriate placing of berms
- Aim to minimize run-off to working areas/areas being filled
- For composting – impermeable area draining to foul e.g. effluent tank. Tank will be periodically emptied/serviced
- Wheel wash served by integrated oil/grit interceptor.

Noise Mitigation

- Screening berms around working areas
- Processing plant behind berms/quarry faces.
- House concrete crusher in an area enclosed by mobile cantilever walls

Lighting

- Visors will be provided in order to minimize light spill in sensitive areas. Flat glass type luminaires with full cut off will be provided. There will be no tilt on the luminaires.
- Each pole will be fitted with a movement detector and only activated when it detects a human approaching.
- Luminaires will be LED. 2700 K or less will be used in light luminaires.
- Lighting on the access road will be dimmable. All fitting will be mounted on poles 6 m or less.

Proposed Final Restoration

As a final restoration a layer comprising 150mm of topsoil and 350mm of subsoil will be placed over the backfilled material and planted with grass. This will minimise soil erosion and dust generation and the lands will progressively be returned to use as agricultural grassland. This process will be conducted on a phased basis during the operations of the backfill. The restoration to a grassland will increase the foraging habitat for mammals in the local area.

7.5.3.2 Aquatic Fauna and Otter

The above best practice mitigation will be adhered to which will alleviate the risk associated with accidental spills and runoff events. In particular, the following measures will be implemented:

- All soil / overburden stockpiles shall be covered (i.e. vegetated) to minimise the risk of rain / wind erosion;
- Restoration of topsoil and overburden will be carried out on an on-going basis to reduce the vulnerability of the bedrock aquifer to possible contamination.
- An emergency spill kit (including absorbers) will be available for use in the event of an accidental spill on the quarry floor; and spill training will be provided to staff members;
- Bi-annual water monitoring shall be undertaken using monitoring boreholes to ensure that no pollution of groundwater is occurring.
- The sowing of grassland species on a phased basis and additional planting of scrub and native trees along the perimeter will enhance the nutrient retention at the site and preventing further nutrient load into receiving surface and groundwater receptors.

7.5.3.3 Small mammal group including bats

Small mammal group

The enhanced boundary treelines with native species and the phased planting of grassland species will benefit small mammals such as hedgehog, shrew and hare, providing additional cover and foraging resource for these species.

Bats

Planting

The enhanced boundary treelines with native species will benefit the bats foraging in the area. See planting plan for further details.

Lighting

The above best practice design mitigation will be adhered to which will alleviate the risk of light disturbance to bats.

The specification and colour temperature of light treatments is chosen based on their tolerability by bats. LED luminaires are ideal due to their sharp cut-off, lower intensity, and dimming capability. A warm white spectrum (2700 K or less) will be used to reduce the blue light component.

While lighting along the access road is necessary, dimmable lights will be installed along the roadway to the site so that during peak dusk activity, the lowest light level is apparent, and the light levels are increased slowly to full output as the natural light decreases.

7.5.3.4 Badger

The marked 30m protection zone and the enforced shrubs put in place during the construction phase will be kept during the operation phase in order to mitigate for the disturbance aspects of the operation phase on badger populations within the site.

For the south west boundary, where there are active badger setts, heavy machinery can disturb the tunnel systems if within 30 m of the sett. Therefore, no heavy machinery should be used within 30 m of badger setts (unless carried out under licence). Likewise, lighter machinery (generally wheeled vehicles) should not be used within 20 m of a sett entrance, and light work, such as digging by hand or scrub clearance should not take place within 10 m of sett entrances.

No heavy works or lighter works are planned within the 30m buffer zone. However should any unforeseen works be carried out within this buffer zone, an application for a badger derogation licence should be made by a suitably qualified ecologist to the Wildlife Licencing unit at National Parks and Wildlife Service.

During the breeding season (December to June inclusive), none of the above works should be undertaken within 50 m of active setts nor blasting or pile driving within 150m of active setts.

7.5.3.5 Breeding Birds - general

Seasonality

Any vegetation clearance works will be conducted outside of the bird nesting season (March to September inclusive). If this is not possible, a breeding bird survey by an appropriately qualified ecologist will be undertaken in advance of the works to ensure that there will be no impacts on nesting birds. If nests are found, they will be safeguarded, with an appropriate buffer, until the chicks have successfully fledged.

Vegetation replacement

The topsoil will be replanted with grassland vegetation on a phased basis as the backfill progresses.

In addition, the thickening of scrub and treelines surrounding the site will provide additional foraging and nesting habitat.

7.5.3.6 Sand Martin

Seasonality

Infill of the quarry in the area where the Sand Martin burrows are located must occur in late autumn or winter, after the migration of the Sand Martin has occurred in order to avoid any potential risk of direct mortality of individuals.

Habitat replacement

A replacement habitat which will be provided during the construction phase of the project will be retained throughout the operation of the project and after the final restoration has taken place and throughout the lifetime of the agricultural usage.

7.6 Residual Impacts

7.6.1 Do Nothing Scenario

The site in its present form is a worked-out quarry with bare soil and recolonising bare ground as dominating features. Under current use there is a neutral effect on the general ecology of the area.

7.6.2 Construction Phase

Residual ecological impacts are those that remain once the development proposals have been implemented. The main aim of ecological mitigation, compensation, and enhancement is to minimise or eliminate residual impacts.

Mitigation measures in place for control of surface and groundwater will minimise any significant impact on the surface and groundwater systems. As such, it is considered that no negative change to existing WFD status will be afforded to waterbodies pertinent to this assessment.

Implementation of mitigation measures during the construction phase, such as the replanting and enhancement of boundary vegetation, along with good site management and construction practices will help to minimise any significant and/or permanent impact on the environment. Further, the 30m protection zone enforced with hedgerow planting will mitigate any potential disturbance on resident badgers.

The creation of a new vertical bank for Sand Martins to nest in will minimise the negative impact on the species due to loss of nesting burrows when the worked-out quarry is filled up. Though there will be a slightly negative residual effect caused by disturbance to viable habitat during construction. Sand Martins are opportunistic and create new burrows when the old are collapsing. By providing a suitable alternative habitat for the following breeding season, the population will be able to remain in the area.

The residual impact during the construction phase is assessed to be of slight negative impact on account of the temporary disturbance to Sand Martin in the area.

7.6.3 Operation Phase

Mitigation measures in place for control of surface and groundwater during the operation phase will offset any potential significant impact on the aquatic receptors.

The proposed enhancement measures, including tree and shrub planting of native species, should act to improve the habitat for all species. The construction of a vertical bank will provide suitable nesting habitat for Sand Martin both during and after the operations work. A slight negative impact is anticipated due to disturbance during operations. The mitigations in place for resident badgers (protection zone and screening vegetation) will mitigate for any potential negative impact during the operations.

Mitigations implemented for otter passage under the bridge over River Graney will offset the negative impact the operations traffic will have on otters.

The residual impact during the operation phase is assessed to be of slight negative impact on account of the medium to long-term disturbance to Sand Martin in the area.

7.7 Cumulative Impacts

Proposed and permitted developments in the area have the potential to have an in-combination effect with the proposed development upon the ecology of local area if no mitigation measures are implemented. The most likely of these potential impacts are construction noise and drainage from developments in the vicinity. There are two permitted developments in Castledermot town located close to River Lerr, which is part of River Barrow and River Nore SAC, that could have a cumulative impact potentially increasing the sediment and nutrient load into the river. Two other developments that could have a cumulative impact are constructions of farm buildings, within 1 km and 3 km respectively of the proposed development. These two developments will result in an increased livestock at the farms, which could result in an increased nutrient load into the River Lerr, thus having a cumulative impact.

There are no policies or objectives within Kildare County Development Plan that when considered with the proposed development could give rise to cumulative effects on the ecology of the site and the immediate environs.

The proposed development would have a significant cumulative impact on the ecology of the local area in combination with the above stated developments if no mitigation measures are implemented. However, implementation of the above stated mitigations will offset any potential negative impacts.

7.8 Conclusions

The application site has been shown to be within the zone of influence for a number of species, in particular Badger, Otter and Sand Martin. Sand Martin burrows and active Badger setts have been identified through specialist surveys as being present within the application site. There is also the possibility of the presence of breeding birds and bat foraging areas in the marginal treelines and scrub surrounding the site. Good habitat also exists for other small mammals within the scrub and treelines of the site. These areas should be dealt with sensitively and with a view to retaining as much marginal vegetation as possible, especially mature trees within the site margin, as they will not regenerate as quickly as any replacement hedgerow habitat.

It is considered that through the implementation of appropriate mitigation, the proposed development is not predicted to impact on the majority of the species present, however, during construction and operation there will be a slight negative residual impact on Sand Martin. In the long-term, the final restoration of the site would have an ecological value similar to surrounding agricultural grasslands.

7.9 References

Bat Conservation Ireland (2010) 'Bats & Lightning - Guidance Notes for Planners, engineers, architechts and developers'.

Bat Conservation Ireland (2014) *Bats in Buildings. Guidance Notes for: Planners, Engineers, Architects and Developers*, Bat Conservation Ireland, available: http://www.batconservationireland.org/wp-content/uploads/2013/09/BCIrelandGuidelines_Building.pdf [accessed 8 Dec 2017].

BWI (2012) 'CBS Manual Guidelines for Countryside Bird Survey participants', available: http://www.birdwatchireland.ie/LinkClick.aspx?fileticket=ZMHg4m%2BJc7k%3D&tabid=116.

Chanin, P. (2003) *Monitoring the Otter: Lutra Lutra*, Rivers Monitoring Series, English Nature, Peterborough.

CIEEM (2018) 'Guidlines For Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater, Coastal and Marine'.

Collins, J. (Ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition)*, 3rd edn. ed, The Bat Conservation Trust, London.

DoHPLG (2018) 'River Basin Management Plan for Ireland 2018-2021', available: https://www.housing.gov.ie/sites/default/files/publications/files/rbmp_report_english_web_version_final_0.pdf [accessed 22 Jan 2019].

EA (2012) *Working at Construction and Demolition Sites PPG6. Pollution Prevention Guidelines*, 2nd ed, Environment Agency: Bristol, England.

English Nature (2002) 'Badgers and development - working today for nature tomorrow'.

English Nature (2004) 'Bat Mitigation Guidelines'.

EPA (2002) 'Guidelines on the information to be contained in Environmental Impact Statements', available: http://www.epa.ie/pubs/advice/ea/guidelines/EPA_Guidelines_EIS_2002.pdf [accessed 14 Feb 2019].

EPA (2003) 'Advice Notes on Current Practice (in preparation of Environmental Impact Statements)', available: https://www.epa.ie/pubs/advice/ea/guidelines/EPA_advice_on_EIS_2003.pdf [accessed 17 Feb 2017].

EPA (2015a) 'Advice Notes for Preparing Environmental Impact Statements (Draft)', available: https://www.epa.ie/pubs/consultation/reviewofdrafteisguidelinesadvicenotes/Draft%20Advice%20Notes%20for%20preparing%20an%20EIS.pdf [accessed 14 Feb 2019].

EPA (2015b) 'Revised Guidelines on the Information to be contained in Environmental Impact Statements (Draft)', available: http://www.epa.ie/pubs/consultation/reviewofdrafteisguidelinesadvicenotes/Draft%20Guidelines%20on%20the%20Information%20to%20be%20contained%20in%20an%20EIS.pdf [accessed 14 Feb 2019].

EPA (2018a) EPA Catchments.Ie [online], *Catchments.ie*, available: https://www.catchments.ie/maps/ [accessed 3 Jan 2018].

EPA (2018b) EPA Maps [online], *Next Generation EPA Maps*, available: https://gis.epa.ie/EPAMaps/ [accessed 9 Jan 2018].

EPA Catchments Unit (2018) *Lerr SC 010 Subcatchment Assessment WFD Cycle 2*, Environmental Protection Agency.

Fossitt, J.A. (2000) *A Guide to Habitats in Ireland*, Heritage Council of Ireland series, Heritage Council/Chomhairle Oidhreachta: Kilkenny.

Hopkins, L. (2001) 'Best Practice Guidlines - Artificial Bank Creation for Sand Martins and Kingfishers', available: http://downloads.gigl.org.uk/website/artificial_bank_creation.pdf [accessed 14 Jun 2019].

IFI (2016) 'Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters', available: http://www.fisheriesireland.ie/fisheries-management-1/624-guidelines-on-protection-of-fisheries-during-construction-works-in-and-adjacent-to-waters/file [accessed 7 Mar 2017].

JBA (2020a) *Soil Recovery Facility Kildare - AA Screening*, JBA Consulting Engineers and Scientists Ltd.

JBA (2020b) *Soil Recovery Facility Kildare - Natura Impact Statement*, JBA Consulting Engineers and Scientists Ltd.

Kelleher, C., Marnell, F. (2006) *Bat Mitigation Guidelines for Ireland*, National Parks and Wildlife Service /Department of Environment, Heritage and Local Government, available: https://www.npws.ie/sites/default/files/publications/pdf/IWM25.pdf.

Kelly, J., Maguire, C.M., Cosgrove, P.J., Muir, R.A. (2015) *Best Practise Management Guidelines Japanese Knotweed Fallopia Japonica.*, National Parks and Wildlife Service / Northern Ireland Environment Agency.

NetRegs (2017) 'Guidance for Pollution Prevention. Works and maintenance in or near water: GPP5', available: http://www.netregs.org.uk/media/1304/gpp-5-works-and-maintenance-in-or-near-water.pdf [accessed 7 Apr 2018].

NPWS (2004) 'Invasive Species in Ireland', available: https://www.npws.ie/sites/default/files/publications/pdf/Stokes_et_al_2004_IAS_Ireland.pdf [accessed 14 Feb 2019].

NPWS (2009a) 'Corballis Hill 001389 - Site Synopsis'.

NPWS (2009b) 'Lowtown Fen 001764 - Site Synopsis'.

NPWS (2009c) 'Ballycore Rath 001751 - Site Synopsis'.

NPWS (2009d) 'Oak Park 000810 - Site Synopsis'.

NPWS (2019) Download Boundary Data | National Parks & Wildlife Service [online], available: https://www.npws.ie/maps-and-data/designated-site-data/download-boundary-data [accessed 11 Feb 2019].

NRA (2005a) 'Guidelines for the Treatment of Badgers prior to the Construction of a National Road Scheme', available: https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Badgers-prior-to-the-Construction-of-a-National-Road-Scheme.pdf [accessed 15 Mar 2019].

NRA (2005b) 'Guidelines for the Treatment of Bats during the Construction of National Road Schemes', available: https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Bats-during-the-Construction-of-National-Road-Schemes.pdf [accessed 15 Mar 2019].

NRA (2008a) *Environmental Impact Assessment of National Road Schemes- A Practical Guide*, National Roads Authority, available: https://www.google.ie/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjF_IO8q8bZAhWBJcAKHdIpDyMQFggpMAA&url=http%3A%2F%2Fwww.tii.ie%2Ftechnical-services%2Fenvironment%2Fplanning%2FEnvironmental-Impact-Assessment-of-National-Road-Schemes-Practical-Guide.pdf&usg=AOvVaw07sfytJ4CpCrkBjKUS1TAe [accessed 27 Feb 2018].

NRA (2008b) 'Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes', available: https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Otters-prior-to-the-Construction-of-National-Road-Schemes.pdf [accessed 15 Mar 2019].

NRA (2009a) *Guidelines for Assessment of Ecological Impacts of National Roads Schemes.*, Transport Infrastructure Ireland, available: http://www.tii.ie/technical-

services/environment/planning/Guidelines-for-Assessment-of-Ecological-Impacts-of-National-Road-Schemes.pdf [accessed 10 Apr 2017].

NRA (2009b) *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*, National Roads Authority, available: http://www.tii.ie/technical-services/environment/planning/Ecological-Surveying-Techniques-for-Protected-Flora-and-Fauna-during-the-Planning-of-National-Road-Schemes.pdf [accessed 29 Nov 2017].

Parnell, J., Curtis, T. (2012) *Webb's An Irish Flora* [online], 8th ed, Trinity College Dublin, available: http://www.corkuniversitypress.com/product-p/9781859184783.htm [accessed 27 Feb 2018].

Preene, M., Roberts, T.O.L., Powrie, W. (2016) *Groundwater Control: Design and Practise, Second Edition*, Guidance document, CIRIA, London.

Smith, G., O'Donoghue, P., O'Hora, K., Delaney, E. (2011) 'Best Practice Guidance for Habitat Survey and Mapping, 2011', available: http://www.heritagecouncil.ie/fileadmin/user_upload/Publications/Wildlife/Habitat_Survey_Guidance/Habitat_Survey_Guidance_Hyperlinked_2.pdf.

8. Soils & Geology

8.1 Introduction

This chapter of the EIAR assesses the impact on the geological environments of the proposed development. The objectives are to provide a review of baseline conditions across the footprint of the site, to assess the potential impact of the proposed development on the underlying soils and geology, and to provide appropriate mitigation measures for any identified potential impacts, if deemed necessary.

The chapter was written by Niall Mitchell. Niall is a professional Hydrogeologist and Chartered Engineer with over 20 years' experience in the area of Hydrogeological and Contaminated land investigations and risk assessments, Environmental Impact Assessments, Remediation design and validation, Wastewater disposal and Environmental Due Diligence. He has an honours Civil Engineering degree from NUI, Galway, a Master's degree in Environmental Engineering from Trinity College and a Master's degree in Applied Hydrogeology from Newcastle University. Niall has been involved with high profile projects across the island of Ireland providing hydrogeological and contamination expertise for Environmental Impact Assessments, brownfield/fuel spill/chemical spill site investigations, risk assessments and remediation design. Example projects have included the Corrib Gas Terminal Site, (Co. Mayo), Titanic Quarter Redevelopment (Belfast), Barrow Street Gasholder Site (Dublin), Poolbeg Incinerator Project (Dublin) and Haulbowline Naval Base (Co. Cork). Niall has also provided expertise at Oral Hearing.

8.2 Assessment Methodology

The assessment was undertaken by undertaking the following:

- A desktop study of soils, subsoils and bedrock across the site and the general environs;
- A review of existing site investigation data pertaining to the site; and,
- Interpretation of all data collated and EIAR reporting.

The following sources of information were used in the compilation of this assessment:

- Ordnance Survey of Ireland, Discovery Series, Sheet 61;
- Ordnance Survey of Ireland (OSI) online historical maps and aerial photographs;
- Geology of Kildare-Wicklow, Geological Survey of Ireland (GSI) (1:100,000), Sheet 16;
- Soil Map of Ireland (Second Edition, 1980), National Soil Survey of Ireland, An Foras Talúntais;
- National Parks and Wildlife Service on-line database www.npws.ie;
- EPA online water quality mapping; https://gis.epa.ie/EPAMaps/
- Met Eireann - met.ie – monthly climatological data;
- Kildare County Council online planning files and County Development Plan;
- Landslides in Ireland. G.S.I. Irish Landslides Working Group (2006); and,
- Directory of Active Quarries, Pits and Mines in Ireland (3rd Edition) G.S.I. 2002;
- Further information request (PPR 06/2802) by Kildare County Council for the continued operation for the extraction of sand & gravel & all associated processing works at Graney West, County Kildare. Golder Associates (November - 2007)
- Environment Assessment Report 1969-01 v2.00 Re: Application for permission for the development of a Waste Recovery Facility at a disused quarry site in Graney West, Castledermot, Co. Kildare. Environmental Efficiency (February - 2018).

This chapter was undertaken in accordance with the following:

- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002);
- Geology in Environmental Impact Statements a Guide, (IGI, 2002);
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes, NRA Document;
- Guidelines for the preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013); and,
- Environmental Protection Agency (EPA) Draft *'Guidelines on the Information to be contained in Environmental Impact Assessment Reports'* (2017).

8.3 Baseline Environment

8.3.1 Site Location and Context

The site in Graney West, Castledermot, Co. Kildare, is approximately 2 km to the south-east of Castledermot village (Figure 8-1), and 12 kilometres from the town of Balltinglass, in Co. Wicklow. The site is located in a rural agricultural area with grazing and tillage being the main agricultural activities. A number of historic sand and gravel extraction sites are situated in the broader area of the site. There are 12 no. residential developments within a radius of 500m, mainly to the east, north and south of the application site.

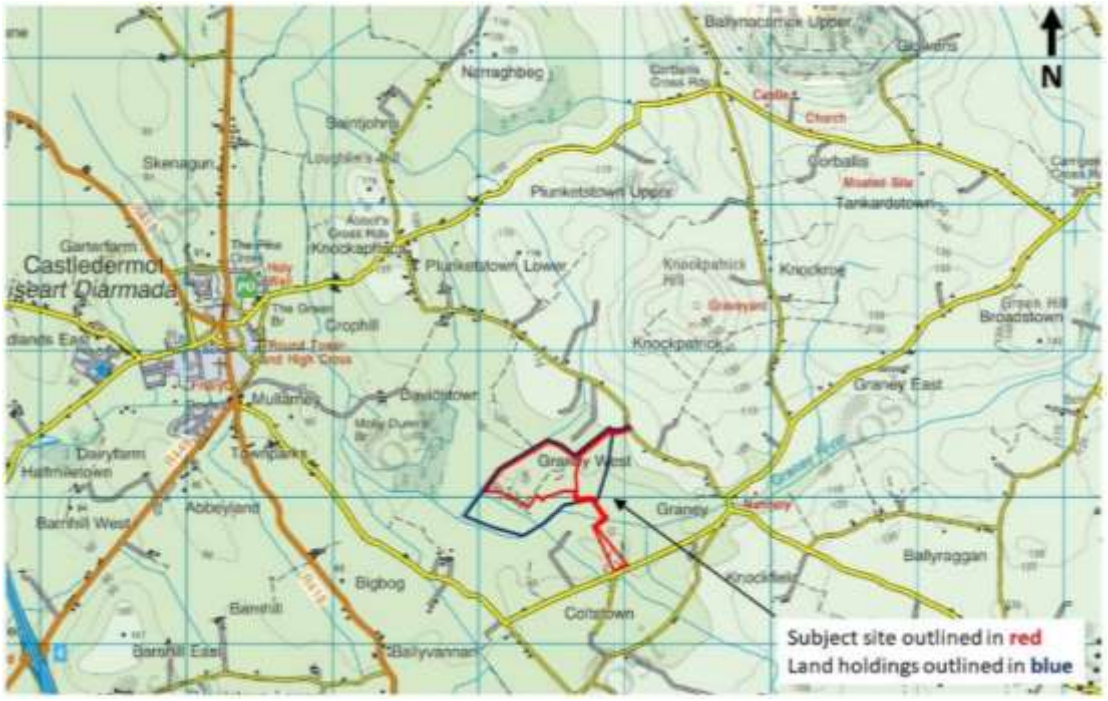


Figure 8-1 Site Location Map

8.3.2 Site History

The site was previously operated as a sand and gravel quarry pit, a settlement pond, processing areas and ancillary infrastructure. Quarrying activities ceased (circa 2007) within the application site when full extraction of materials occurred. The resulting terrain across the site comprises worked out quarry voids. Sand and gravel soils in these areas were previously extracted, leaving mineral sub-soil/rock exposed at the ground surface. Ground levels across the site have been significantly disturbed over time and lowered by the historical quarrying activities. Original ground levels across the quarry typically ranged between a high of 95 mOD to a low of 81 mOD. Existing quarry floor levels typically vary from a high of 86.7 mOD to a low of 79 mOD.

Quarrying activities will continue to take place in an adjacent field to the north of the site outside the application site boundary in accordance with the existing planning permission (Ref. 06/2802).

There are several quarries located within a 5 km radius predominantly, to the east and into Co. Carlow. The closest large quarry is located 1.1 km to the north-west and there is a smaller quarry located 1.6 km to the east.
Geological

8.3.3 Site Description

The application site covers an area of 19.2 hectares. Pockets of tree groves and vegetative growth occur sporadically throughout the site, with hedgerows existing along sections of the site boundary. A series of settlement lagoons are located in the southern region of the site for the purposes of managing surface water run-off.

The following buildings, facilities, services and infrastructure, utilized in connection with the pre-existing quarry activity and farming activities, are currently present on-site.

- Site offices (2 x portable cabins)
- Washing plant and ancillary equipment
- Stockpiling areas and existing retaining walls
- Existing site access road to the east of the site
- Internal haul routes
- Covered, bunded fuel tanks
- Non-permeable concrete area (surrounding residence and farm buildings/structures)
- Covered, slatted effluent tank
- Site boundary trees and vegetation
- Surface water/Foul water drainage infrastructure including drains, pump house, septic tank, soak pit and settlement lagoons (x 3).
- Dwelling house and its curtilage
- Various agricultural buildings and structures used in connection with farming activity, including a cattle shed (with effluent tank), outhouse and horse boxes, horse paddock, silage pit, farm store/machinery repair and racking area.

An existing concreted yard area surrounds the buildings present on-site. Plant and equipment used in connection with pre-existing quarrying activities are also situated in this area and immediately south of the area.

8.3.4 Proposed Development

Sancom Ltd proposes on establishing and operating a Material Recovery Facility (MRF) at the site. The principal activity will involve the use of imported, uncontaminated soil and stone, sourced from construction sites, to backfill and restore the worked out quarry. A detailed description of the proposed activities are provided in Section 5 with a summary outlined below:

- Sancom Ltd intend on accepting a maximum of approximately 1.8 million tonnes of soil and stone material on-site per annum for backfilling over the course of 10 to 25 years, depending on market demand for disposal services.
- The proposed activity above will be for the purposes of recovering said materials through land deposition, and to achieve the improvement and development of land and site restoration. The material accepted on-site will be inert and will comprise subsoil, clay, gravels, topsoil, stone and mixtures of such.
- The proposed activity will include the placement of cover soils and seeding and return to use as agricultural grassland.
- In addition to the principal waste activity described above, it is proposed to carry out the following waste recovery activities on-site:
    - Intake of top-soil, screening at proposed screening plant and resale of such material,
    - Intake of gravel and sands, washing at existing washing plant and resale of such materials,
    - Intake of concrete, concrete crushing using concrete crushing equipment, mixing with sand and gravel before being fed to the washing plant to form aggregate, and resale of such material, and;
    - Intake of garden waste, shredding and composting of this waste within a silage pit over an underground effluent storage tank, for use for agricultural land spreading.

It is proposed to utilise pre-existing plant and, in addition, install further plant on-site to be used in connection with the proposed development activity

8.3.5 Previous Investigations

The following reports were reviewed during the compilation of this EIAR chapter on Soils & Geology and pertinent information is contained in the following sections:

1. *Items 1 to 9 of Further Information Request (PPR 06/2802) by Kildare County Council for a Sand and Gravel Quarry at Graney West, County Kildare*, Golder Associates, November 2007.
2. *Environment Assessment Report 1969-01 v2.00 Re: Application for permission for the development of a Waste Recovery Facility at a disused quarry site in Graney West, Castledermot, Co. Kildare*. Environmental Efficiency, February 2018.

8.3.6 Topography

The site at Graney West falls from north to south, approximately 1:50. Based on a topographical survey undertaken in 2007 the elevation along the northern boundary is approximately 87 mOD while the area in the south of the site is approximately 81.5 mOD. The site slopes towards the River Graney which lies at approximately 80 mOD. The River Graney flows from east to west towards the River Lerr at Castledermot, along the southern boundary of the land holding area. To the north the site, ground levels rise towards Knockpatrick Hill (1.4 km to the northeast of the site) with a topographical high greater than 160 mOD.

8.3.7 Bedrock

According to GSI sheet 16, the bedrock geology beneath the site, mapped by the GSI "Geology of Kildare-Wicklow" (McConnell, 1994), is Tullow Type 2 Granite, a microcline porphyritic granite with microcline phenocrysts. The geology to the north, west and east is mapped as Tullow Type 2 Equigranular Granite, a pale, fine to course-grained granite. Other formations in proximity to the site include the Tullow Type 1 fine grained granite. These Tullow granites compose the Tullow Pluton of the Leinster Granite intrusion and are typically extremely weathered and broken.

The depth to granite bedrock was recorded at the site ranging between 9.15 and 12.3m during the drilling of deep groundwater boreholes on-site in 2019.

There are no mapped bedrock outcrops within the site boundary; the closest mapped outcrop in the local area to the east along the L8100 road and at Graney Bridge. There is a mapped fault line trending from northwest to southeast i.e. (from Castledermot to Killerrig) and is located approximately 1.8 km to the west-southwest of the site (Figure 8-2).

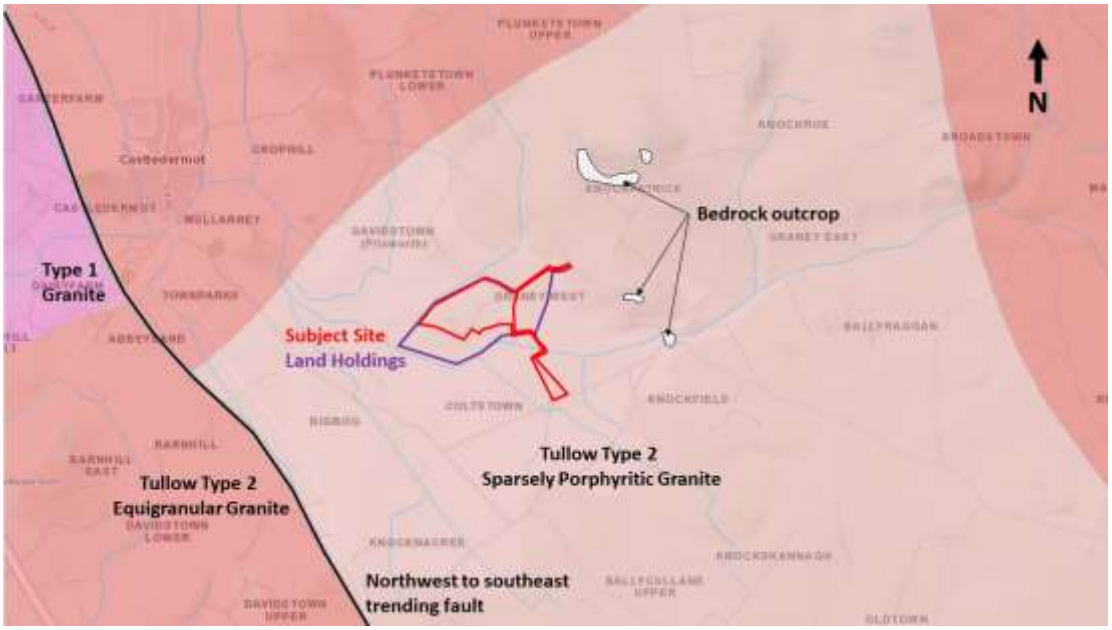


Figure 8-2 Bedrock Geology Map

8.3.8 Subsoil (Quaternary) Geology

The quaternary period is the most recent stage of the geological time period. It marks the period of the Ice Age and the postglacial period which extends to the present day. Most surface deposits were deposited in the Quaternary Period and provide the parent materials for the soils in the area.

Most sediments of the Quaternary period were deposited during the Ice Age itself either directly from the huge ice sheets or by meltwater from the sheets as they melted. Ice sheets would have slowly eroded the underlying bedrock producing sediment. This sediment may include particles of all sizes ranging from clay to boulder and which when spread over the surface by glacial ice, takes the form of till (boulder clay). Alternatively, sediment may be carried and sorted by meltwater and deposited as sand and gravel, with silt and clay deposited separately in lake systems or carried away to the sea.

Glacial deposits therefore contain fragments of the type of bedrock over which the ice originally passed.

The site is underlain by gravels derived from limestone which extend to the west, north and the east and a narrow band of alluvium along the southwestern site boundary (in the area of the settlement lagoons) which is separate from the River Graney alluvium. Other sediments in the area include Tills derived from limestone and granites and the alluvium along the route of the River Graney (see Figure 8-3).

Four (4 no.) shell and auger boreholes were drilled (10-13th July 2007) around the perimeter of the site at Graney West. The total depth of the boreholes was between 4.0 and 7.0m. The ground conditions generally comprise firm brown sandy gravelly clay overlying fine sand and dense medium gravels with large cobbles.

The overburden sandy gravel was recorded at depths of between 9.15 and 12.3m during the drilling of deep groundwater boreholes on-site in 2019.

Figure 8-3 Subsoil Geology Map

8.3.9 Soils

The present site is almost completely stripped of soil cover to allow excavation of sands and gravel. Prior to the extraction of sands and gravels, the soil types mapped in this area are classified by the GSI as BminSW or shallow well drained mineral soil and BminPD shallow poorly drained mineral soil derived from mainly calcareous plant material (Figure 8-4). According to Teagasc online soil database these soils are known as Elton (*1000c*) fine loamy drift with limestones.

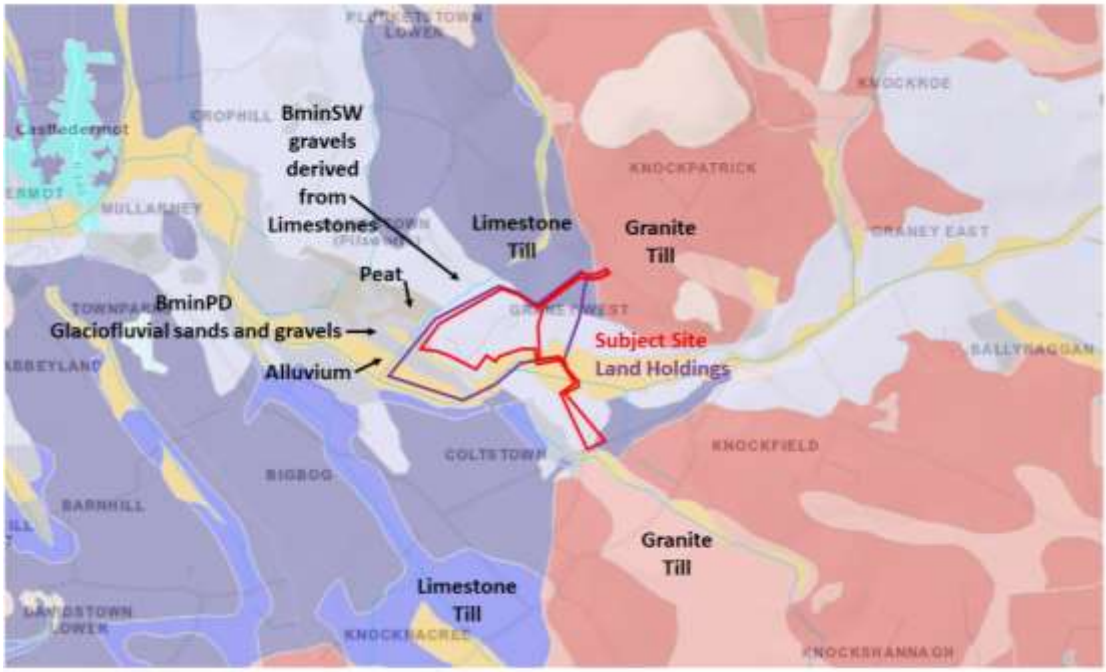


Figure 8-4 Soils Geology Map

8.3.10 Contamination

No evidence of waste or material is known to be present at the site.

8.3.11 Designated Protected Areas

There are no sensitive sites located at or near the site at Graney West. The closest sensitive site is the River Lerr at Castledermot (approximately 1.8km northwest of the site). The River Graney flows into the River Lerr at Castledermot. The River Graney and the River Lerr are tributaries of the River Barrow. The River Lerr flows west from Castledermot for approximately 9.5 km to its confluence with the River Barrow near Newacre. The River Barrow and River Nore is a Special Area of Conservation (SAC) selected for a number of habitats and/or species listed on Annex I/II of the E.U. Habitats Directive (listed at https://www.npws.ie/sites/) and are discuss in more detail in Section 7.

8.3.12 Areas of Geological Heritage Importance

The GSI provides scientific appraisal and interpretative advice on geological and geomorphological sites, and is responsible for the identification of important sites that are capable of being conserved as Natural Heritage Area (NHA). The National Parks and Wildlife Service (NPWS) have the responsibility of designation and management of sites, with appropriate advice from GSI.

At present, the GSI has compiled a list of sites proposed for designation as Natural Heritage Areas (pNHAs). The GSI has also determined a secondary list of County Geological Sites (CGS), which may be considered for protection at local authority functional control level (i.e. may be included in county development plans).

According to the GSI, there are no areas of Geological Heritage Importance in the vicinity of the site or within 10km radius of the site.

8.3.13 Radon

Radon is a radioactive gas which is naturally produced in the ground from the uranium present in small quantities in all rocks and soils. The RPS has produced a Radon Map of Ireland based on the results of the National Radon Survey where radon measurements were carried out in a number of houses in each 10 km grid square of the OS national grid.

The results were used to predict the percentage of homes in each 10km grid square with radon concentrations in excess of the national reference level of 200 Bq/m^3 (Becquerels per cubic metre). The radon map has five categories: less than 1%, 1-5%, 5-10%, 10-20& and greater than 20%. These categories refer to the number of homes in the 10km grid square that are likely to have radon concentrations above the reference level.

This map was accessed online at http://www.epa.ie/radiation/radonmap/ on the 2nd July 2019. The map shows that between ten and twenty per cent of the homes in this 10km grid square encompassing the proposed development are estimated to be above the Reference Level. This is a High Radon Area.

8.3.14 Geohazards

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating the slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a result. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The GSI landslide database was consulted and the nearest landslide to the proposed development was over 12km to the northeast. There have been no recorded landslide events at the site. Due to the local topography and the underlying strata there is a negligible risk of a landslide event occurring at the site.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics at the Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. However, currently there are five permanent broadband seismic recording stations in Ireland and operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied for local and regional events. Records since 1980 show that the nearest seismic activity to the proposed location was in the Irish sea (1.0 – 2.0 Ml magnitude) and ~55 km to the south in the Wicklow Mountains. There is a very low risk of seismic activity to the proposed development site.

There are no active volcanoes in Ireland so there is no risk from volcanic activity.

8.4 Characteristics of the Proposed Development

There are a number of elements associated with the operation of the proposed development which have the potential to impact on the environment with respect to soils and geology.

A detailed description of the proposed development is provided in Section 5 of this EIAR Report. The activities associated with the proposed development which are relevant to the soils and geology environment are detailed below:

- The proposed development is for the importation of inert material for waste recovery on the existing lands comprising a worked-out sand and gravel pit and existing agricultural lands.
- Other than some soil stripping and vegetation removal across parts of the site, there will be no impact to the current soils and geology across the site.
- This assessment therefore will focus on the potential impact of the inert recovery material on the land, soils and geology at the site.

8.5 Potential Impact Assessment

8.5.1 Likelihood of Impacts

It is anticipated that the main environmental factors associated with the soils and geology across the site and within its immediate environs are not likely to be significantly affected by the proposed project.

Contaminated soils or buried waste are not anticipated at the site based on historical site information and the detailed site walkover undertaken.

8.5.2 Assessment Criteria

The significance of potential impacts on geological and hydrogeological sensitive receptors was estimated by implementing the National Roads Authority (NRA) *Design Manual for Roads and Bridges (*DMRB) and IGI Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (2013) style of assessment using geological type attributes and measures to determine the magnitude of the impact on the attribute.

Table 1-1 Estimation of Importance of Sensitive Attributes illustrates the criteria for determining the importance of sensitive receptors at the site, Table 1-2 demonstrates the criteria for estimating the magnitude of the impact on an attribute and Table 1-3 presents the resulting estimation of the significance of potential impacts.

Importance	Criterion	Typical Examples
Very High	Attribute has a high quality, significance or value on a regional or national scale Degree or extent of soil contamination is significant on a national or regional scale.	Geological feature rare on a regional or national scale (NHA) Large existing quarry or pit Proven economically extractable mineral resource
High	Attribute has a high quality, significance or value on a local scale. Degree or extent of soil contamination is significant on a local scale	Contaminated soil on site with previous heavy industrial usage Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site) Well drained and/or high fertility soils Moderately sized existing quarry or pit Marginally economic extractable mineral resource
Medium	Attribute has a medium quality, significance or value on a local scale. Degree or extent of soil contamination is moderate on a local scale	Contaminated soil on site with previous light industrial usage Small recent landfill site for mixed wastes Moderately drained and/or moderate fertility soils Small existing quarry or pit Sub-economic extractable mineral resource
Low	Attribute has a low quality, significance or value on a local scale Degree or extent of soil contamination is minor on a local scale	Large historical and/or recent site for construction and demolition wastes Small historical and/or recent landfill site for construction and demolition wastes Poorly drained and/or low fertility soils Uneconomically extractable mineral resource

Table 1-1 Estimation of Importance of Sensitive Attributes

Magnitude	Criterion	Typical Example
Major Adverse	Results in loss of attribute and/or quality and integrity of attribute. Severe.	Loss of high proportion of future quarry or pit reserves Irreversible loss of high proportion of local high fertility soils Removal of entirety of geological heritage feature Requirement to excavate / remediate entire waste site Requirement to excavate and replace high proportion of peat, organic soils and/or soft mineral soils beneath alignment.
Moderate Adverse	Results in effect on integrity of attribute, or loss of part of attribute. Major.	Loss of moderate proportion of future quarry or pit reserves Removal of part of geological heritage feature Irreversible loss of moderate proportion of local high fertility soils. Requirement to excavate / remediate significant proportion of waste site

Magnitude	Criterion	Typical Example
		Requirement to excavate and replace moderate proportion of peat, organic soils and/or soft mineral soils beneath alignment
Minor Adverse	Results in some measurable change in attributes quality or vulnerability. Minor.	Loss of small proportion of future quarry or pit reserves Removal of small part of geological heritage feature Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils Requirement to excavate / remediate small proportion of waste site Requirement to excavate and replace small proportion of peat, organic soils and/or soft mineral soils beneath alignment
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity. Not significant.	No measurable changes in attributes
Minor Beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring.	Minor enhancement of geological heritage feature
Moderate Beneficial	Results in moderate improvement of attribute quality	Moderate enhancement of geological heritage feature
Major Beneficial	Results in major improvement of attribute quality	Major enhancement of geological heritage feature

Table 1-2 Estimation of the Magnitude of a Potential Impact on an Attribute

A qualitative approach was used in this evaluation, generally following the significance classification in Table 1-3 and through professional judgement. The significance of a predicted impact is based on a combination of the sensitivity or importance of the attribute and the predicted magnitude of any effect.

Importance of Attribute	Magnitude of Potential Impact			
	Negligible	Minor Adverse	Moderate Adverse	Major Adverse
Extremely High	Imperceptible	Significant	Profound	Profound
Very high	Imperceptible	Significant / Moderate	Profound/ Significant	Very Large
High	Imperceptible	Moderate / Slight	Significant/ Moderate	Profound/Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight / Moderate

Table 1-3 Estimation of the Significance of Potential Impact

Terms relating to the duration of impacts are as described in the EPA's guidelines on the information to be contained in Environmental Impact Assessment Reports draft (August 2017) as:

- Momentary Effects - Effects lasting from seconds to minutes
- Brief Effects - Effects lasting less than a day
- Temporary Effects - Effects lasting less than a year
- Short-term Effects - Effects lasting one to seven years.
- Medium-term Effects - Effects lasting seven to fifteen years.
- Long-term Effects - Effects lasting fifteen to sixty years.
- Permanent Effects - Effects lasting over sixty years
- Reversible Effects - Effects that can be undone, for example through remediation or restoration

The prediction of potential impacts by the proposed development are summarised in the following sections and tables. The impacts are separated into construction stage impacts and operational stage impacts.

8.5.3 Potential Cumulative Impacts

The EU Guidelines[5] define cumulative impacts as:

"Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. For example:

- Incremental noise from a number of separate developments;
- Combined effect of individual impacts, e.g. noise, dust and visual, from one development on a particular receptor; and,
- Several developments with insignificant impacts individually but which together have a cumulative effect."

5 Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions, May 2009, EC DG XI Environment, Nuclear Safety & Civil Protection Ref: NE80328/D1/3

The EPA Guidelines on the Information to be contained in Environmental Impact Statements mirrors this approach and defines cumulative impacts as "The addition of many small impacts to create one larger, more significant, impact".

Therefore, the assessment of cumulative impacts considers the total impact associated with the proposed development when combined with other past, present, and reasonably foreseeable future developments.

The site is a previously excavated sand and gravel quarry. No other quarries or similar type of development that could impact on the soil and geology environment is present in proximity to the site. No further excavation works are proposed across the site. Therefore, it is considered that the overall development will have an imperceptible cumulative impact on the underlying geology.

8.5.4 'Do-Nothing' Impacts

If the proposed project does not go ahead there will be no impact from the proposed site operations on the soils and geology at the site. It is envisaged that the land use would remain unchanged as a former sand and gravel quarry site.

8.5.5 Interaction with Other Impacts

No interactions with other impacts have been identified for the land, soils or geology attributes associated with the proposed development.

8.5.6 Potential Impacts Risks

Table 1-4 outlines the range of potential impacts associated with the construction and operational phases of the proposed development.

8.5.6.1 Operational Phase Potential Impacts

No.	Operational Activity	Attribute	Character of Potential Impact	Importance of Attribute (see Table 5.1)	Magnitude of Potential Impact (see Table 5.2)	Significance of Potential Impact (see Table 5.3)
1	Excavation Works	Bedrock	It is anticipated that the development of the site preparation works will not be deep enough to intersect or impact the underlying bedrock geology. Therefore, the impact on bedrock is considered to be imperceptible	Medium	Negligible	Imperceptible
2	Excavation Works	Site Subsoils	The subsoils are already exposed at the site from historical quarry operations and the planned site preparation works are not anticipated to excavate significant additional subsoils. Some site preparation works will be required including the construction of a new access road off the L4015, the creation of a permeable carpark and regrading of the ground surface in the stockpiling and sorting area. These will involve localised shallow excavation in areas previous excavated as part of the historical quarrying operations.	Medium	Negligible	Imperceptible

No.	Operational Activity	Attribute	Character of Potential Impact	Importance of Attribute (see Table 5.1)	Magnitude of Potential Impact (see Table 5.2)	Significance of Potential Impact (see Table 5.3)
3	Vehicle traffic	Subsoils	There may be a risk of soil pollution from site traffic through the accidental release of oils, fuels and other contaminants from vehicles. Risks to groundwater and surface water are discussed in more detail in Chapter 9.	Medium	Moderate Adverse	Moderate
4	Fuel Storage/Usage on site	Subsoils	Accidental spillage of contaminants during vehicle movements or refuelling of machinery on site may cause short to long term, moderate to significant impacts to subsoils and to future site users if not stored and used in a an environmentally safe manner. Potential impacts to groundwater are addressed separately within Chapter 9.	Medium	Moderate Adverse	Moderate
5	Contaminated land / waste	Subsoils	The importation of unsuitable or contaminated fill material may pose a risk to the groundwater aquifer and surface waters in proximity to the site. However, any imported fill for filling in the worked-out quarry is expected to be inert and therefore the risk is considered to be imperceptible.	Medium	Negligible	Imperceptible

Table 1-4 Potential Operational Impacts

8.6 Avoidance, Remedial & Mitigation Measures

Mitigation measures are outlined here for the site preparation and operational stage of the proposed inert waste recovery facility. The site preparation stage is relatively short lived and is required before the recovery of the inert material can take place at the site.

8.6.1 Site Preparation Stage

During the site preparation stage some soils will be stripped to facilitate road construction and the construction of some hard-standing areas. Any soils stripped with be temporarily stockpiled on site ready for use in restoration.

In order to preserve the structure and integrity of the soils and limit the effects of erosion on the on the stored soil the following measures will be implemented:

- Soil material placed in stockpiles will be at a safe angle of repose.
- Stockpiles will be re-vegetated where they are in place for a sufficient length of time to justify such a measure; and
- The re-handling of soil material will be minimised as much as possible in order to preserve the integrity of the stripped material. This is also an economically prudent practice.

8.6.2 Site Operational Stage

The following mitigation measures are required during the operational element of the development: If these measures are implemented, the residual risks posed to the underlying subsoils and geology are considered to be imperceptible.

- Topsoiling and landscaping of the works shall be undertaken as soon as finished levels are achieved, in order to reduce weathering and erosion and to retain soil properties. Any existing topsoil shall be retained on site to be used for the proposed development.
- Topsoil shall be stored in an appropriate manner on site for the duration of the construction works and protected for re-use on completion of the main site works.
- Suitable runoff and sediment control measures shall be designed and implemented prior to and during construction activities. These control measures depend upon weather conditions, site characteristics and operational activities and will ensure protection to the underlying subsoils and groundwater aquifer.
- The provision of wheel wash facilities close to the site entrance shall reduce the deposition of mud, soils and other substances on the surrounding road network.
- Reusable excavated gravels, sands or rock shall be retained on-site for backfilling or drainage purposes to reduce the total volume of imported material.
- An existing bunded, roofed storage area shall be upgraded/repaired for the storage of hazardous materials such as fuels, oils and concrete additives on-site. This area shall be designed in accordance with EPA Guidance IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities, taking into account criteria for bund requirements (e.g. 110% of the capacity of the largest tank or drum within the bunded area; or 25% of the total volume of substance which could be stored within the bunded area, whichever is greater).

- A separate drainage system serving the proposed fuel storage area and re-fuelling area is proposed. Surface water arising in the re-fuelling area will be captured by this drainage system and directed to a silt-trap, an oil interceptor and a soakaway.
- Waste fuels and materials shall be stored in designated areas that are isolated from surface water drains or open waters (*e.g.* excavations). Skips shall be closed or covered to prevent materials being blown or washed away and to reduce the likelihood of contaminated water leakage. Hazardous wastes such as waste oil, chemicals and preservatives, shall be stored in sealed containers and kept separate from other waste materials while awaiting collection by a registered waste carrier. Fuelling, lubrication and storage areas and site offices shall not be located within 25m of drainage ditches, surface waters or open excavations. Fuel interceptor tanks shall be installed on the site to treat any runoff.
- All waste containers (including all ancillary equipment such as vent pipes and refuelling hoses) shall be stored within a secondary containment system (*e.g.* a bund for static tanks or a drip tray for mobile stores and drums). The bunds shall be capable of storing 110% of the tank capacity. Where more than one tank is stored, the bund shall be capable of holding 110% of the largest tank of 25% of the aggregate capacity (whichever is greater). Drip trays used for drum storage shall be capable of holding at least 25% of the drum capacity. Where more than one drum is stored the drip tray shall be capable of holding 25% of the aggregate capacity of the drums stored.
- Spill kits shall be kept in these areas in the event of spillages.
- Hazardous waste shall be dealt with in accordance with the Waste Management (Hazardous Waste) Regulations.
- All potentially hazardous materials shall be securely stored on site.
- Back-up plans to deal with the possibility of contamination shall be developed and included in an overall Construction Environmental Management Plan (CEMP).
- Any vehicles utilised during the operation of the development shall be maintained on a weekly basis and checked daily to ensure any damage or leakages are corrected. The potential impacts are limited by the size of the fuel tank of the largest plant / vehicles used on the site. Precautions shall be taken to avoid spillages. These include:

    a. Use of secondary containment e.g. bunds around oil storage tanks;
    b. Use of drip trays around mobile plant;
    c. Supervising all deliveries and refuelling activities; and,
    d. Designating and using specific impermeable refuelling areas isolated from surface water drains.

- Special environmental and human health contingency plans and procedures, following best-practice guidance and in accordance with Waste Management Legislation and Regulations, shall be developed for the unexpected discovery of contaminated or illegally deposited waste materials, if encountered.
- Adequate security measures shall be installed on the site. Early assessment of the sensitivity of the project and identifying potential locations at risk will assist in the design of the site layout and security measures required. Security measures will include secure fencing, secure site access, securing site plant and equipment, secure storage of materials, sufficient warning signage, and security lighting.

8.7 Residual Impact Assessment

The residual impacts on land, soil and geology are those impacts which remain following the implementation of the mitigation measures outlined above

8.7.1 Site Preparation Stage

The soils at the site will be stored in accordance with best practice to preserve the structure and integrity of the soils. The soils will be reused at the site for restoration to agricultural land. With this mitigation measure in place it is considered that the residual impact on soils will be low.

8.7.2 Operational Stage

The recovery of the inert waste material at the site and the restoration of the former landform will facilitate the restoration of soils across the site and the beneficial landuse in terms of agriculture and ecological habitats. The residual impact of the proposed recovery facility therefore will be both positive and beneficial.

8.7.3 Reinstatement

The principal activity which will be undertaken at the application site is backfilling and restoration of lands within an existing sand and gravel quarry. A cover layer comprising 150 mm of topsoil and approximately 350 mm of subsoil shall be placed over the inert backfilled materials on completion of the backfilling activities. This will then be planted with grass in order to promote stability and minimise soil erosion and dust generation. Thereafter the lands will be progressively returned to use as agricultural grassland.

It is envisaged trees planted during the lifetime of the facility along the northern, eastern and south western boundaries will have reached their semi-mature stage and will be retained. Existing vegetation along the western boundary of the site will also be retained. It is envisaged that trees around the perimeter of the site will promote soil stability and minimize soil erosion around the boundary of the fill area where steeper gradients will be present.

On progression and completion, the final landform will be modified as necessary to ensure that surface water run-off across the site is directed to the boundary ditch along the western border of the site. Existing settlement ponds situated on-site will ultimately be filled in.

On completion, all mobile plant and equipment associated with the waste recovery activities will be removed off-site. Any dedicated temporary site accommodation, infrastructure and/or services will also be progressively decommissioned and/or removed off-site.

A Landscape Restoration Plan detailing the final landscape proposal on-site adjoins the Planning Application (Drawing Ref. 1467-002)

8.8 Monitoring

Following the restoration of the site monitoring of the site shall be undertaken over a three Year period to ensure that the restored soil and landuse is successful to pastoral agricultural landuse in accordance with the Landscape Restoration Plan.

9. Hydrogeology & Hydrology

9.1 Introduction

This chapter of the EIAR assesses the impact on the hydrogeological and hydrological environments of the proposed development. The objectives are to provide a review of baseline conditions across the footprint of the site, to assess the potential impact of the proposed development on the hydrological and hydrogeological environments and to provide appropriate mitigation measures for any identified potential impacts, if deemed necessary.

9.2 Assessment Methodology

The methodology used in the investigation follows the guidelines and advice notes provided by the Environmental Protection Agency on environmental impact assessments and the Institute of Geologists of Ireland's (IGI) guide or the preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements.

Existing information on the surface water, groundwater and geological features at the site and the surrounding area was collated and evaluated. Monitoring data from the site in relation to groundwater levels and groundwater quality was assessed.

The methodology involved in the assessment can be summarised as follows:

- A desk study, in which existing data and relevant regional data sources for the area were examined;
- Field visits in which aspects of the surface water management at the site and the sites hydrology and hydrogeology were examined;
- Groundwater level monitoring data provided by the client; and
- Analysis of the information gathered.

Unmitigated potential impacts on hydrology and hydrogeology are considered for the initial assessment, before appropriate mitigation measures for the potential impacts identified are discussed, and the identified potential impacts reassessed assuming the identified mitigation measures in place which assess residual risk.

The following sources of information were used in the compilation of this assessment:

- Ordnance Survey of Ireland, Discovery Series, Sheet 61.
- Ordnance Survey of Ireland (OSI) online historical maps and aerial photographs.
- Geology of Kildare-Wicklow, Geological Survey of Ireland (GSI) (1:100,000), Sheet 16.
- County Kildare Groundwater Protection Scheme (2002).
- GSI On-line Groundwater Database. Aquifer Classification, Aquifer Vulnerability.
- GSI New Ross and Ballyglass Groundwater body (GWB).
- Soil Map of Ireland (Second Edition, 1980), National Soil Survey of Ireland, An Foras Talúntais.
- National Parks and Wildlife Service on-line database www.npws.ie.
- EPA online water quality mapping; https://gis.epa.ie/EPAMaps/
- OPW hydro-data (http://www.opw.ie/hydro-data);
- Met Eireann - met.ie – monthly climatological data.
- Kildare County Council online planning files and County Development Plan.

- Further information request (PPR 06/2802) by Kildare County Council for the continued operation for the extraction of sand & gravel & all associated processing works at Graney West, County Kildare. Golder Associates (November - 2007)
- Environment Assessment Report 1969-01 v2.00 Re: Application for permission for the development of a Waste Recovery Facility at a disused quarry site in Graney West, Castledermot, Co. Kildare. Environmental Efficiency (February - 2018).

This chapter was undertaken in accordance with the following:

- Guidelines on the information to be contained in Environmental Impact Statements (EPA, 2002),
- Geology in Environmental Impact Statements a Guide, (IGI, 2002),
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes, NRA Document.
- Guidelines for the preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013),
- DELG/EPA/GSI (1999). Groundwater Protection Schemes. Document prepared jointly by the Geological Survey of Ireland (GSI), the Environmental Protection Agency, and the Department of Environment, Heritage and Local Government.
- Draft EPA revised Guidelines on information to be contained in Environmental Impact Statements; and Advice Notes for preparing EIS, 2015.

9.3 Baseline Environment

9.3.1 Site Location and Context

The site in Graney West, Castledermot, Co. Kildare, is approximately 2 km to the south-east of Castledermot village (Figure 9-1), and 12 kilometres from the town of Balltinglass, in Co. Wicklow. The site is located in a rural agricultural area with grazing and tillage being the main agricultural activities. A number of historic sand and gravel extraction sites are situated in the broader area of the site. There are 12 no. residential developments within a radius of 500m, mainly to the east, north and south of the application site.

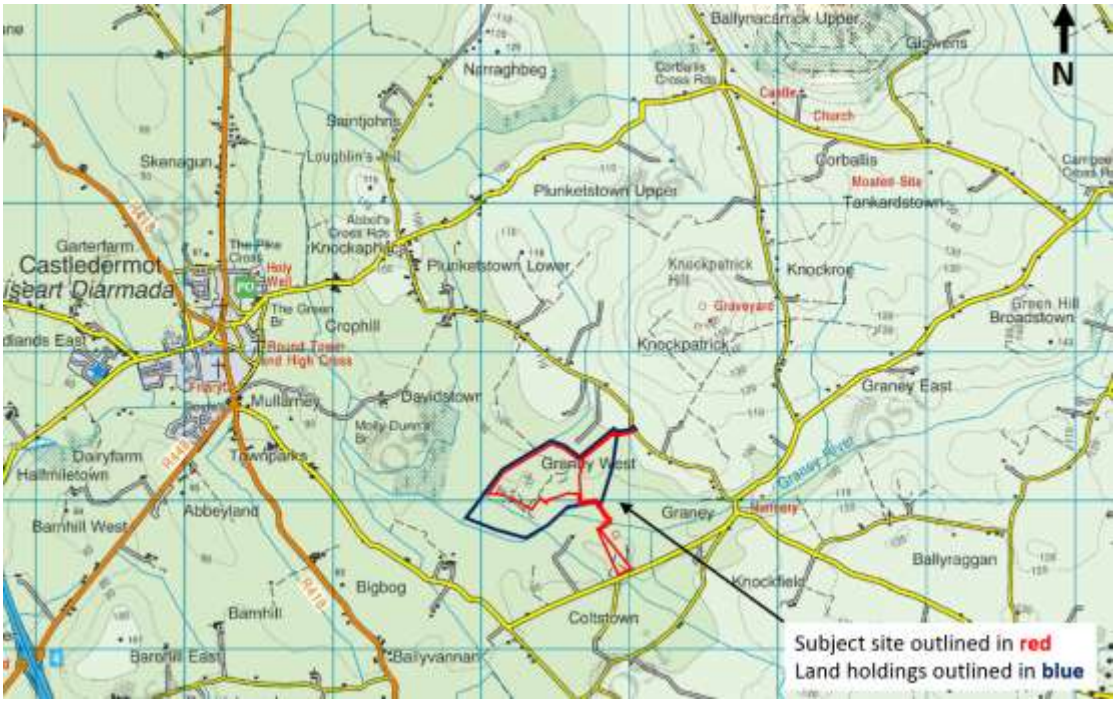


Figure 9-1 Site Location Map

9.3.2 Site History

The site was previously operated as a sand and gravel quarry. Quarrying activities ceased (circa 2007) within the application site when full extraction of materials occurred. The resulting terrain across the site comprises worked out quarry voids. Sand and gravel soils in these areas were previously extracted, leaving mineral sub-soil/rock exposed at the ground surface. Ground levels across the site have been significantly disturbed over time and lowered by the historical quarrying activities. Original ground levels across the quarry typically ranged between a high of 95 mOD to a low of 81 mOD. Existing quarry floor levels typically vary from a high of 86.7 mOD to a low of 79 mOD.

Quarrying activities will continue to take place in an adjacent field to the north of the site outside the application site boundary in accordance with the existing planning permission (Ref. 06/2802).

There are several quarries located within a 5 km radius predominantly, to the east and into Co. Carlow. The closest large quarry is located 1.1 km to the north-west and there is a smaller quarry located 1.6 km to the east.

9.3.3 Site Description

The application site covers an area of 19.2 hectares. Pockets of tree groves and vegetative growth occur sporadically throughout the site, with hedgerows existing along sections of the site boundary. A series of settlement lagoons are located in the southern region of the site for the purposes of managing surface water run-off.

The following buildings, facilities, services and infrastructure, utilized in connection with the pre-existing quarry activity and farming activities, are currently present on-site.

- Site offices (2 x portable cabins)
- Washing plant and ancillary equipment
- Stockpiling areas and existing retaining walls
- Existing site access road to the east of the site
- Internal haul routes
- Covered, bunded fuel tanks
- Non-permeable concrete area (surrounding residence and farm buildings/structures)
- Covered, slatted effluent tank
- Site boundary trees and vegetation
- SW/foul drainage infrastructure; existing SW/foul drains, pump house, septic tank, soak hole and settlement lagoons (x 3).
- Dwelling house and its curtilage
- Various agricultural buildings and structures used in connection with farming activity, including cattle shed (with effluent tank), outhouse and horse boxes, horse paddock, silage pit, farm store and racking area.

An existing concreted yard area surrounds these buildings present on-site. Plant and equipment used in connection with pre-existing quarrying activities are also situated in this area and immediately south of the area.

There are several quarries located within a 5 km radius predominantly, to the east and into Co. Carlow. The closest large quarry is located 1.1 km to the north-west and there is a smaller quarry located 1.6 km to the east.

9.3.4 Proposed Development

Sancom Ltd proposes on establishing and operating a Material Recovery Facility (MRF) at the site. The principal activity will involve the use of imported, uncontaminated soil and stone, sourced from construction sites, to backfill and restore the worked-out quarry. A detailed description of the proposed activities is provided in Section 5 with a summary outlined below:

- Sancom Ltd intend on accepting a maximum of approximately 1.8 million tonnes of soil and stone material on-site per annum for backfilling over the course of 10 to 25 years, depending on market demand for disposal services.
- The proposed activity above will be for the purposes of recovering said materials through land deposition, and to achieve the improvement and development of land and site restoration. The material accepted on-site will be inert and will comprise subsoil, clay, gravels, topsoil, stone and mixtures of such.
- The proposed activity will include the placement of cover soils and seeding and return to use as agricultural grassland.
- In addition to the principal waste activity described above, it is proposed to carry out the following waste recovery activities on-site:
- Intake of top-soil, screening at existing screening plant and resale of such material,
- Intake of gravel and sands, washing at existing washing plant and resale of such materials,
- Intake of concrete, concrete crushing using concrete crushing equipment, mixing with sand and gravel before being fed to the washing plant to form aggregate, and resale of such material, and;

- Intake of garden waste, shredding and composting of this waste for use for agricultural land spreading.

It is proposed to utilise pre-existing plant and, in addition, install further plant on-site to be used in connection with the proposed development activity.

9.3.5 Previous Investigations

The following reports were reviewed during the compilation of this EIAR chapter on Hydrology and Hydrogeology and the pertinent information is contained in the subsequent sections:

3. *Items 1 to 9 of Further Information Request (PPR 06/2802) by Kildare County Council for a Sand and Gravel Quarry at Graney West, County Kildare*, Golder Associates, November 2007.
4. *Environment Assessment Report 1969-01 v2.00 Re: Application for permission for the development of a Waste Recovery Facility at a disused quarry site in Graney West, Castledermot, Co. Kildare*. Environmental Efficiency, February 2018.
5. *Surface Water and Groundwater Testing Report for Sancom Ltd*., Environmental Efficiency, March 2020.

9.3.6 Topography

The site at Graney West slopes from north to south (a fall of approximately 10m in 500m). Based on a topographical survey (2007) the elevation along the northern boundary is approximately 87 mOD while the area in the south of the site is approximately 81.5 mOD. The site slopes towards the River Graney which lies at approximately 80 mOD. The River Graney flows from east to west towards the River Lerr at Castledermot, along the southern boundary of the land holding area. To the north the land elevation increases towards Knockpatrick Hill with a topographical high greater than 160 mOD.

9.3.7 Subsoils and Bedrock

A detailed description of the subsoils and bedrock across the site is provided in Chapter 7.

A brief summary is provided below:

- According to GSI sheet 16, the bedrock geology beneath the site mapped by the GSI as Tullow Type 2 Granite, a microcline porphyritic granite with microcline phenocrysts. These Tullow granites compose the Tullow Pluton of the Leinster Granite intrusion and are extremely weathered and broken down.
- The depth to granite bedrock was recorded between 9.15 and 12.3m during the drilling of deep groundwater boreholes on-site in 2019.
- There is no mapped bedrock outcrop within the site boundary.
- Subsoils (Quaternary Sediments) underlying the site are comprised of gravels derived from limestones. The overburden was recorded as sandy gravel at depths of between 9.15 and 12.3m during the drilling of deep groundwater boreholes on-site in 2019.

9.3.8 Hydrogeology

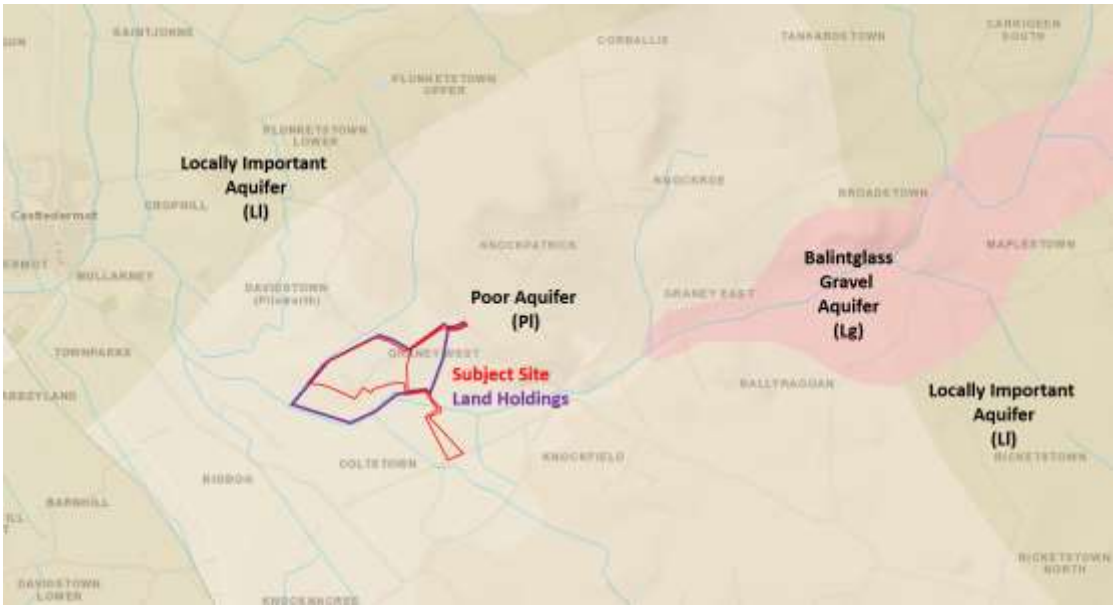
Groundwater can be defined as water that is stored in, or moves through, pores and cracks in sub-soils. The potential of rock to store and transport water is governed by permeability of which there are two types, inter-granular and fissure permeability. Intergranular permeability is found in sediments, sands, gravels and clays as are also present at the subject site, and fissure permeability which is found in bedrock, where water moves through (and is stored in) cracks, fissures, fracture planes and solution openings for example. Aquifers are generally classified as rocks or other matrices that contain sufficient void spaces and which are permeable enough to allow water to flow through them in significant quantities.

9.3.8.1 Aquifer Classification

The GSI has devised a system for classifying the aquifers in Ireland based on the hydrogeological characteristics, size and productivity of the groundwater resource into the National Draft Bedrock Aquifer Map. The three main classifications are Regionally Important Aquifers, Locally Important Aquifers, and Poor Aquifers. Each of these types of aquifer is further subdivided and has a specific range of criteria associated with it, such as the transmissivity (m^2/day), productivity, yield, and the potential for springs.

Graney West is located in the New Ross Groundwater Body (GWB) which is comprised of both moderately productive and unproductive aquifers. The site is underlain by granite bedrock, classified as a poor aquifer which is generally unproductive except for local zones (Pl) (Figure 9-2). Irish granites do not provide large groundwater supplies but can generally provide reliable water supplies for domestic and farm supplies. To the north, west and east the bedrock is described as a Locally Important Aquifer - granite bedrock which is moderately productive only in local zones (Ll).

The Baltinglass Gravel Aquifer within the Ballyglass GWB is mapped to the east of the site. Although it does not appear to underlie the site, it is noted to be thick enough to constitute a sand & gravel aquifer.



Source: GSI

Figure 9-2 Aquifer Classification

9.3.8.2 Characteristics and Properties of the Aquifer

There are no available data for the granite aquifers in the New Ross GWB. The granites in this area have undergone tectonic stresses, resulting in faulting and fracturing and are noted to have been extensively weathered to depths of 30m. Increased rock fracturing is likely to be a focus for groundwater flow.

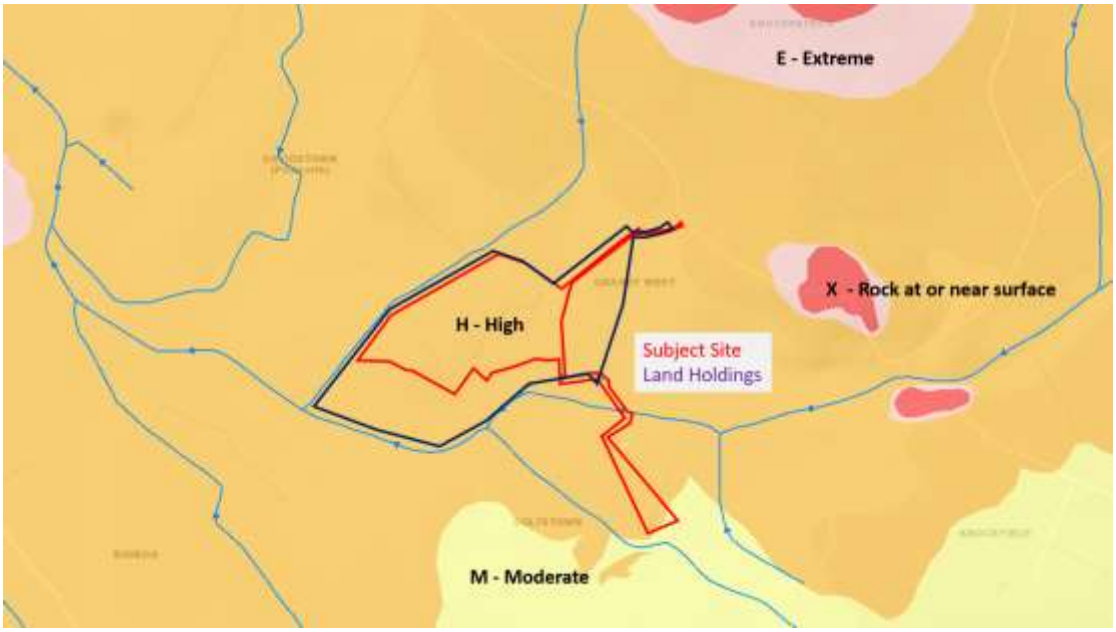
9.3.8.3 Regional Aquifer Vulnerability

The GSI classify aquifer vulnerability as the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. The vulnerability of groundwater depends on the ability of contaminants to migrate to the underlying aquifer which is dependant predominantly on the permeability and thickness of the subsoils overlying the groundwater body and the types of recharge source (i.e. diffuse or point source) (see Table 9-1). Under the GSI groundwater vulnerability classification scheme the mapped vulnerability at a location applies to the shallowest groundwater target (i.e. aquifer) at the location.

A groundwater vulnerability map is provided in (Figure 9-3) and outlines the GSI aquifer vulnerability mapping for the area in the vicinity of the site. Aquifer vulnerability is largely dependent on overburden thickness and the inherent permeability of the bedrock. If bedrock is near or exposed at the surface the groundwater classification will be extreme. A detailed description of the groundwater vulnerability categories can be found in the Groundwater Protection Schemes document (DELG / EPA / GSI, 1999) and in the draft GSI Guidelines for Assessment and Mapping of Groundwater Vulnerability to Contamination (Fitzsimons et al, 2003). According to the GSI the vulnerability classification for the site is **High (H)**, likely based on the presence of high permeability sand and gravel subsoils.

Vulnerability Rating	**Hydrogeological Conditions**				
	Subsoil Permeability (Type) and Thickness			**Unsaturated Zone**	**Karst Features**
	High Permeability (sand/gravel)	Moderate permeability (e.g. sandy subsoil)	Low permeability (e.g. clayey subsoil, clay, peat)	(Sand/gravel aquifers only)	(<30m radius)
Extreme (E)	0 – 3.0m	0 – 3.0m	0 – 3.0m	0 – 3.0m	-
High (H)	> 3.0m	3.0 – 10.0m	3.0 – 5.0m	> 3.0m	N/A
Moderate (M)	N/A	> 10.0m	5.0 – 10.0m	N/A	N/A
Low (L)	N/A	N/A	> 10.0m	N/A	N/A
Notes: (1) N/A = not applicable (2) Precise permeability values cannot be given at present (3) Release point of contaminants is assumed to be 1-2m below groundwater surface					

Table 9-1 Vulnerability Mapping Criteria (adapted from DELG / EPA / GSI, 1999)



Source: GSI

Figure 9-3 Groundwater Vulnerability Map

9.3.8.4 Groundwater Water Framework Directive Status

Graney West is located in the New Ross GWB. Work completed for the Water Framework Directive has assigned 'Status' to surface waters and groundwater (http://wfdireland.ie/maps.html). The Water Framework Directive status of the New Ross GWB (IE_SE_G_102) is rated as good (based upon final RBMP, 2009-2015) with a future projection of 1b probably at risk.

9.3.8.5 Groundwater Recharge

The GSI has published Groundwater Recharge Mapping for almost all of Ireland. Potential or effective rainfall is the amount of rainfall that is available to infiltrate the ground and that will not evaporate or be taken up by plants. The effective rainfall for the area is 515 mm/year. Groundwater recharge in this area is likely to occur over most of the land surface through the sands and gravels and permeable tills and will discharge in local areas. Due to the low storage capacity of this aquifer a recharge cap of 100 mm/year applies in this area.

Across the existing worked out pit the soils and vegetation has been removed and there is no evapotranspiration, the majority of rainfall will recharge the underlying Sand/Gravel aquifer.

9.3.8.6 GSI Well Database and Local Groundwater use

The GSI online map identifies the following list of wells within 1 km of the site as outlined in Table 9-2 below:

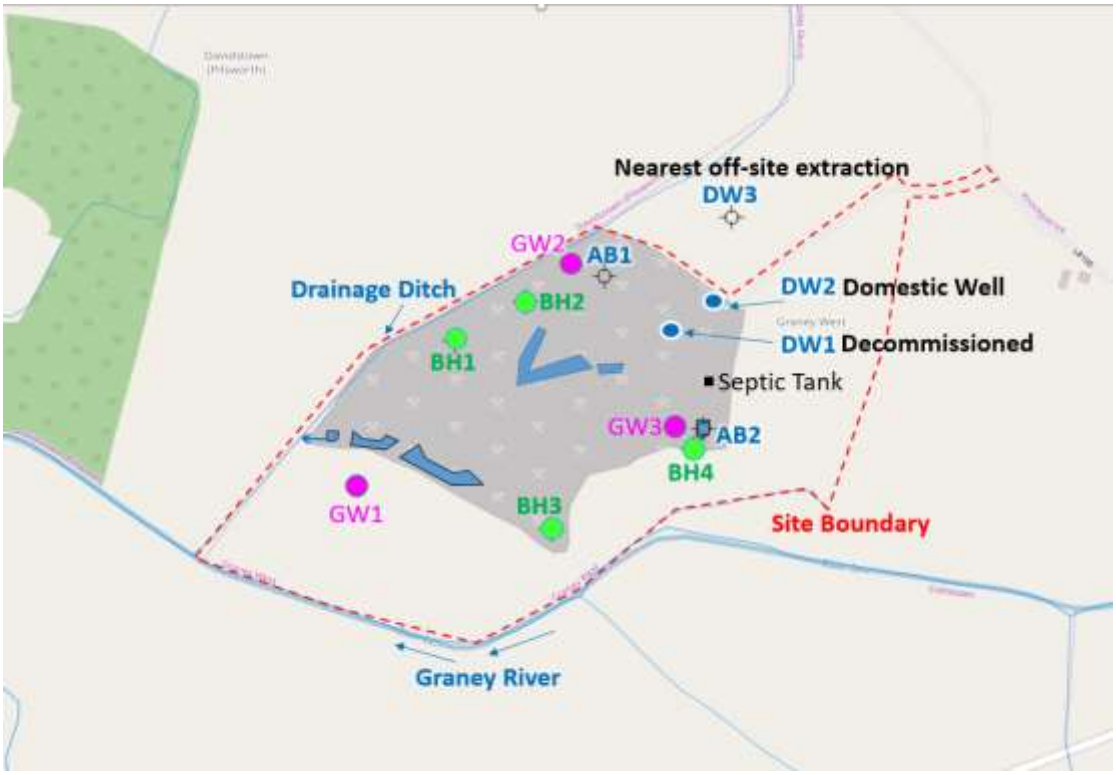
Name	E	N	Well Type	Depth (m)	Bedrock (m)	Well Use	Yield (m^3/d)	GSI yield class
2617NEW236	280360	183500	Dug Well	2.4	2.4	Unknown	21.82	Poor
2617NEW367	280280	183230	Dug Well	2.4	Unknown	Unknown	Unknown	Unknown
2617NEW363	280560	184230	Dug Well	6.1	Unknown	Unknown	Unknown	Unknown
2617NEW365	279770	183580	Dug Well	2.1	Unknown	Unknown	Unknown	Unknown
2617NEW366	279630	183260	Dug Well	1.8	Unknown	Unknown	Unknown	Unknown
2617NEW244	280020	182340	Borehole	9.8	4.6	Unknown	27.28	Poor
2617NEW235	281240	185060	Borehole	16.2	3.7	Unknown	21.82	Poor
2617NEW222	280670	185250	Borehole	27.4	21.3	Agri & Domestic	27.3	Poor
2617NEW248	278680	184680	Borehole	43.6	Unknown	Unknown	5.46	Poor

Table 9-2 Groundwater wells within 1 km

Well (2617NEW363) listed in Table 3.2 was a 6m deep hand-dug well located on-site but has now been decommissioned (see DW1, Figure 9-4). A domestic borehole on-site currently supplies the existing residence and is installed into the bedrock aquifer (see DW2, Figure 9-4). This is the only well regularly abstracting groundwater from the bedrock aquifer on-site. No other information is available about this borehole.

Groundwater was historically abstracted from two wells installed within the shallow gravels on-site for quarrying and concrete manufacture (see AB1 and AB2, Figure 9-4). AB1 comprised a concrete ring set within a shallow trench. Water was pumped from this point to the concrete batching plant at intermittent intervals. AB2 comprised an excavated pond from which water was pumped to the gravel washing plant. AB2 was reported to have been periodically topped up with water pumped from the nearby Graney River. Historically recorded groundwater level analysis indicated the abstraction from these locations, when in operation, did not significantly impact on groundwater levels in the area.

The majority of households within the vicinity of the site use mains water supply. The nearest domestic groundwater abstraction well was found to be 50m north of the quarry site boundary (see DW3 Figure 9-4).



Source: OpenStreetMap.

Figure 9-4 Groundwater Features

9.3.8.7 EPA/GSI Source Protection Zones

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

There are two main elements to source protection land surface zoning:

- Areas surrounding individual groundwater sources; these are termed source protection areas (SPAs)
- Division of the SPAs on the basis of the vulnerability of the underlying groundwater to contamination.

These elements are integrated to give the source protection zones. Two source protection areas are recommended for delineation:

- Inner Protection Zone (IPA). This area is designed to protect against the effects of human activities that might have an immediate effect on the source and, in particular, against microbial pollution. The area is defined by a 100-day time of travel (TOT) from any point below the water table to the source. In karst areas, it will not usually be feasible to delineate 100-day TOT boundaries, as there are large variations in permeability, high flow velocities and a low level of predictability. In these areas, the total catchment area of the source will frequently be classed as SI.
- Outer Protection Zone (OPZ), encompassing the remainder of the groundwater source catchment area or Zone of Contribution (ZOC). It is defined as the area needed to

support an abstraction from long-term groundwater recharge i.e. the proportion of effective rainfall that infiltrates to the water table.

There are no source protection areas or public water supply (PWS) schemes within 3km of the site. No karst features have been identified within 10km of the site.

9.3.8.8 Site Hydrogeology

Four (4 no.) Shell and Auger boreholes were drilled and installed as groundwater monitoring wells (10-13th July 2007) around the perimeter of the site to a depth. The ground conditions were reported to comprise firm brown sandy gravelly clay overlying fine sand and dense medium gravels with large cobbles. The borehole logs did not record any groundwater strikes during drilling operations.

The monitoring well details are presented in Table 9-3 and the locations outlined in Figure 9-4. The groundwater levels were recorded during the period of July 2007 which was noted as one of the wettest on record. The groundwater levels ranged between 0.65 and 3.45 mbgl (78.8 and 80.4 mOD). The highest levels were recorded within BH4 located in the southeast of the site and the lowest levels were recorded within BH1 located in the west of the site.

Three (3 no.) of deeper groundwater wells were drilled in 2019 (GW1, GW2 and GW3). In the absence of borehole logs, summary details are outlined in Table 9-4. The wells were drilled to depths of between 25.9 and 74.7m. The depth to bedrock was recorded between 9.15 and 12.3m. The wells were sampled for groundwater quality on 29/06/2019. Groundwater manual dips recorded on the day recorded groundwater levels between 0.74 and 1.6 metres below top of well casing (mbtoc). These wells are reported to yield between 10.91 and 21.82 m^3/day which is consistent with expected yields within this bedrock aquifer. These wells have not been surveyed to Ordnance Datum and therefore groundwater contours have not been produced to-date.

BH ID	Total Depth (mbgl)	Ground Level (mOD)	Water Level (mbgl)*	Water Level (mOD)*	Screened depth (mbgl)	Lithology
BH1	4.5	79.83	0.9 – 1.0	78.83 – 78.9	1.0 – 4.5	Dense medium gravels with large cobbles (0 - 3.2m) overlying fine brown-grey sand (3.2 - 4.5m).
BH2	7.0	82.93	3.4 – 3.45	79.48 – 79.53	1.0 – 7.0	Firm brown sandy gravelly clay with occasional cobbles (0 - 1.8m) overlying dense medium gravels with large cobbles (1.8 - 6.1m) overlying fine brown granular sand (6.1 - 7.0m).
BH3	4.0	79.85	0.65 – 0.68	79.17 – 79.2	1.0 – 4.0	Firm sand and gravel with large cobbles (0 – 2m) overlying firm fine sand with gravels and occasional cobbles (2.0 – 4.0m)
BH4	4.0	82.76	2.3 – 2.4	80.36 – 80.43	10 – 4.0	Firm brown sandy gravelly clay (0 - 1.2m) overlying dense medium gravels with cobbles (1.2 - 4.0m)
*Recorded on 18th, 23rd and 30th July 2007.						

Table 9-3 Summary Borehole Logs 2007

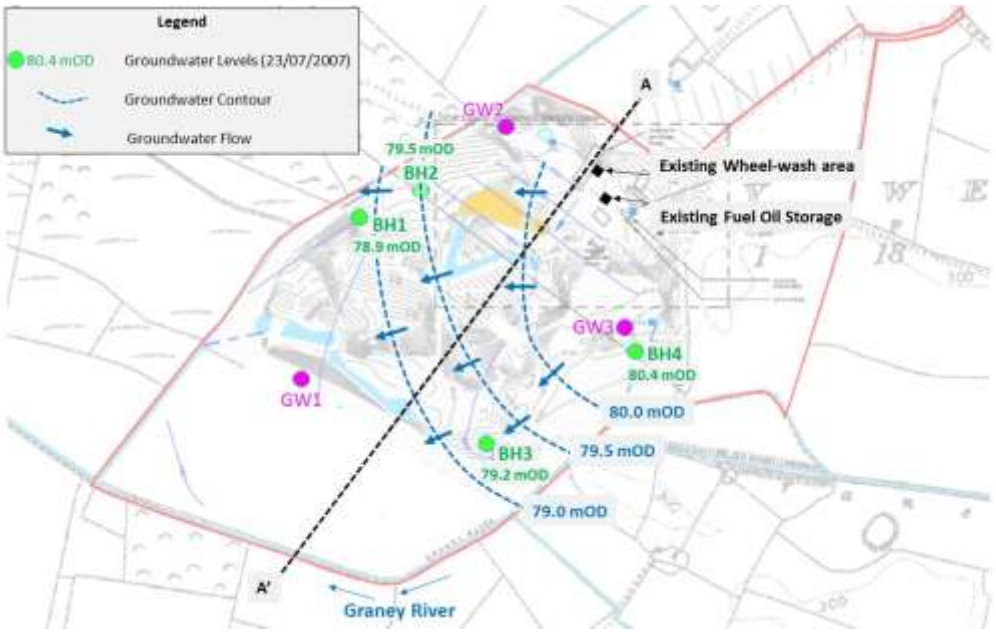
BH ID	Total Depth (mbgl)	Ground Level (mOD)	Water Strikes (mbgl)	Water Levels* (mbtoc)	Screened depth (mbgl)	Lithology
GW1	74.7	TBC-	67.1	0.74	24.4 - 74.7	Overburden sandy gravel (0 - 12.3m) overlaying granite (12.3 - 74.7m).
GW2	50.3	TBC	42.7	0.9	18.3 - 50.3	Overburden sandy gravel (0 - 12.3m) overlaying granite (12.3 - 50.3m).
GW3	25.9	TBC	18.3	1.6	13.3 - 25.9	Overburden sandy gravel (0 - 9.15m) overlaying granite (9.15 - 25.9m).
*Recorded on 29th June 2019						

Table 9-4 Summary Borehole Logs 2019

9.3.8.9 Groundwater levels, Flow Directions and Gradients

Regional groundwater flows toward and discharges to the River Barrow to the southwest. The granites have been subject to a variety of different tectonic stresses and are thought to be extensively weathered to depths of 30m. This fractured zone could be the focus for groundwater flow. Local groundwater flow at the site is expected to follow the topographical relief of the area and flow in a westerly direction from the site towards Castledermot and the River Lerr.

Groundwater levels recorded in July 2007 within the shallow monitoring wells BH1 to BH4 indicate that groundwater is flowing in westerly direction across the site towards the Graney River and following the topographical relief of the area (see Figure 9-5).

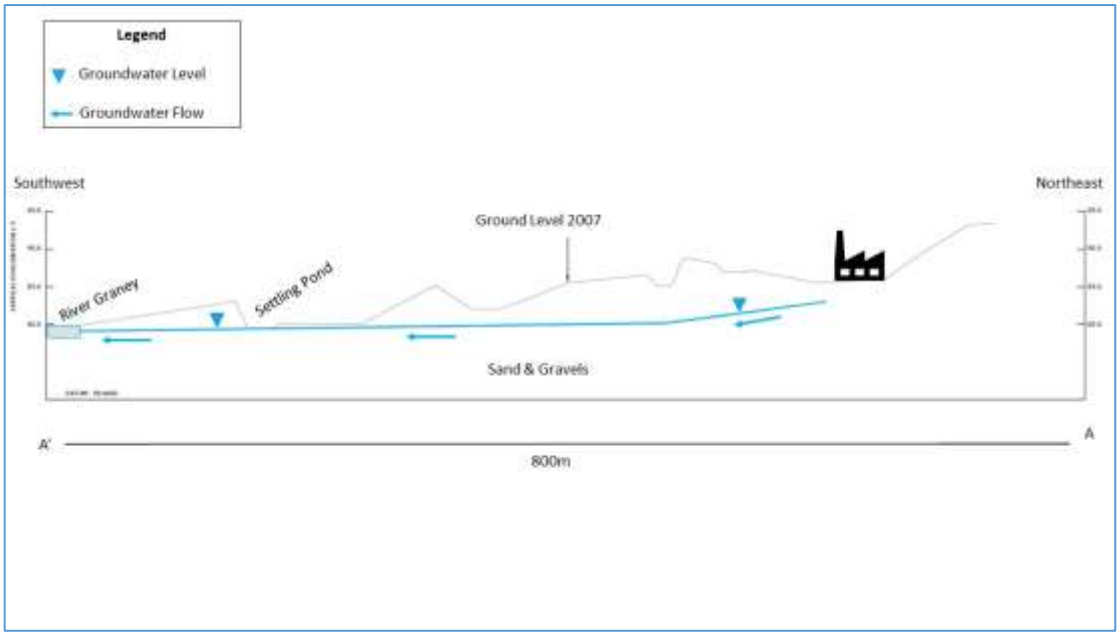


Source: Adapted from Golder, 2007.

Figure 9-5 Groundwater Flow

9.3.9 Cross-section through the site

Based on the geological and hydrogeological data collated previously across the site, a conceptual understanding of groundwater flow (see Figure 9-5) was provided in the 2007 Golder report. This interpretation is considered accurate and broadly represent current site conditions. The cross-section A-A' is delineated in Figure 9-6. Groundwater level at the site is interpreted to be in hydraulic continuity with the ponds in the southwest of the site and with the River Graney.



Source: Adapted from Golder, 2007.

Figure 9-6 Cross Section A_A'

9.3.9.1 Site Groundwater Quality

Groundwater sampling was undertaken on 29/06/2019 following the drilling of three deep groundwater boreholes on-site (GW1, GW2 and GW3). The groundwater monitoring locations are presented in Figure 9-4 and detailed in Table 9-5. All samples were sent for testing to Concept Life Sciences (CLS) Laboratory based in Manchester. CLS are a UKAS accredited laboratory. The laboratory certificates of analysis are contained in Appendix 1.

Monitoring Well	Location Detail	Grid Coordinates
GW1 (2181/X)	Downgradient - below the runoff settlement ponds in the southwestern region of the site.	52.901138, -6.809682
GW2 (2181/Y)	Sidegradient - in the northern region of the site.	52.904177, -6.805426
GW3 (2181/Z)	Upgradient - in the eastern region of the site.	52.901796, -6.803060

Table 9-5 Groundwater Monitoring Point Details

The results were compared with Groundwater Threshold Values (GTV) prescribed by the Groundwater Regulations 2010, as amended in 2016, where possible. Where, a GTV is not prescribed for a particular parameter, results are compared with an EPA Interim Guideline Value (IGV), were possible. The results are summarised as follows:

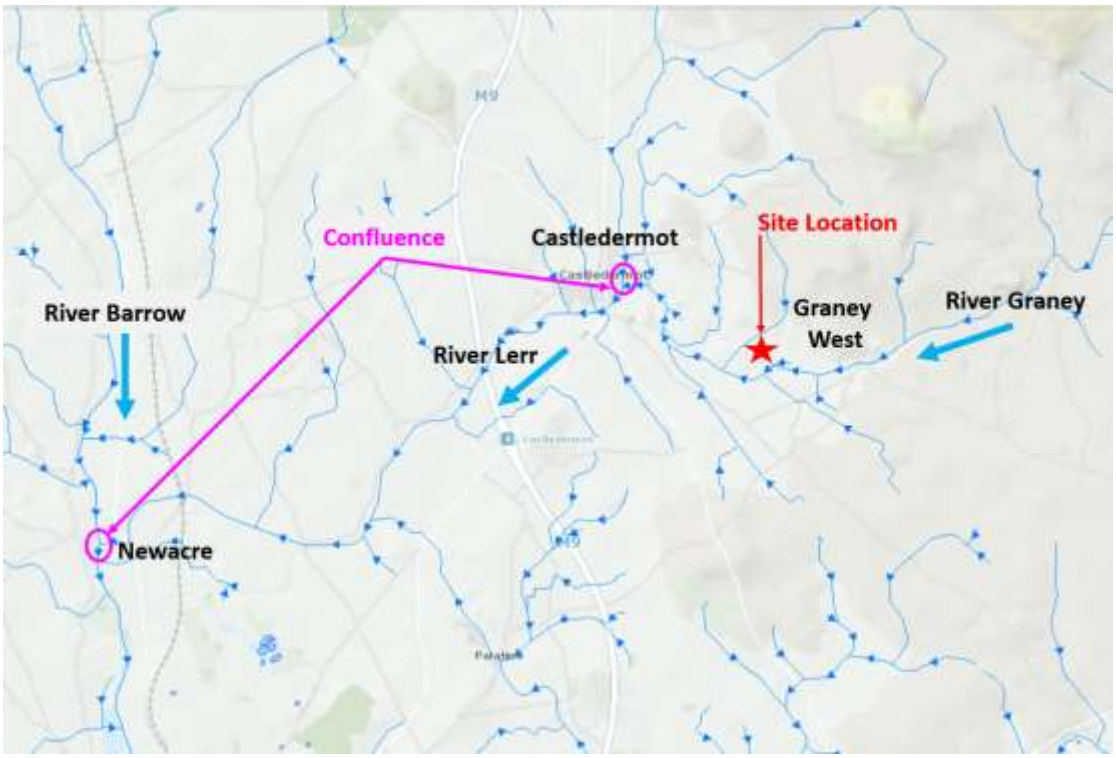
- Water hardness was very hard in all 3 no. monitoring wells (400 – 410 mg/l). The IGV is 200 mg/l based on the average hardness of various Irish aquifers. The GSI Preliminary Groundwater Total Hardness map does indicate that the site is located within a hard water area.
- Slightly elevated levels of Aluminium were recorded at 0.4 mg/l within all monitoring wells above the GTV (0.15 mg/l). This is attributed to natural background levels and from any historical site activities.
- All heavy metals were below their respective threshold levels.
- All inorganics were below their respective threshold levels with the exception of Nitrates and Ammoniacal Nitrogen. Slightly elevated Nitrate levels were recorded between 45 and 56 mg/l above the GTV of 37.5 mg/l. Elevated levels of Ammoniacal Nitrogen was recorded between 0.1 and 1.0 mg/l above the GTV of 0.175 mg/l. Both parameters were highest in the upgradient well GW3 and are attributed upgradient agricultural activity in the catchment area. No historical activities at the site were attributed to the source of these elevated levels.
- Low levels of hydrocarbons (TPH) were recorded within monitoring well GW2 at a level of 30 µg/l). The GTV for TPH is 7.5 µg/l. GW2 is located in the northern region of the site and partially downgradient of the former fuel storage area. Although the levels are not considered significant in terms of environmental risk, historical fuel storage practices may have resulted in some localised spillages in this area that may have locally impacted on groundwater quality.
- A trace level above the laboratory limit of detection of the Phenanthrene (0.01 ug/l) was recorded in the downgradient monitoring well GW1 in the south of the site. However, the level is below the GTV for PAH Total (0.075 ug/l); and
- Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) and all Volatile Organic Compounds (VOCs) were below the laboratory limit of detection.

9.3.10 Hydrology

9.3.10.1 Regional Catchment

The River Graney, located in the South Eastern River Basin District hydrometric area 14 subcatchment 6, is a stream which rises near Knockpatrick Hill and Corballis Hill and flows into the River Lerr at Castledermot. The River Graney and the River Lerr are tributaries of the River Barrow. The River Lerr flows west from Castledermot for approximately 9.5 km to its confluence with the River Barrow near Newacre (see Figure 9-7).

The Barrow catchment is underlain in its flat northern area by limestones of varying purity which continue down the western side of the catchment and sustain good groundwater resources in places. On the eastern side of the catchment where the site is located, granites dominate, culminating in the summits of the Blackstairs Mountains.



Source: GSI

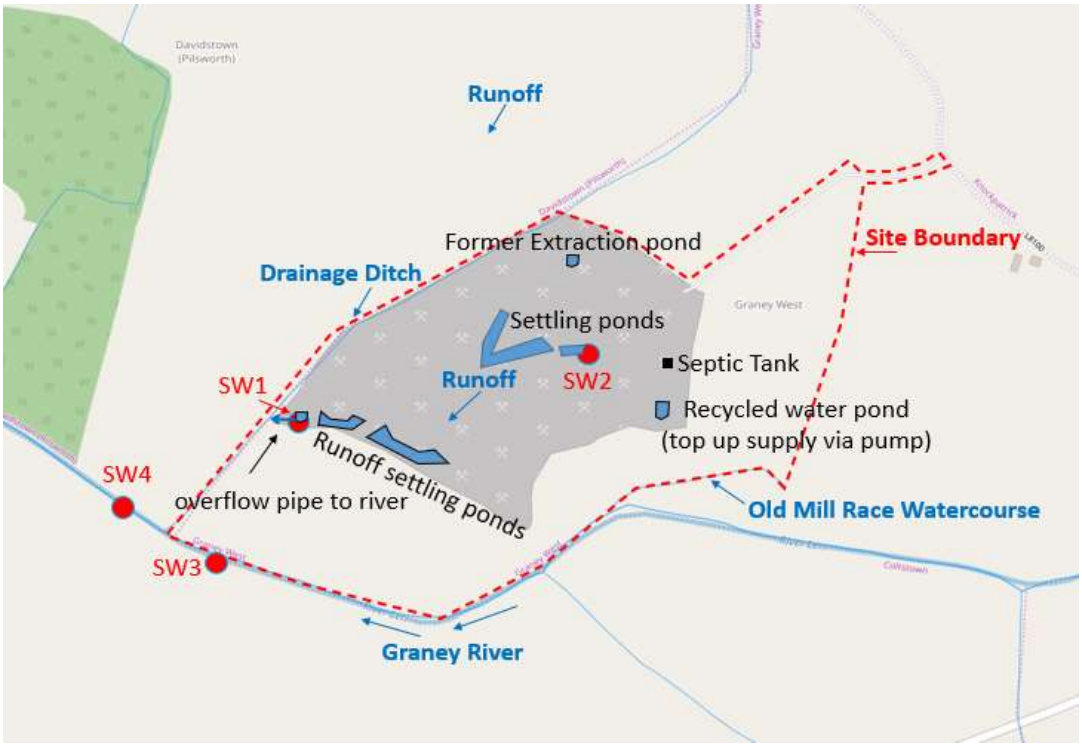
Figure 9-7 Regional Hydrology

9.3.10.2 Local Surface Water Catchment

The River Graney flows to the south of the site from east to west within 100m of the southern site at its closest point. There are a number of existing settling lagoons from historical quarrying operations in the northern, southwestern, eastern and central areas of the site (see Figure 9-8 and Figure 9-9). The small pond in the north was predominantly groundwater fed from a proximate abstraction well and used for a water supply to the former concrete batching plant.

The surface water catchment immediately up-gradient of the site has an approximate maximum area of 11 Ha. This area is at a higher elevation to the Graney West site and the topographical relief of the area indicates that local rainfall and subsequent surface water flow to the north of the site is likely to be towards the Graney River to the south of the site. There is a drainage ditch along the northwestern boundary of the site which intercepts this surface runoff into the Graney River thereby bypassing the site (see Figure 9-8). The Old Mill race watercourse, which is part of the River Graney, is present along the southeastern boundary of the site.

The extracted quarry has a catchment of approximately 18.3 Ha. Hardstanding areas are limited, and the exposed sand and gravel stratum is likely to result in rainfall percolation through the subsoil down to the water table. During heavy rainfall runoff has been observed to flow towards the abstraction sump pond in the east of the site (AB2) or south towards the ponds in the southern region of the site. During periods of extended and high rainfall, the pond in the southwestern region of the site overflows and discharges into the River Graney via a discharge pipe.



Source: OpenStreetMap

Figure 9-8 Existing Site Drainage Layout

Figure 9-9 Settlement Pond in the southwest of the site

9.3.10.3 Water Framework Directive Studies

The EPA water quality mapping provides the most recent river water quality Q-values:

- Upstream - at the station *Bridge in Graney* (RS14G070200 on the L4016 road) was 3-4 '*Moderate*' in 2017; and,
- Downstream - at *Lerr River confluence* (RS14G070310) was 3 '*Poor*' in 2018.

The WFD.ie website contains the data for the first cycle of River Basin Managements Plans (RBMP) for the period from 2009 to 2015. Based on these data the River Graney, Tributary of Barrow (IE_SE_14_620) was classified as having Moderate overall status and a risk category 1a "At risk" of not achieving good status by 2015. The River Lerr has Poor to Moderate status and is also at risk.

The Catchments.ie website contains the material in relation to the second and subsequent cycles of RBMPs. Based on these data the Graney (Lerr)_(IE_SE_14G070310) remains 'At risk' due to agriculture and hydromorphology pressures and the waterbody date to meet its environmental objective is 2027.

9.3.10.4 Surface Water Quality

Surface water sampling was undertaken by Environmental Efficiency Consultants (EEC) at 4 no. locations at the site on the 11th December 2018. Grab samples were collected at the locations presented in Figure 9-8 and outlined in Table 9-6. All samples were sent for testing to CLS accredited laboratory based in Manchester. The laboratory certificates of analysis are presented in Appendix 1.

Monitoring Point	Location Detail	Grid Coordinates
SW1	Site Outfall Point	52.901711, -6.810465
SW2	Settlement Lagoon	52.902510, -6.805178
SW3	River Graney Upstream	52.899680, -6.813093
SW4	River Graney Downstream	52.900185, -6.814523
Source: SW & GW Testing Report 2019 for Sancom Ltd. March, 2020		

Table 9-6 Surface Water Monitoring Point Details

The results were compared with the Environmental Quality Standards prescribed by the Surface Water Regulations 2009 as amended in 2015 and 2019. The results are summarised as follows:

- pH, Temperature, Conductivity and Chemical Oxygen Demand (COD) of the 4 no. samples were within the normal range for surface waters.
- Biological Oxygen Demand (BOD) were recorded at 0 mg/l all samples.
- Suspended Solids and Orthophosphate were recorded below the laboratory limits of detection.
- Nitrates levels were recorded detected on-site at low to moderate levels (7.7 – 21 mg/l). Elevated levels ranging between 41 and 42 mg/l were recorded within the River Graney in both upstream and downstream locations from the site. There is no surface water EQS for Nitrates but for comparative purposes the groundwater threshold is 37.5 mg/l. The high nitrates are attributed to agricultural activity (fertiliser runoff) in the catchment area.
- Slightly elevated levels of Total Petroleum Hydrocarbons (TPH) were detected within SW2 settlement lagoon only (i.e. 40 µg/l). This settlement lagoon is located near the buildings and hardstanding areas. Vehicle re-fuelling or fuel storage is the most likely source. This level exceeds The Irish Drinking Water Regulations, 1988 (S.I. No. 81 of 1988) threshold of 10 µg/l and the 2016 GTV of 7.5 µg/l.

9.3.11 Flood Risk

There have been no recorded instances of flooding on-site. The OPW's Preliminary Flood Risk Assessment undertaken in 2012 classifies the site as a Fluvial flood risk zone at risk of a one in a hundred year fluvial flood event.

The OPW flood maps (http://www.floodinfo.ie/) indicates that the site is not within a flood risk zone.

9.3.12 Designated Protected Areas

There are no sensitive sites connected directly to the site at Graney West. However, the River Graney flows into the River Lerr at Castledermot which is a tributary of the River Barrow. The River Barrow and River Nore is a Special Area of Conservation (SAC, 002162) selected for a number of Qualifying Interests (listed at https://www.npws.ie/sites/)/.

9.4 Characteristics of the Proposed Development

There are a number of elements associated with the operation of the proposed development which have the potential to impact on the environment with respect to Hydrogeology and Hydrology.

A detailed description of the proposed development is provided in Section 5 of this EIAR Report. The activities associated with the proposed development which are relevant to the water environment are detailed below:

9.4.1 Waste Materials

Inert waste material will be brought via an internal haul road to a stockpiling and sorting area situated in the southern region of the site. Here, the materials will be inspected and manually and mechanically separated into the following waste streams:

- Sub-soil and overburden (EWC Code 17 05 04)
- Top-soil (EWC Code 17 05 04)
- Sand and Gravel (EWC Code 17 05 04)
- Concrete (EWC Code 17 01 01)
- Biodegradable garden waste (EWC Code 20 02 01)

The various segregated waste streams will be directed to a number of processes on-site. Unauthorised wastes identified at this stage will be brought directly to the waste inspection / quarantine area on-site.

Sub-soil and overburden material will be brought via an internal haul road to the proposed fill area to the north of the application site for infilling.

Sand and Gravel will be brought to a sand and gravel stockpiling area situated adjacent for storage prior to processing at an adjacent, pre-existing sand and gravel washing plant on-site.

Top-soil will be directed to the soil screening plant situated adjacent to the stockpiling and sorting area for processing.

Concrete will be directed to the concrete jaw crusher plant situated adjacent to the stockpiling and sorting area for processing prior to being mixed with sand and gravel before being fed to the washing plant to form aggregate.

Biodegradable garden waste will be directed to a hard-standing concrete area to the north of the site where it will await processing in a green waste shredder proposed to be situated in this area, prior to being dispatched for storage and decomposition at a hardstanding, impervious, bunded composting area situated adjacent.

It is expected there will be a negligible quantity of residual waste generated when carrying out any of the above waste activities.

9.4.2 Potential for Groundwater Contamination

It is not proposed to accept any contaminated material and the vast majority of waste brought on-site will be inert construction and demolition waste. Such waste is unreactive both biologically and chemically.

Biodegradable garden waste will be accepted on-site for composting. It is proposed that this waste will be transferred without delay to a bunded composting area on-site for curing/maturation. Composting curing/maturation will take place on a bunded area which drains to an 180,000 litre slatted effluent storage tank to prevent the discharge to the environment of potentially polluting materials associated with this process. This effluent storage tank will be regularly inspected and emptied, cleaned and serviced when necessary.

The storage of fuel oil on-site is the principal risk to groundwater contamination on site via vertical migration through the permeable subsoil into the bedrock. It is proposed that re-fuelling shall take place in a designated, roofed and appropriately designed hardstanding re-fuelling area which drains to a silt trap and an oil interceptor to protect against oil spills.

A wheel wash shall be installed on the site access road 100 metres from the site entrance to prevent tracking of dusty material and mud along the proposed site access road and public roads. The first 100 metres of the proposed site access road will be laid with asphalt. It is proposed that the wheel wash unit will be served by an integrated silt tank and oil interceptor. The wheel-wash unit on-site will be a self-contained unit that utilises recycled water originating from a groundwater abstraction point (by way of bowser). The silt tank/oil interceptor will be in place for when excessive rainfall causes overflow from the system. The wheel wash system will be desludged and cleaned ca. every 6 months at a minimum or as needed by an appropriate provider. Waste sludge from the unit will be dispatched to an appropriate authorised destination waste facility.

It is also proposed that any hazardous materials spilled on-site will be dealt with promptly using an emergency response procedure including on-site spill-kits.

9.4.3 Proposed Source of Water Supply

There is no public water supply to the site. The water requirement for site activities would be mainly for the washing of sand and gravels. Water for these purposes would be sourced from a groundwater abstraction point and a settlement lagoon present on-site.

Water for the sand and gravel washing plant shall be drawn from the recycled water pond to the south east of the site via two supply lines. A 150 mm diameter line will feed the main washing plant and a 100 mm diameter line will supply the sand cyclone; both are driven by submersible electric pumps. The washing plant discharge will be piped by gravity feed to the primary and secondary settling ponds to the west of the application site for treatment, before returning to the recycled water pond via a 225 mm diameter gravity line. The primary settling pond is large with ample space for maintenance and silt storage. Top up water will be supplied from a groundwater abstraction well on site when required. This supply would be controlled by a water level device in the recycled water pond.

9.4.4 Proposed Drainage

The settlement lagoons will allow the settlement of all suspended solids. Overflow from the last of these lagoons will be via a 300 mm diameter concrete pipe to a drain which flows into the Graney River (estimated flow 3 l/s). Water also leaves the site by percolation through gravels at the southern section of the site.

9.4.5 Proposed Foul Drainage

There is an existing septic tank system on-site into which all-domestic effluent from the staff toilet drains. It is anticipated that only 2 part-time staff will work at the facility.

It is proposed to utilise an existing effluent sealed storage tank on-site (180,000 litres capacity) which underlies the proposed composting area to serve this area. It is proposed that this effluent storage tank shall be periodically emptied by an authorised waste contractor and disposed of at another appropriately licensed site, as such there will be no discharges to the environment from the composting area.

9.4.6 Proposed Surface Water Disposal

Surface water runoff from the site will be directed to the existing settling lagoons at the quarry site by the natural topography of the site as well as an existing drainage system serving (1) roofs of residential and farm buildings and non-permeable concrete areas and (2) the washing plant.

A separate drainage system serving the proposed re-fuelling area is proposed. Surface water falling on the re-fuelling pad will be directed to this drainage system and will be served by a silt-trap, an oil interceptor and a soakaway before draining by natural topography to the settling lagoons on-site.

The settlement lagoons will allow the settlement of all suspended solids and, where needed, the water would then be pumped back to the washing plant by via a pump house and recycled within the process. Overflow from the last of these lagoons is via a 300 mm diameter concrete pipe to the Graney River. Surface water also leaves the site by percolation through gravels to ground and underlying groundwater.

As the site is infilled over time, the settlement ponds in the southwestern region of the site will be infilled with inert material and replacement temporary settlement ponds installed as part of a rolling program of infilling across the site.

9.5 Potential Impact Assessment

9.5.1 Likelihood of Impacts

It is anticipated that the main environmental factors associated with the hydrogeology and hydrology across the site and within its immediate environs are not likely to be significantly affected by the proposed project.

Contaminated soils or buried waste are not anticipated at the site based on historical site information and the detailed site walkover undertaken. Any contaminated soils or buried waste are anticipated to be localised.

9.5.2 Assessment Criteria

The significance of potential impacts on geological and hydrogeological sensitive receptors was estimated by implementing the National Roads Authority (NRA) *Design Manual for Roads and Bridges (*DMRB) and IGI Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (2013) style of assessment using geological type attributes and measures to determine the magnitude of the impact on the attribute.

Table 9-1 illustrates the criteria for determining the importance of sensitive receptors at the site, Table 1-2 demonstrates the criteria for estimating the magnitude of the impact on an attribute and Table 1-3 presents the resulting estimation of the significance of potential impacts.

Importance	Criterion	Typical Examples
Very High	Attribute has a high quality and rarity on regional or national scale	River, wetland or surface water or groundwater body ecosystem protected by EU legislation. Aquifer providing a regionally important drinking water resource or supporting site protected under wildlife legislation
High	Attribute has a high quality and rarity on local scale	Aquifer providing locally important resource or supporting peat ecosystem (undesignated)
Medium	Attribute has a medium quality and rarity on local scale	Aquifer providing water for agricultural or industrial use with limited connection to surface water. Eroding bog
Low	Attribute has a low quality and rarity on local scale	Non-aquifer. Cutover blanket bog.

Table 9-1 Estimation of Importance of Sensitive Attributes

Magnitude	Criterion	Typical Example
Major Adverse	Results in loss of attribute and/or quality and integrity of attribute. Severe.	Loss of aquifer water supply by dewatering or major contamination event Potential high risk of pollution to groundwater from routine run-off
Moderate Adverse	Results in effect on integrity of attribute, or loss of part of attribute. Major.	Partial loss or change to aquifer characteristics Potential medium risk of pollution to groundwater from routine run-off Loss in peat margins or loss in recharge to a potential SAC Annex 1 habitat.
Minor Adverse	Results in some measurable change in attributes quality or vulnerability. Minor.	Potential low risk of pollution to groundwater from routine run-off Risk of pollution from accidental spillage. Localised peat extraction on bog
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity. Not significant.	No measurable impact upon aquifer and no perceivable risk of pollution from accidental spillages Slight impact on peat by animal hoofs etc
Minor Beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring.	Insignificant risk of contamination to groundwater due to surface sealing.
Moderate Beneficial	Results in loss of attribute and/or quality and integrity of attribute. Severe.	Loss of aquifer water supply by dewatering or major contamination event Potential high risk of pollution to groundwater from routine run-off
Major Beneficial	Results in effect on integrity of attribute, or loss of part of attribute. Major.	Partial loss or change to aquifer characteristics Potential medium risk of pollution to groundwater from routine run-off Loss in peat margins or loss in recharge to a potential SAC Annex 1 habitat.

Table 1-2 Estimation of the Magnitude of a Potential Impact on an Attribute

A qualitative approach was used in this evaluation, generally following the significance classification in **Error! Reference source not found.** and through professional judgement. The s ignificance of a predicted impact is based on a combination of the sensitivity or importance of the attribute and the predicted magnitude of any effect.

Importance of Attribute	Magnitude of Potential Impact			
	Negligible	Minor Adverse	Moderate Adverse	Major Adverse
Extremely High	Imperceptible	Significant	Profound	Profound
Very high	Imperceptible	Significant / Moderate	Profound/ Significant	Very Large
High	Imperceptible	Moderate / Slight	Significant/ Moderate	Profound/Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight / Moderate

Table 1-3 Estimation of the Significance of Potential Impact

Terms relating to the duration of impacts are as described in the EPA's guidelines on the information to be contained in Environmental Impact Assessment Reports draft (August 2017) as:

- Momentary Effects - Effects lasting from seconds to minutes
- Brief Effects - Effects lasting less than a day
- Temporary Effects - Effects lasting less than a year
- Short-term Effects - Effects lasting one to seven years.
- Medium-term Effects - Effects lasting seven to fifteen years.
- Long-term Effects - Effects lasting fifteen to sixty years.
- Permanent Effects - Effects lasting over sixty years
- Reversible Effects - Effects that can be undone, for example through remediation or restoration

The prediction of potential impacts by the proposed development are summarised in the following sections and tables. The impacts are separated into construction stage impacts and operational stage impacts.

9.5.3 'Do-Nothing' Impacts

If the proposed project does not go ahead there will be no impact from construction or operations on groundwater or surface water across the site to the River Graney. It is envisaged that the site would remain as an exploited former quarry site.

9.5.4 Potential Impacts Risks

Table 1-4 and Table 1-5 outline the range of potential impacts associated with the construction and operational phases of the proposed development.

The risks have been separated under Construction/Site Preparation Works and Site Operation Activities. Both direct and indirect impacts have been considered.

9.5.4.1 Construction Works Potential Impacts

No.	Construction Activity	Attribute	Character of Potential Impact	Importance of Attribute	Magnitude of Potential Impact	Significance of Potential Impact
1	Excavation activities	Groundwater Surface Water	The nature of the proposed development is the backfilling of a worked-out quarry using inert waste material to backfill and restore existing voids on site. This will not require any deep excavation of the subsurface with the exception of localised site preparation works. No excavation works into the water table will be undertaken.	High	Negligible	Imperceptible
2	Fuel storage/usage on-site	Groundwater Surface Water	Accidental spillage of contaminants during construction works may cause short to long term, moderate to significant impacts to groundwater and surface water if not stored and used in an environmentally safe manner.	High	Moderate/Adverse	Significant /Moderate
3	Wheel Wash Wastewater	Groundwater Surface Water	Wastewater arising from the wheel wash has the potential to contaminate groundwater beneath the site and surface water lagoons on the site.	High	Minor Adverse	Moderate / Slight
4	Construction Traffic	Groundwater Surface Water	There may be a risk of groundwater pollution from site traffic through the accidental release of oils, fuels and other contaminants from vehicles.	High	Minor Adverse	Moderate / Slight

Table 1-4 Potential Impacts during Construction Phase

9.5.4.2 Operational Phase Potential Impacts

No.	Operational Activity	Attribute	Character of Potential Impact	Importance of Attribute	Magnitude of Potential Impact	Significance of Potential Impact
1	Fuel Storage	Groundwater Surface Water	Inappropriate storage of fuels and chemical on site could potentially result in the release to ground and surface water and impacting on the quality of these water features.	High	Moderate/ Adverse	Significant /Moderate
2	Contaminated imported fill	Groundwater Surface Water	The proposed restoration will use inert material only. However, in the event of the unintentional importation of non-inert material there is the potential to impact on groundwater quality.	High	Moderate/ Adverse	Significant/ Moderate
3	Wheel Wash Wastewater	Groundwater Surface Water	Wastewater arising from the wheel wash has the potential to contaminate groundwater beneath the site and surface water lagoons on the site.	High	Minor Adverse	Moderate / Slight
4	Construction Traffic	Groundwater Surface Water	There may be a risk of groundwater pollution from site traffic through the accidental release of oils, fuels and other contaminants from vehicles over permeable ground.	High	Minor Adverse	Moderate / Slight
5	Vandalism	Groundwater Surface Water	Pollution due to vandalism of fuel stores or plant poses a risk to groundwater and future site users.	High	Moderate/ Adverse	Significant/ Moderate
6	Wastewater Treatment	Groundwater	All foul water generated from toilets will be appropriately treated within a suitably designed and installed wastewater treatment system, (e.g. septic tank and percolation area).	High	Negligible	Imperceptible

No.	Operational Activity	Attribute	Character of Potential Impact	Importance of Attribute	Magnitude of Potential Impact	Significance of Potential Impact
7	Composting curing/maturation	Groundwater Surface Water	Intake of garden waste, shredding and composting of this waste could potentially leach into the groundwater and be transported to proximate rivers/streams if not appropriately stored.	High	Moderate / Adverse	Significant/ Moderate

Table 1-5 Potential Impacts during Operational Phase

9.6 Avoidance, Remedial & Mitigation Measures

The significant predicted impacts detailed under Table 1-4 and Table 1-5 are resolved under the mitigation measures set out below. All mitigation measures identified are considered suitable to ensure all risks identified are appropriately mitigated with a residual long-term and imperceptible risk to groundwater and surface water by the proposed development.

1. The proposed infilling operations will be above the groundwater level; the infilling will increase the thickness of unsaturated material above the water table at the site and this is considered positive as it offers the groundwater additional protection.
2. Proposed abstraction of groundwater during the operational phase of the works will be intermittent and at low levels Therefore, no impact on groundwater levels across the site are anticipated.
3. A series of settlement lagoons are situated on-site for the treatment of site surface water run-off containing elevated levels of particles. These settling lagoons will be cleaned and dredged as necessary.
4. As the site is infilled over time, the settlement ponds in the southwestern region of the site will be infilled with inert material and replacement temporary settlement ponds installed as part of a rolling program of infilling across the site.
5. In the event of substantial rainfall and the build-up of surface water run-off, most surface water runoff from the site will be directed to the settling lagoons to ensure appropriate levels of treatment prior to any discharge to the river.
6. Surface water run-off arising on existing and proposed non permeable areas will be directed via topography toward a drain east of the dwelling on-site which in turn will direct this water to the pond to the south east of the site.
7. The settlement lagoons to be utilised at the site shall facilitate the settlement of all settleable solids within surface water runoff across the site. Where necessary, the water in the last of the lagoons located at the centre of the site will be pumped back to the washing plant via a pump house and recycled within the process. Overflow from the last of the lagoons situated to the south west of the site is via a 300 mm diameter concrete pipe to the Graney River. It is anticipated that water will overflow from this pond on rare occasions during exceptional heavy rainfall periods. The quality of this water during this event is anticipated to be sufficiently treated to ensure no risk is posed to the river. In addition, this pond will be backfilled as part of the infilling works with no surface water discharging to the river anticipated once ground levels have risen.
8. An oil interceptor serving the proposed visitor and staff car park shall be appropriately installed to treat runoff from this area. Runoff shall drain to the pond to the south east of the site before being utilising within the wash plant on site.
9. A surface water drainage inspection, maintenance and monitoring programme shall be established and surface water emanating from at-risk site locations (e.g. re-fuelling area) and contained in receiving water bodies (e.g. lagoons) shall be monitored on a periodic basis.
10. An existing bunded, roofed storage area shall be upgraded for the storage of hazardous materials such as fuels, oils and concrete additives on-site. This area shall be designed in accordance with EPA Guidance IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities, taking into account criteria for

bund requirements (e.g. 110% of the capacity of the largest tank or drum within the bunded area; or 25% of the total volume of substance which could be stored within the bunded area, whichever is greater).

11. A separate drainage system serving the proposed fuel storage area and re-fuelling area shall be constructed. Surface water runoff or spills arising in the re-fuelling area will be captured by this drainage system installed across concrete hardstanding and directed to a silt-trap, an oil interceptor before being discharged to ground via a soakaway.
12. Oil which accumulates within the petrol interceptor shall be regularly removed by an appropriately licensed contractor. In addition, the petrol interceptor shall be appropriately maintained in accordance with the manufacturer's specification.
13. Testing of bund integrity shall be conducted upon commencement of site operations and every three years thereafter in accordance with good practice to verify the water tightness and integrity of bunds on-site. Where bund testing fails a programme of works shall be established by a Chartered Engineer to fix the bund and ensure its water tightness and integrity.
14. Waste fuels and materials shall be stored in designated areas that are isolated from surface water drains or open waters (*e.g.* excavations). Waste skips will be closed or covered to prevent materials being blown or washed away and to reduce the likelihood of contaminated water leakage. Hazardous wastes such as waste oil, chemicals and preservatives, will be stored in sealed containers and kept separate from other waste materials while awaiting collection by a registered waste carrier. Fuelling, lubrication and storage areas and site offices will not be located within 25m of drainage ditches, surface waters or open excavations. Fuel interceptor tanks will be installed on the site to treat any runoff.
15. All waste containers (including all ancillary equipment such as vent pipes and refuelling hoses) shall be stored within a secondary containment system (*e.g.* a bund for static tanks or a drip tray for mobile stores and drums). The bunds shall be capable of storing 110% of the tank capacity. Where more than one tank is stored, the bund shall be capable of holding 110% of the largest tank of 25% of the aggregate capacity (whichever is greater). Drip trays used for drum storage shall be capable of holding at least 25% of the drum capacity. Where more than one drum is stored the drip tray shall be capable of holding 25% of the aggregate capacity of the drums stored.
16. Regular monitoring of water levels within drip trays and bunds due to rainfall shall be undertaken to ensure sufficient capacity is maintained at all times.
17. The wheel wash unit shall be served by an integrated silt tank and oil interceptor. The wheel wash unit on-site will be a self-contained unit that utilises recycled wate. The silt tank/oil interceptor shall be in place for when excessive rainfall causes overflow from the system. The wheel wash system shall be desludged and cleaned ca. every 6 months at a minimum or as needed by an appropriate provider. Waste sludge from the unit shall be dispatched to an appropriate authorized destination waste facility.
18. Monitoring prior to, during and post site works of surface water quality shall be undertaken to ensure minimum disturbance of water quality in the Graney River. During the construction phase, the monitoring programme shall include daily checks, weekly inspections and monthly audits to ensure compliance with the Construction Environmental Management Plan. This shall be undertaken in consultation with the wishes of Kildare County Council.

19. Back-up plans to deal with the possibility of contamination or fuel spills, *e.g.* pumping of wells or sumps to collect contaminated groundwater or surface water for treatment shall be undertaken and included in an overall Environmental Management Plan (EMP) and Emergency Operation Plan (EOP). In accordance with the CIRIA document (2001) a contingency plan for pollution emergency shall address the following:
    i. Containment measures;
    ii. Emergency discharge routes;
    iii. List of appropriate equipment and clean-up materials;
    iv. Maintenance schedule of equipment;
    v. Details of trained staff;
    vi. Details of staff responsibilities;
    vii. Notification procedures to inform the relevant environmental protection authority;
    viii. Audit and review schedule; and,
    ix. List of specialist pollution clean-up companies and their telephone numbers.
20. Daily checks will be carried out and records kept on a weekly basis and any items that have been repaired/replaced/rejected noted and recorded. Any items of plant machinery found to be defective should be removed from site immediately or positioned in a place of safety until such time that it can be removed.
21. An interceptor maintenance and inspection programme shall be implemented - the interceptors on-site shall be inspected every 6 months by suitably qualified persons and should be cleaned and serviced regularly as necessary
22. Composting curing/maturation will take place on a bunded area which drains to an 180,000-litre slatted effluent storage tank to prevent the discharge to the environment of potentially polluting materials associated with this process. This effluent storage tank will be regularly inspected and emptied, cleaned, and serviced when necessary.
23. A septic tank will be in place to manage domestic wastewater on-site and shall be appropriate designed and installed at the site.
24. Waste Acceptance Procedures will be in place to ensure that hazardous waste or putrescible waste are prevented from arriving on-site and, were found to be present on-site, temporarily stored in a bunded waste quarantine area prior to being dispatched off-site to an authorized waste facility within 24 hours
25. Emergency Response Procedures will be in place to ensure the prompt and thorough response to any spills of hazardous materials. Spill kits will be present on-site for this purpose.
26. Waste Acceptance Procedures will be in place to ensure that hazardous waste or putrescible waste are prevented from arriving on-site and, were found to be present on-site, temporarily stored in a bunded waste quarantine area prior to being dispatched off-site to an authorized waste facility within 24 hours.
27. Restoration of topsoil and overburden shall be carried out on an on-going basis to reduce the vulnerability of groundwater to possible contamination.
28. The sowing of grassland species on a phased basis and additional planting of scrub and native trees along the perimeter shall enhance the nutrient retention at the site and preventing further nutrient load into receiving surface and groundwater receptors.

29. Adequate security measures shall be installed on the construction site. Security measures will include secure fencing, secure site access, securing site plant and equipment, secure storage of materials and sufficient warning signage.
30. All grout/concrete washout facilities shall be established away from exposed excavations and surface waters and into dedicated skips on site. The activities shall be monitored, and the skips will be appropriately located and secured.
31. In the event of a major spillage the contractor's Emergency Operating Plan (EOP) shall be followed. The first action will be to stop the source of pollution and contain the spillage.
32. The positive, albeit relatively low levels of hydrocarbons detected within GW2, suggest that groundwater has been impacted most likely from inappropriate and historical fuel storage practices on site. The upgrading and repair of the existing fuel bund shall minimise any future potential impact to groundwater in this area.

It is considered that the proposed development, taking account of the previous works undertaken at the site, will have a long-term and imperceptible impact on the hydrogeological and hydrological conditions at the site and the surrounding area.

9.6.1 Predicted Impacts

The nature of the development dictates that the greatest potential impact on the underlying aquifer and proximate streams/rivers associated with the soil recovery facility will be during the operational phase of the works. It is predicted that the hydrogeological and hydrological impacts associated with the development will be short to long-term and imperceptible to moderate. Implementation of the proposed mitigation measures as detailed in this EIAR chapter shall ensure that the residual impacts will be long-term and imperceptible.

9.6.2 Monitoring

Monitoring prior to, during and post construction works of groundwater and surface water quality shall be undertaken to ensure minimum disturbance of water quality in the general vicinity of the site. The monitoring programme shall include daily checks, weekly inspections, and monthly audits to ensure compliance with the Construction & Demolition Waste Management Plan (C&DWMP) and the CEMP. This shall be undertaken in consultation with the requirements of Kildare County Council.

Groundwater quality monitoring shall be undertaken within the three groundwater monitoring points on-site (GW1, GW2 and GW3). Surface water monitoring shall be undertaken in location detailed in Figure 9-8. An agreed program of monitoring shall be developed in consultation with Kildare County Council.

9.7 References

- CIRIA, 2001, Control of Water Pollution from Construction Sites (C532)
- DoELG, EPA, and GSI (1999). Groundwater Protection Schemes. Department of the Environment and Local Government (DOELG), Environmental Protection Agency (EPA) and the Geological Survey of Ireland (GSI).
- Fitzsimons, V., Daly, D. and Deakin, J. (2003) GSI Guidelines for Assessment and Mapping of Groundwater Vulnerability to Contamination. Draft, June 2003, The Geological Survey of Ireland, Dublin, Ireland.
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions, May 2009, EC DG XI Environment, Nuclear Safety & Civil Protection Ref: NE80328/D1/3
- Misstear, B.D.R., Brown, L (2008) Water Framework Directive: recharge and groundwater vulnerability. STRIVE report series no. 6. Environmental Protection Agency, Wexford, Ireland.
- Misstear, B.D.R., BROWN, L. AND DALY, D. (2008a) A methodology for making initial estimates of groundwater recharge from groundwater vulnerability mapping, Hydrogeology Journal, 17(2), pp. 275-285 [Online] Available at: http://www.springerlink.com/content/051216t6t121g915/fulltext.pdf.
- NRA Design Manual for Roads and Bridges, 2011
- Water Framework Directive Website - http://www.wfdireland.ie/maps.html
- Wright., G. (1988) 8th Annual Seminar, IAH (Irish) Group. Portlaoise, Ireland.

10. Air and Climate

10.1 Introduction

The applicant intends on using an existing quarry site as a material recovery facility. Namely, the applicant intends on accepting soil and stone on-site for backfilling of quarry void areas and C&D waste on-site for C&D recovery processing. Further information on the proposed development including information on proposed site infrastructure, operations, environmental management and controls, can be found in Section 5 of this EIAR.

This chapter of the Environmental Impact Assessment Report, prepared by Environmental Efficiency Consultants, describes and characterizes the existing air environment in the vicinity of the application site and assesses the impact proposed development activities will have upon the receiving air environment. Proposed development activities will have the potential to generate fugitive dust emissions which may impact upon local air quality and nearby sensitive receptors. As such, this chapter primarily addresses potential dust related impacts associated with the proposed development. It also characterizes climate conditions associated with the region and evaluates the potential impacts the proposed activity will have on climate conditions.

Mitigation measures are identified where required, to eliminate and reduce any adverse impacts identified insofar as practical.

The impact of Noise and Vibration associated with the proposed development on the surrounding environment is assessed separately in Section 11 of this EIAR.

10.2 Assessment Methodology

10.2.1 Overview of Methodology Implemented to Assess Air Quality Impacts.

The following steps were completed in order to assess the impacts of the proposed activity upon the Air Environment and Climate:

1. A walkover of the site and the local area and a desktop survey of published geographic and environmental information was undertaken in order to adequately characterize the baseline environment.
2. Baseline Bergerhoff Dust Monitoring was undertaken at Site Boundary Location in order to adequately characterize existing dust levels on-site.
3. Review of Ambient Air Quality Data for the local area as recorded by the EPA's National Ambient Air Quality Network.
4. A qualitative assessment was carried out to assess and evaluate dust and emission impacts during the carrying out of Site Preparation Works (The Construction Phase).
5. A Dust Impact Assessment was carried out considering the Operational Phase of the Proposed Development in accordance with *Guidance on the Assessment of Mineral Dust Impacts for Planning* (May 2016 (v1.1)) which has been prepared by the Institute of Air Quality Management (IAQM). A qualitative risk-based approach using the Source-Pathway-Receptor concept defined in the Guidance Document has been adopted.
6. An assessment of climate impacts was carried out considering the nature and scale of the proposed development and baseline climatic conditions.
7. An assessment of odour impacts was carried out considering the nature and scale of potentially malodourous site activities and the characteristics and proximity of sensitive receptors.
8. Mitigation and monitoring measures suitable for reducing air quality impacts and monitoring air impacts on an ongoing basis were identified having regard to various industry guidelines in order to reduce and control air quality impacts and adequately monitor air quality impacts on an ongoing basis going forward.
9. An assessment of residual air impacts the proposed development could have on local air quality, nearby sensitive receptors and climate was carried out having regard to the Dust Impact Assessment carried out and mitigation measures proposed and using professional judgement.

10.3 Baseline Environment

10.3.1 Site Context

The application site is located in the townland of Graney West, approximately 2 kilometres south east of the town of Castledermot and 12 kilometres west of the town of Balltinglass, in Co. Kildare. There is an established but disused sand and gravel pit at the subject site.

The site has historically been in use as a quarry. The site as it is consists of an area consisting of residential and agricultural buildings, an area where plant and equipment used in connection with pre-existing quarrying and aggregate production activities are situated and a much larger area consisting of worked out quarry voids.

The applicant intends on backfilling soil and stone material into previously extracted quarry voids on-site in order to a achieve land restoration. In addition, the applicant intends on accepting C&D waste on-site for recovery processing. Processed materials will be resold as per market demand. Pre-existing plant and additional proposed plant will be used to process C&D waste materials.

The site is situated in rural location dominated by agriculture and interspersed with one off housing. There are a small number of residential developments in the vicinity of the site, mainly to the east, north and south of the application site. There are no significant tourism and recreational sites or areas in the local area surrounding the site. There is no commercial or industrial development in the vicinity of the site. There are no plans to develop any sites in the local area surrounding the site.

10.3.2 Baseline Air Quality

The EPA has established an ambient air quality monitoring network in Ireland. Baseline ambient air quality data for the region was obtained from a number of EPA monitoring stations situated in the region including Carlow, Kilkenny and Port Laoise monitoring stations to allow for a comprehensive understanding of baseline air quality. Between these monitoring stations the parameters PM_{10}, $PM_{2.5}$, NO_2, SO_2, Co, O_3 as well as BTEX compounds are measured. No limits prescribed in the Air Quality Standards Regulations 2011 for any of the relevant parameters have been exceeded. Generally, low levels of these pollutants have been recorded in the region. This is to be expected in a region that is predominantly rural in nature.

10.3.3 Baseline Dust Monitoring

Baseline Dust Monitoring using the Bergerhoff method was carried out at the application site over the month of May 2019 going into June 2019. Dust monitoring took place at three site boundary locations around the application site. These boundary locations were chosen on the basis of risk posed to off-site receptors in the vicinity of the site. These location are as follows:

- D1 - adjacent to where the proposed site access road meets the site
- D2 - adjacent to where the existing site access roads meets the site
- D3 - North eastern corner of the site adjacent to nearest sensitive receptor

Figure 10-1 below shows the location of these Dust Monitoring Location on-site.

The results of the dust monitoring undertaken are presented in Table 10-1 below.

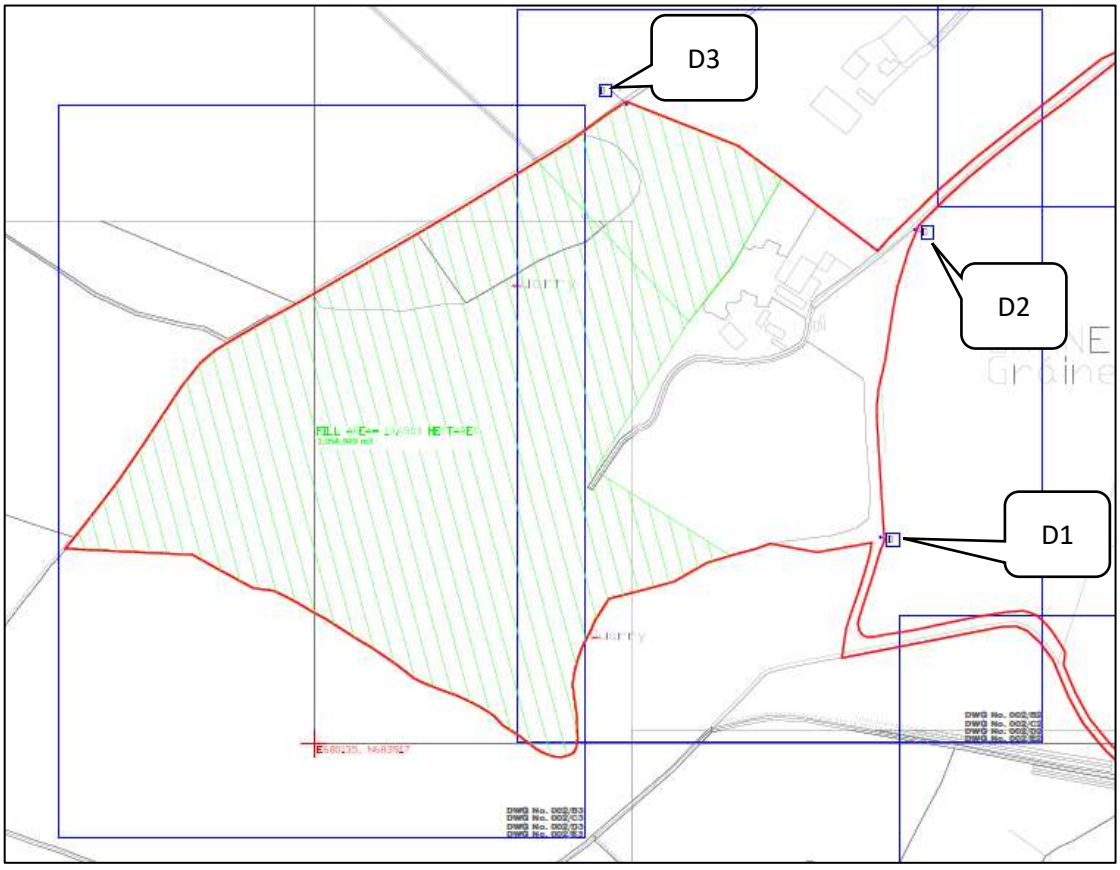


Figure 10-1 Dust Monitoring Locations

Table 10-1 Dust Deposition Monitoring Results

Location	Start Monitoring	End Monitoring	Date Analysed	Results (mg/m^2/day)
D1	01/05/2019	06/06/2019	14/06/2019	0.7
D2	01/05/2019	06/06/2019	14/06/2019	60.4
D3	01/05/2019	06/06/2019	14/06/2019	41

10.3.4 Meteorological Conditions

The proposed activity will exist within the context of a temperate, maritime Irish climate, characterized by mild temperatures and wet weather. The weather in the region is influenced by the Irish Sea, resulting in mild, moist weather dominated by cool air masses.

The nearest weather station to the site is the Met Eireann weather station at Oakpark, Co. Carlow which lies ca. 8 km to the south west of the site. Monitoring at this station commenced in January 2007. Averages for relevant meteorological parameters since monitoring commenced are shown in the table below.

Table 10-2 Averages (since January 2007) for meteorological data from Met Eireann's Oakpark Weather Station

Parameter	Average (since January 2007)
Mean Daily Rainfall (mm)	2.3
Mean Temperature (Degrees Celsius)	9.9
Mean Wind Speed (Knots)	7.4

The most important climate parameters which influence dust emissions are wind direction, wind speed and rainfall.

Wind direction determines the broad transport of the emission and the sector of the compass into which the emission is dispersed. Wind speed will affect ground level emissions by increasing the initial content of particles in the emission. It will also affect the potential for dust entrainment.

A wind rose for average wind conditions recorded at Oakpark over a five year period from 01/7/2014 to 30/06/2019 is shown in Figure 10-2. The predominant wind direction is from the south western quadrant. Moderate to high speed winds (>2 m/s) occur for 78.5% of the time.

Winds affecting the site are relatively warm winds from the Atlantic and frequently bring rain. Easterly winds are weaker and less frequent and tend to bring cooler weather from the north east in spring and warmer weather from the south east in summer.

Rainfall can suppress dust at the source and eliminate the pathway to the receptor. According to Arup (1995)[6] rainfall greater than 0.2 mm per day is sufficient to suppress dust emissions.

Daily average rainfall data from Oakpark weather station from the time monitoring commenced on 13/08/2003 to 30/06/2019 was obtained and analysed. 54.7% of days in this period had rainfall in excess of 0.2 mm. As such, natural dust suppression (from rainfall) exists for 54.7% of days.

[6] Arup Environmental. Environment Effects of Surface Mineral Workings. UK DoE, October 1995

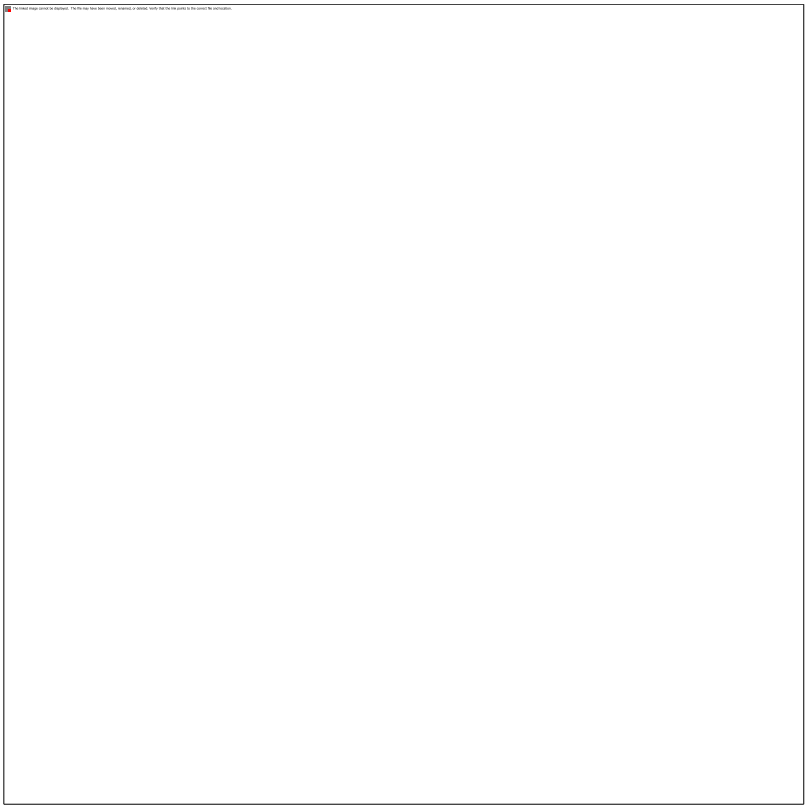


Figure 10-2 Wind Rose for Oak Park from 01/07/2014 – 30/06/2019

10.3.5 Dust Sensitive Receptors

Sensitive receptors to dust constitute locations where people may be adversely affected by dust emissions. Locations with high sensitivity can include dwellings, hospitals, schools or areas of high amenity value.

Sensitive receptors within 500 metres of the site boundary have been identified. All sensitive receptors identified are residential dwellings. This is a cautious approach given that dust generating activities are located within the site rather than at the site boundary.

All receptors are detailed in Table 10-3 and shown on aerial photography in Figure 10-3. A total of 12 sensitive receptors have been identified. Table 10-3 identifies the sensitive receptors, their sensitivity and their proximity to the nearest dust generating activity within the application site. The sensitivity of receptors has been valued with reference to established criteria detailed in the IAQM's Guidance on the Assessment of Mineral Dust Impacts for Planning.

Figure 10-3 Dust Sensitive Locations within 500 Metres of Application Site Boundary

Table 10-3 Dust Sensitive Receptors within 500 metres of the site

Receptor Reference	Receptor	Sensitivity	Distance from site boundary (m)	Direction from nearest dust generating site activity
A	Residential Dwelling	High	480	SW
B	Residential Dwelling	High	185	SE
C	Residential Dwelling	High	235	SE
D	Residential Dwelling	High	476	S
E	Residential Dwelling	High	124	NE
F	Residential Dwelling	High	195	E
G	Residential Dwelling	High	350	E
H	Residential Dwelling	High	500	E
I	Residential Dwelling	High	314	E
J	Residential Dwelling	High	500	N
K	Residential Dwelling	High	460	N
L	Residential Dwelling	High	317	NE

10.4 Impact Assessment

10.4.1 Impacts during Site Preparation Works

Construction activities that may give rise to dust and air emissions are as follows:

- Vegetative/soil stripping.
- Earthworks.
- Material loading and unloading.
- Laying of road surface.
- Use of mobile and fixed plant.
- Mobile plant and vehicle movements on-site.

Give the small-scale magnitude of construction activities and the temporary nature of the site preparation works phase, and given the low number of receptors in proximity to the site, the distance these receptors are away from the site and the generally the low sensitivity of the local area, it is anticipated that construction dust and emission impacts will be negligible. Dust control mitigation measures will be adopted and implemented during the Site Preparation Works to prevent adverse dust impacts. These are detailed in Section 10.5.1.

10.4.2 Operational Phase Dust Impacts

Dust emissions from proposed operating activities occurring have the potential to adversely impact upon sensitive dust receptors. The significance of impacts depends on the magnitude of emissions, meteorological conditions and the proximity of sensitive receptors to dust generating site activities.

As discussed, a Dust Impact Assessment was carried out in accordance with the IAQM's *Guidance on the Assessment of Mineral Dust Impacts for Planning* (May 2016 (v1.1)) in order to identify and characterize dust impacts upon sensitive receptors. An overview of the assessment methodology is presented below. It should be noted the Dust Impact Assessment was carried out not having regard to any proposed mitigation measures.

10.4.2.1 Dust Impact Assessment Methodology

Step 1: Describe Site Characteristics and Baseline conditions

A site and local area walkover and an analysis of proposed development operations took place in order to characterize the baseline environment, identify the location and nature of dust sensitive receptors and identify and characterize proposed activities on-site that may give rise to dust emissions. Receptor Sensitivity was determined with reference to criteria prescribed in the aforementioned guidance document. Receptor Sensitivity can be classed as High, Medium or Low.

Step 2: Estimate Dust Impact Risk

The Dust Impact Risk for each receptor will be determined.

The risk with each site preparation and operational phase source activity was determined. Based on the scale, duration, intensity and nature of dust generating activities. Dust Emission Classes of Low, Medium or High were defined for each proposed activity. Dust Emission Classes were defined using professional judgement and having regard to guidance prescribed in Appendix 4 of the IAQM's *Guidance on the Assessment of Mineral Dust Impacts for Planning.*

Where there is uncertainty as regards the Dust Emission Class, a precautionary approach is taken and the higher dust emission class is assigned.

Following this, the pathway effectiveness was determined. In other words, it was determined how easily dust could make its way to sensitive receptors. For each receptor within 500 m of the site boundary the frequency potentially dusty winds (defined as >5 m/s) from the direction of the nearest dust source on dry days was determined with reference to meteorological data for 5 years at Oakpark meteorological station in Co. Carlow. A Frequency Category was then assigned to each receptor in accordance with the criteria detailed in
and based on 36 x 10° wind direction sectors.

Table 10-4 Frequency of Potentially Dusty Winds

Frequency Category	Criteria
Infrequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are less than 5%
Moderately frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 5% and 12%
Frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 12% and 20%
Very frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are greater than 20%

Receptor distance from sources was categorized in accordance with the Table 10-5 below.

Table 10-5 Receptor Distance from Source

Category	Criteria
Distant	Receptor is between 200 m and 400 m from the dust source
Intermediate	Receptor is between 100 m and 200 m from the dust source
Close	Receptor is less than 100 m from the dust source

The pathway effectiveness was then classified using the Frequency of Potentially Dusty Winds from
and the Receptor Distance from Source from Table 10-5, as shown in Table 10-6.

Table 10-6 Pathway Effectiveness

		Frequency of Potentially Dusty Winds			
		Infrequent	Moderately frequent	Frequent	Very frequent
Receptor Distance Category	Close	Ineffective	Moderately Effective	Highly Effective	Highly Effective
	Intermediate	Ineffective	Moderately Effective	Moderately Effective	Highly Effective
	Distant	Ineffective	Ineffective	Moderately Effective	Moderately Effective

The Dust Emission Class and the Pathway Effectiveness were combined to predict the Dust Impact Risk as shown in Table 10-7.

Table 10-7 Estimation of Dust Impact Risk

		Dust Emission Class		
		Small	Medium	Large
Pathway Effectiveness	Highly effective Pathway	Low Risk	Medium Risk	High Risk
	Moderately effective pathway	Negligible Risk	Low Risk	Medium
	Ineffective pathway	Negligible Risk	Negligible Risk	Low Risk

Step 3: Estimate Likely Magnitude of Dust Effects

The likely effect at each receptor was determined from the Dust Impact Risk (Table 10-7) and the Receptor Sensitivity as shown in Table 10-8

Table 10-8 Descriptors for Magnitude of Dust Effects

		Receptor Sensitivity		
		Low	Medium	High
Dust Impact Risk	High Risk	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
	Medium Risk	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
	Low Risk	Negligible Effect	Negligible Effect	Slight Adverse Effect
	Negligible Risk	Negligible Effect	Negligible Effect	Negligible Effect

10.4.2.2 Dust Impact Assessment

10.4.2.2.1 Assigning Dust Emission Classes for Proposed Dust Generating Activities

The Proposed Development will involve the carrying out of the following dust generating activities.

- Haulage of materials to and from the site
- Internal material haulage and handling
- Infilling / Site Restoration
- C&D Material Processing
- Stockpiling

Table 10-9 below details the Dust Emission Class assigned to each of these proposed activities.

Table 10-9 Assigning Dust Emission Classes

Activity	Dust Emission Class	Basis for Dust Emission Class
Haulage of materials to and from the site	Medium	Moderate traffic levels (<250 >25 per day). Presence of Wheel Wash Facilities. Employment of an effective roadsweeper
Internal material haulage and handling	High	Material haulage and handling a small distance from site boundary
Infilling / Site Restoration	High	Large working area, high volume of material movement
C&D Material Processing	High	High volume of material movement
Stockpiling	High	Long term stockpiles, frequent material transfers, stockpiles close to site boundary

10.4.2.2.2 Frequency of Potentially Dusty Winds

Table 10-10 below details the frequency of potentially dusty winds (≥2 m/s) from the direction of the nearest dust source on days without natural dust suppression (<0.2 mm of rainfall in a day).

Table 10-10 Frequency of Potentially Dusty Winds

Receptor Reference	Receptor	Relative Wind Direction	Frequency of dusty winds (>2 m/s) from the direction of the dust source on dry days are less than 5% Note 1	Frequency of Potentially Dusty Winds Category
A	Residential Dwelling	20-30	0.35%	Infrequent
B	Residential Dwelling	360-10	0.94%	Infrequent
C	Residential Dwelling	60-70	0.32%	Infrequent
D	Residential Dwelling	20-30	0.35%	Infrequent
E	Residential Dwelling	220-230	1.95%	Infrequent
F	Residential Dwelling	250-260	2.82%	Infrequent
G	Residential Dwelling	260-270	1.76%	Infrequent
H	Residential Dwelling	270-280	3.39%	Infrequent
I	Residential Dwelling	240-250	2.25%	Infrequent
J	Residential Dwelling	160-170	4.23%	Infrequent
K	Residential Dwelling	180-190	5.11%	Moderately frequent
L	Residential Dwelling	210-220	1.79%	Infrequent

Note 1: Based on the frequency of moderate to high winds (≥.2 m/s) which would cause dust emissions to travel in the direction of the receptor. Adjusted for natural suppression in the form of rainfall > 0.2 mm occurring 54.7% of the time.

10.4.2.2.3 Receptor Distance from Source

Table 10-11 below details the Receptor Distance from Source category for each identified sensitive receptor.

Table 10-11 Receptor Distance from Source

Receptor Reference	Receptor	Distance from site boundary (m)	Receptor Distance from Source Category
A	Residential Dwelling	480	Distant
B	Residential Dwelling	185	Intermediate
C	Residential Dwelling	235	Distant
D	Residential Dwelling	476	Distant
E	Residential Dwelling	124	Intermediate
F	Residential Dwelling	195	Intermediate
G	Residential Dwelling	350	Distant
H	Residential Dwelling	500	Distant
I	Residential Dwelling	314	Distant
J	Residential Dwelling	500	Distant
K	Residential Dwelling	460	Distant
L	Residential Dwelling	317	Distant

10.4.2.2.1 Determining Pathway Effectiveness for Sensitive Receptors

The Pathway Effectiveness for each sensitive receptor was determined with reference to the Frequency Category for potentially dusty winds detailed in Table 10-10 and Receptor Distance from Source category detailed in Table 10-11. Table 10-12 below details the Pathway Effectiveness for each sensitive receptor.

Table 10-12 Pathway Effectiveness for Sensitive Receptors

Receptor Reference	Receptor	Frequency of Potentially Dusty Winds Category	Receptor Distance from Source Category	Pathway Effectiveness
A	Residential Dwelling	Infrequent	Distant	Ineffective
B	Residential Dwelling	Infrequent	Intermediate	Ineffective
C	Residential Dwelling	Infrequent	Distant	Ineffective
D	Residential Dwelling	Infrequent	Distant	Ineffective
E	Residential Dwelling	Infrequent	Intermediate	Ineffective
F	Residential Dwelling	Infrequent	Intermediate	Ineffective
G	Residential Dwelling	Infrequent	Distant	Ineffective
H	Residential Dwelling	Infrequent	Distant	Ineffective
I	Residential Dwelling	Infrequent	Distant	Ineffective
J	Residential Dwelling	Infrequent	Distant	Ineffective
K	Residential Dwelling	Moderately frequent	Distant	Ineffective
L	Residential Dwelling	Infrequent	Distant	Ineffective

10.4.2.2.2 Determining Dust Impact Risk for Sensitive Receptors

The Dust Impact Risk was determined for each receptor with reference to the Dust Emission Class of the nearest dust generating activity on-site and the Pathway effectiveness of each receptor. Table 10-13 below details the Dust Impact Risk for each receptor.

Table 10-13 Dust Impact Risk of Receptors

Receptor Reference	Receptor	Nearest Dust Generating Activity	Dust Emission Class	Pathway Effectiveness	Dust Impact Risk
A	Residential Dwelling	Infilling/Site Restoration	High	Ineffective	Low Risk
B	Residential Dwelling	Haulage of materials to and from the site	Medium	Ineffective	Negligible Risk
C	Residential Dwelling	Haulage of materials to and from the site	Medium	Ineffective	Negligible Risk
D	Residential Dwelling	Haulage of materials to and from the site	Medium	Ineffective	Negligible Risk
E	Residential Dwelling	Infilling/Site Restoration	High	Ineffective	Low Risk
F	Residential Dwelling	Internal material haulage and handling	High	Ineffective	Low Risk
G	Residential Dwelling	Internal material haulage and handling	High	Ineffective	Low Risk
H	Residential Dwelling	Internal material haulage and handling	High	Ineffective	Low Risk
I	Residential Dwelling	Internal material haulage and handling	High	Ineffective	Low Risk
J	Residential Dwelling	Infilling/Site Restoration	High	Ineffective	Low Risk
K	Residential Dwelling	Infilling/Site Restoration	High	Ineffective	Low Risk
L	Residential Dwelling	Infilling/Site Restoration	High	Ineffective	Low Risk

10.4.2.2.3 Determining Magnitude of Dust Impacts

The Magnitude of Dust Impacts was determined in Table 10-14 below with reference to the Receptor Sensitivity Category and Dust Impact Risk.

Table 10-14 Magnitude of Dust Impacts on Sensitive Receptors

Receptor Reference	Receptor	Receptor Sensitivity	Dust Impact Risk	Magnitude of Dust Effect
A	Residential Dwelling	High	Low Risk	Slight Adverse Effect
B	Residential Dwelling	High	Negligible Risk	Negligible Effect
C	Residential Dwelling	High	Negligible Risk	Negligible Effect
D	Residential Dwelling	High	Negligible Risk	Negligible Effect
E	Residential Dwelling	High	Low Risk	Slight Adverse Effect
F	Residential Dwelling	High	Low Risk	Slight Adverse Effect
G	Residential Dwelling	High	Low Risk	Slight Adverse Effect
H	Residential Dwelling	High	Low Risk	Slight Adverse Effect
I	Residential Dwelling	High	Low Risk	Slight Adverse Effect
J	Residential Dwelling	High	Low Risk	Slight Adverse Effect
K	Residential Dwelling	High	Low Risk	Slight Adverse Effect
L	Residential Dwelling	High	Low Risk	Slight Adverse Effect

10.4.2.3 Discussion of Dust Impact Assessment Results

Generally, there is a negligible to low risk the proposed development may adversely affect sensitive receptors surrounding the development site.

The Dust Impact Assessment concluded however that a number of receptors in the receiving environment are likely to be subject to slight adverse dust effects as a result of dust generating activities associated with the proposed development. It is important to note however that this assessment does not take into account proposed mitigation measures.

Mitigation measures to control and minimize dust emissions associated with proposed development are detailed in Section 10.5.

10.4.3 Climate Impacts

The operation of heavy plant and mobile plant and machinery, and HGV movements associated with the proposed development will result in the release of greenhouse gas emissions.

Heavy plant to be used in connection with the proposed development will be powered by a 250 kva diesel generator. This generator considered to be minor emission sources with reference to EPA criteria on the definition of minor and main emissions (i.e. <250 kW for liquid fuels). As such, emissions from this source is not considered to be environmentally significant.

The impact of greenhouse emissions associated with proposed development activities upon climate conditions is deemed to be imperceptible given the nature and scale of the proposed development.

10.4.4 Odour Impacts

The vast majority of waste brought on-site will be inert construction and demolition waste. Such waste is unreactive both biologically and chemically, and will not cause any odour. Biodegradable garden waste will be accepted on-site for composting. This type of waste is not malodourous in nature. This waste sill be transferred without delay to a bunded composting area on-site for curing/maturation.

Strictly no food waste or slurries will be accepted on-site for composting purposes. Waste Acceptance Procedures are in place to prevent the acceptance and processing of any malodorous, waste such as food waste or slurries.

Given that garden waste is being composted it is not envisaged that the composting windrows will be particularly odorous. Proper windrow aeration and moisture application will take place to prevent anaerobic conditions or the excessive generation of leachate which may give rise to odours. The nearest sensitive receptor is 120 metres north east of the site boundary so it is not expected there will be any noticeable odour impact on sensitive receptors.

Daily olfactory inspections will take place to ensure odours emanating from windrows are negligible. Odour incidents or complaints will be recorded and corrective/preventative actions will be planned and implemented, where necessary, although it is considered unlikely that incidents/complaints would occur.

Given the nature of waste being accepted on-site for composting, and the proximity of sensitive receptors relative to composting windrows which will be situated on-site, it is not anticipated there will be any adverse local odour impacts.

Malodourous waste identified upon arrival to the site or on-site will be transferred to the waste quarantine area before being dispatched to an authorized waste facility within 24 hours.

10.5 Mitigation and Monitoring Measures

10.5.1 Mitigation Measures during Site Preparation Works

The following mitigation measures will be implemented on-site to control dust and air emissions during Site Preparation Works (The Construction Phase):

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary.
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. Make the complaints log available to the local authority when asked.
- Undertake daily on-site and off-site inspection, when carrying out works close to receptors, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as roads, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Plan construction/site preparation activities so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Cover temporary construction related stockpiles that may be situated in close proximity to receptors to prevent wind whipping. Keep stockpiles moist during dry and windy conditions.
- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use dust suppression when carrying out dust generating activities (E.g. Earthworks) in close proximity to residences.
- Minimise drop heights from loading shovels and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Avoid scabbling (roughening of concrete surfaces) if possible.
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site.
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.

- Regularly dampen haul routes during dry and/or windy conditions using a water bowzer.
- Implement the proposed wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable) prior to the commencement of construction activities.
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit as early as possible.
- Cease carrying out dust generating activities in dry and windy conditions. Ensure dust generating activities (e.g. earthworks) are never carried out upwind of a residential receptor.

10.5.2 Operational Phase Mitigation Measures

The Operational Phase Dust Impact Assessment carried out concluded that a number of receptors in the receiving environment are likely to be subject to slight adverse dust effects as a result of dust generating activities associated with the proposed development.

The following Mitigation Measures will be implemented in connection with the proposed development in order to prevent and control airborne dust generation and ensure there are no adverse dust impacts upon sensitive receptors.

- Tall trees will be planted along the northern, eastern and south western boundaries of the site prior to the commencement of the development in order to minimize dust impacts on the nearest sensitive receptors to the site (Receptors B, E & F). The presence of these trees will also serve to minimize the generation of wind-blown dust on-site. These trees will be maintained at a height of 14 metres. Tall trees planted at the northern and eastern perimeters of the fill area will be placed on 2 metre high screening mounds. Existing vegetation along the western boundary of the site will also be retained. These trees will remain in place for the duration of the operational phase and will remain a part of the restored site as semi-mature trees.
- Dusty plant, namely the Soil Screening Plant and Concrete Crushing Plant, will be situated towards the centre of the site and a good distance away from the site boundary. This will ensure that there is a significant separation distance between dusty plant and sensitive receptors off-site. The aforementioned plant will also be situated in a sheltered location behind stockpiles in order to minimize the potential for wind-blown dust affecting off-site receptors.
- The following good housekeeping measures will be employed to minimize the generation of dust and dust impacts on sensitive receptors.
- All waste collected and accepted on-site and all materials being transported off-site will be in sealed or covered vehicles only to prevent dust emissions on local roads and internally on-site associated with dustfall from waste contained on vehicles.
- Roadsweeping will be carried out to ensure the access road to the site and internal haul roads are kept clean from dusty materials.
- Water spraying using water bowzers will take place on haul roads and stockpiles during dry and windy days to dampen dust and prevent airborne dust generation.
- A speed limit of 10 kph will be strictly enforced on-site to prevent the turning up of dust associated with traffic movements on-site.
- Long term exposed surfaces e.g. top soil and overburden storage mounds will be vegetated/planted to reduce dust emissions.
- Soil handling will be minimized during adverse weather.

- The timing of operations will be optimized having regard to meteorological conditions.
- Imported soil will be compacted in-situ immediately after being unloaded to minimize wind-blown dust.
- Drop heights will be minimized to minimize dust generation.
- Site access roads and internal haul routes will be regularly re-gravelled in order to prevent deterioration of road conditions and consequent dust generation due to traffic movement.
- Plant operatives will avoid working in windy locations insofar as practicable. Operations will be carried out primarily in more sheltered locations.
- Training on dust mitigation measures will be provided to plant operatives. Plant operatives will be made aware of the nearest sensitive receptors to the site and the good housekeeping practices that should be implemented to prevent dust impacting upon these receptors.
- The slopes and the crest of the fill areas will be reseeded on a phased basis as the project progresses in order to bind the soil and prevent dust blow off.

10.5.3 Dust Monitoring

It is proposed to carry out Bergerhoff dust monitoring at the three dust monitoring locations situated at the site boundary on a quarterly basis. Dust monitoring results will be compared with the EPA's conventional limit value of 350 mg/m2/day in order to ensure dust is not having a negative effect on any off-site receptor.

10.6 Residual Impacts

With the adoption of the above mitigation measures is deemed that dust generating activities associated with the proposed development will not have a significant impact upon sensitive receptors in the baseline environment.

It is deemed that there will be no significant climate or odour impacts associated with the proposed development.

10.6.1 Indirect Impacts

It is not anticipated that there will be any indirect adverse impact on the ambient air environment as a result of the proposed activity.

10.6.2 Cumulative Impacts

No other significant existing or proposed development has been identified in the area which would result in a significant cumulative air or dust impacts in combination with the subject development.

11. Noise

11.1 Introduction

Environmental Efficiency were commissioned by the applicant to assess noise impacts associated with proposed development activities at the subject site in Graney West, Castledermot, Co. Kildare. The purpose of this assessment was to determine the impact proposed operations associated with the proposed development would have on the surrounding noise environment, and in particular, sensitive receptors surrounding the site.

An assessment of vibration impacts has not taken place in this EIAR. During the EIA Scoping Stage it was determined that it is unlikely plant and equipment on-site will create airborne or ground borne vibration that could affect sensitive receptors given the proximity of these receptors to where proposed development activities will be taking place and given that large plant such as the soil and stone screener or concrete crusher will be situated towards the centre of the site a substantial distance away from sensitive receptors.

The proposed development will involve the backfilling of soils into a dedicated fill area on-site as well as the operation of a C&D waste recovery facility. The proposed development is summarized below.

- Sancom Ltd intend on accepting a maximum of approximately 1.8 million tonnes of soil and stone material on-site for backfilling into a dedicated fill area over the course of 25 years, depending on market demand for disposal services. This equates to a maximum of 72,000 tonnes of soil and stone material per annum over 25 years in the ideal scenario for the applicant.

- The following C&D waste recovery activities will be carried out on-site in a separate dedicated C&D recovery area.

    - Intake of top-soil, screening at existing screening plant and resale of such material,
    - Intake of gravel and sands, washing at existing washing plant and resale of such materials,
    - Intake of concrete, concrete crushing using concrete crushing equipment, mixing with sand and gravel before being fed to the washing plant to form aggregate, and resale of such material, and;
    - Intake of garden waste, shredding and composting of this waste for use for agricultural land spreading.

Further information on the proposed development is contained in Section 5.

The proposed development will lead to increased activity on-site. The noise impact assessment presented herein describes and assesses the existing noise baseline characteristics of the local area. The anticipated effects of proposed development activities are then applied to these baseline conditions and the resulting noise impacts assessed. Mitigation measures are identified where necessary to eliminate or minimise adverse impacts.

11.2 Glossary of Terms and Definitions

The following definitions apply throughout this Chapter of the EIAR.

Table 11-1 Noise Terminology

Noise Monitoring Parameters	
Survey	The measurement of noise over one or more days and is made up of a number of monitoring runs with one or more noise meters.
Run or monitoring run	A single measurement at one location to determine noise level. A number of monitoring runs will be typically be made at each location. The duration of a monitoring run is typically 15 or 30 minutes and is stipulated in the licence.
dB(A)	This is the unit used to quantify noise measurements. "dB" stands for decibel and the "A" indicates that the noise reading is A-weighted and therefore is a measurement of noise audible to the human ear. The scale is logarithmic.
$L_{Aeq,T}$	This parameter is measured on-site using a noise meter for a specified time period (T minutes). It represents the average noise level that occurred over that period.
Rated Noise Level or $L_{Ar,T}$	The Rated Noise Level is equal to $L_{Aeq,T}$ plus any penalty for confirmed tonal and/or subjective impulsive. The penalty is only added for daytime and evening monitoring.
L_{AF10} and L_{AF90}	The L_{AF10} and L_{AF900} are both statistical noise levels. L_{AF10} indicates that for 10% of the monitoring period, the sound levels were greater than the quoted value. L_{AF90} indicates that for 90% of the monitoring period, the sound levels were greater than the quoted value. The L_{AF90} indicates the background noise levels if short-term, intermittent noise sources were ignored e.g. a passing car. The L_{AF10} can be used to determine the effect to which these short-term noise sources effect the overall average reading i.e. if the L_{AF10} is very different to the L_{AF90}, then intermittent noise is a significant source of noise
L_{AFmax}	The maximum RMS A-weighted sound pressure level occurring within a specified time period. Measured using the “Fast” time weighting.
Continuous	Noise produced without interruption.
Impulsive Noise	A noise of short duration (typically less than one second), the sound pressure of which is significantly higher than the background; brief and abrupt.
Intermittent Noise	Noise produced on discontinuous basis e.g. equipment operating in cycles or events such as single passing vehicle or aircraft.
Tonal Noise	Noise, which contains a clearly audible, tone i.e. a distinguishable, discrete or continuous note (whine, hum, drone, screech, etc.).
Ambient Noise	Total sound at a receiving location; comprising sound from on-site and off-site, both near and distant
At-source noise monitoring	Noise monitoring that has taken place at or in the close vicinity of the point of origin
Residual noise	Ambient noise remaining at a receiving location when ‘Specific Noise’ is not occurring
Specific Noise	Noise originating from the source under investigation

11.3 Methodology

11.3.1 Overview of Methodology for Assessing Noise Impacts

The following steps were undertaken in order to assess the baseline noise environment and identify and characterize the impacts the proposed development will have on the surrounding noise environment and noise sensitive receptors.

1. A desk based study and an initial site walkover took place in order to develop an understanding the baseline noise environment.
2. An evaluation of the characteristics of the proposed development and the identification of plant and processes in connection with the proposed development that may give rise to noise then took place.
3. A baseline noise survey took place in order to identify typical existing noise levels on-site and at receptors closest to the proposed development site in varying cardinal directions. The methodology of the baseline noise survey undertaken is set out in detail in Section 11.3.2.
4. Noise impacts associated with Site Preparation Works (The Construction Phase) were qualitatively assessed and evaluated.
5. Noise impacts associated with the operational phase of the proposed development were predicted using methods prescribed in British Standard 5228-1:2009+A:2014 *Noise and vibration control on construction and open sites*, Part 1: Noise (BS5228). BS5228 sets out a methodology for predicting noise levels arising from a wide variety of construction and related activities. It can be used to predict noise levels arising from proposed development activities. The specific methodology for predicting noise associated with proposed development activities is set out in Section 11.3.3.
6. Predicted noise levels at sensitive receptors during the carrying out of proposed development activities were determined and a comparison with relevant criteria for the assessment of noise impacts took place in order to determine the significance of noise impacts. Criteria for the assessment of noise is detailed in Section 11.3.4.
7. Mitigation and monitoring measures have been proposed in order to ensure noise emanating from the proposed development is kept within acceptable levels and does not have a significant adverse impact upon sensitive receptors.

11.3.2 Baseline Noise Survey Methodology

11.3.2.1 Date and Time of Baseline Noise Survey

A Baseline Noise Survey took place on the 25th of August 2019. Noise monitoring runs took place during the morning, midday and evening. Baseline Noise monitoring took place in order to determine Background or Residual Noise levels for the local area which will be referred to when predicting noise impacts on NSL's associated with the Proposed Development.

11.3.2.2 Instrumentation Used

The equipment shown in the table below was used during the noise survey. All Sound Level Meters are Type I. The SLMs and calibrators are identified by a LEN (Laboratory Equipment Number) and this is shown in the table below. Calibration certificates for the equipment, where appropriate, are shown in the appendices and are referenced by the LEN.

Table 11-2 Equipment Used

Equipment used	LEN (Lab equipment Number)	Make/Model	Serial Number	Cal cert
First SLM	LEN 089	Svantek SV2	40396	Yes
First Calibrator	LEN 003	Cirrus	51431	Yes
Anemometer	N/A	Kestrel	N/A	N/A

Note: Calibration Certificates for the SLM, Microphone and Calibrator can be made available upon request.

All noise measurements were 'A' weighted and the time-weighting 'Fast' was applied (to equate to human ear hearing). Each SLM is calibrated in the field before the start of the survey and again at the end of the survey. Unless stated otherwise in this report, there was no drift in calibration greater than 0.1 dB over the duration of the survey.

11.3.2.3 Noise Survey Personnel

The noise survey was undertaken by Environmental Efficiency staff as follows:

Lead consultant	Ronan Sutcliffe, Dip Environmental Protection, IOA Certified Environmental Noise Assessor

11.3.2.4 Meteorological Conditions

Weather conditions on the days of monitoring were considered appropriate for surveying purposes and therefore did not affect the readings i.e. conditions were dry and wind speed was less than 5 m/s (the normal upper limit for taking measurements). The Sound Level Meter was also fitted with a windshield to minimise interference from potential meteorological conditions, in keeping with good practice. The meteorological conditions during the survey periods are shown below.

Table 11-3 Meteorological Conditions

Survey	Date	Time	Av. wind speed, m/s	Temp, C	Prevailing wind direction	Weather
Morning	25/08/2019	10:02	0.4	17.0	SW	No precipitation
Mid-day	25/08/2019	12:58	0.0	20.0	Still	No precipitation
Evening	25/08/2019	15:44	1.0	22.0	SW	No precipitation

11.3.2.5 Measurement Locations

Noise Monitoring took place at one monitoring location labelled as NSL1. It can be assumed that the noise measurement readings at this location would be closely similar for all NSL's in the vicinity of the site given the rural nature of the site.

The locations of the three closest noise sensitive locations site in varying cardinal directions are described in the table below and shown in Figure 11-1.

A photograph of the SLM at NSL1 are shown following the map.

Table 11-4: Description of monitoring locations

Location	Height above ground, m	Distance from reflective surface, m	Location Description	Noise sensitive location
NSL1 (Location Ref. E)	1.2	>3.5	Residential Dwelling	Yes
NSL2 (Location Ref. E)	1.2	>3.5	Residential Dwelling	Yes
NSL3 (Location Ref. E)	1.2	>3.5	Residential Dwelling	Yes

Figure 11-1 NSL's surrounding the site

11.3.2.6 Ground attenuation

If the intervening ground between a noise source and a measurement location is acoustically absorptive, this can result in a reduction in noise level at the receptor due to absorption of sound energy by the ground itself. On the contrary, if the intervening ground is acoustically reflective ground, its products the opposite effect

The details of the intervening ground between sources and measurement positions are described in the following table:

Table 11-5 Ground attenuation

Location	% Soft Ground	% Hard Ground	Comments
NSL1	100	0	No comment
NSL2	100	0	No comment
NSL3	100	0	No comment

11.3.3 Noise Prediction Modelling Methodology

For the purpose of this EIA, a Noise Prediction Assessment was conducted to assess the impact of the planned activity at Noise Sensitive Locations (NSL's) in the vicinity of the site.

At-source Development Noise levels associated with the planned activity were determined. Sound pressure levels of operational noise sources were either monitored in-situ, or where certain plant is currently not present on-site, plant specifications were referred to in order to determine sound pressure level output.

The Development Noise levels at NSL's, during site operations, were predicted in accordance with methodology outlined within British Standard 5228:2009 *Code of practice for noise and vibration control on construction and open sites (Part 1)*, taking into account at-source noise levels of processes/equipment, distance from source to receptor and mixed ground (hard/soft) attenuation. This resulted in the determination of Specific Noise levels at NSL's.

Predicted Development Noise levels at NSL's, or Specific Noise Levels, taking into account all influencing factors, were then added to Background or Residual Noise levels which were measured at each respective NSL at a time when no site processes were occurring, in order to predict Overall Ambient Noise (Specific + Residual Noise) levels at NSL's after the planned activity has begun.

The following assumptions have been made when predicting Ambient Noise Levels at NSL's.

- All mobile plant (Volvo 180 E wheel loader, 2 x Hitachi excavators 360, Kamatsu D65 E bulldozer) are in operation at the closest point to each NSL for 25% of the 11 hour working day.
- All stationary plant (Macgen 250 kva generator, Soil and Stone Powerscreen MK II, Jaw Crusher Pegasus 600 x 12) are in constant operation at their defined locations throughout the 11 hour working day.
- The green waste shredder is in operation at the defined location for 5% of 11 hour working day (This plant will only be used on an occasional basis).
- Delivery trucks are in operation along the haul routes defined in the Site Layout Plans adjoining the Planning Application
- The attenuating effect of a 2 metre high screening mound around the northern, eastern and southern site boundaries has been taken into account (as shown on the Landscape Masterplan during Construction adjoining the Planning Application).
- The attenuating effect of 7m high stockpiles between situated between the Soil and Stone Screening Plant and the Concrete Crushing Plant and NSL1 has been taken into account. (as shown on the Landscape Masterplan during Construction adjoining the Planning Application).

In practice sequencing of processes/activities and the timing and duration of the processes/activities on any given day may vary. Therefore, it is deemed that the above assumptions are representative of worst-case scenario noise on-site.

11.3.4 Criteria for Assessment of Noise Impacts and Determination of Significance

Noise Impact Assessment criteria have been identified in order to assess and characterize noise impacts upon the surrounding noise environment resulting from proposed development activities.

11.3.4.1 Guidelines for Noise Impact Assessment (IEMA)

The Guidelines for Noise Impact Assessment produced by the Institute of Environmental Management and Assessment (IEMA) are generally recognised as established good practice guidelines for developing noise impact assessments. An example impact scale offered by the IEMA Guidelines is shown in Table 11-6 below.

Table 11-6 Impact Scale taken from IEMA Guidelines for Noise Impact Assessment

Very Substantial	Greater than 10 dB LAeq change in sound level perceived at a receptor of great sensitivity to noise
Substantial	Greater than 5 dB LAeq change in sound level at a noise-sensitive receptor, or a 5 to 9.9 dB Laeq change in sound level at a receptor of great sensitivity to noise
Moderate	A 3 to 4.9 dB LAeq change in sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB LAeq change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB LAeq change in sound level at a receptor of some sensitivity
None	Less than 2.9 dB LAeq change in sound level and/or all receptors are of negligible sensitivity to noise or marginal to the zone of influence of the proposals

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3dB is generally considered to be the smallest change in environmental noise that is perceptible to the human ear under most normal conditions. A 10 dB change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

It has been decided to refer to the impact assessment scale listed above when assessing the potential impact of noise associated with the proposed development upon sensitive receptors in order to aid the characterization of noise effects.

11.3.4.1 EPA Guidelines on Environmental Management in the Extractive Industry

The EPA has produced guidelines for Quarries (Environmental management in the Extractive Industry) which define noise limit values for extractive industry sites. Activities occurring on these sites shall typically not give rise to noise levels off-site at any Noise Sensitive Location (NSL) in excess of these limits. An NSL may be described as follows:

'Any dwelling, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity, which for its proper enjoyment requires the absence of noise at nuisance levels.'

Noise limits for quarries prescribed by the EPA are shown in the table below.

Table 11-7 Noise Limits for Licensed Sites prescribed by EPA Guidelines Environmental Management in the Extractive Industry

Daytime Noise Criterion, dB $L_{Aeq,\ 1\ hr}$ (08:00 to 20:00 hrs)	Night-time Noise Criterion, dB $L_{Aeq,\ 1\ hr}$ (20:00 to 08:00 hrs)
55dB	45dB

Given the nature of the proposed activity, it is proposed to refer to the above limits when assessing noise impacts in this instance. Predicated noise levels at each sensitive receptor were compared with relevant EPA limits for relevant periods in order to assess whether proposed development activities are acceptable in terms of noise impact.

11.4 Baseline Environment

11.4.1 Local Area Context

The application site is located in the townland of Graney West, approximately 2 kilometres south east of the town of Castledermot and 12 kilometres west of the town of Balltinglass, in Co. Kildare. There is an established but disused sand and gravel pit at the subject site.

The site has historically been in use as a quarry. The site as it is consists of an area consisting of residential and agricultural buildings, an area where plant and equipment used in connection with pre-existing quarrying and aggregate production activities are situated and a much larger area consisting of worked out quarry voids.

The applicant intends on backfilling soil and stone material into previously extracted quarry voids on-site in order to a achieve land restoration. In addition, the applicant intends on accepting C&D waste on-site for recovery processing. Processed materials will be resold as per market demand. Pre-existing plant and additional proposed plant will be used to process C&D waste materials.

The site is situated in rural location dominated by agriculture and interspersed with one off housing. There are a small number of residential developments in the vicinity of the site, mainly to the east, north and south of the application site. There are no significant tourism and recreational sites or areas in the local area surrounding the site. There is no commercial or industrial development in the vicinity of the site. There are no plans to develop any sites in the local area surrounding the site.

11.4.2 Noise Sensitive Locations

There are a number of noise sensitive locations in the vicinity of the site. Noise sensitive locations within 500 metres of the site have been identified. The prediction of noise impacts associated with the proposed development on three NSL's which are in the closest proximity to the site in varying cardinal directions has been carried out. These NSL's are shown in Figure 11-1.

11.5 Impact Assessment

11.5.1 Impacts during Site Preparation Works

Various types of construction related mobile plant and equipment will be used during excavation, construction and access road activities that will be carried out during the Site Preparation Works stage. Given that proposed site preparation works will be small-scale and limited in nature, scale and duration, it is envisaged that there will be Not Significant to Slight, temporary noise impacts upon the character of the local area and nearby NSL's surrounding the site during this stage of the development. It is recommended Mitigation Measures are implemented to control and minimize noise associated with proposed construction and site preparation activities.

11.5.2 Operational Impacts

11.5.2.1 Sources of Noise at the Proposed Development

The following noise sources will be present on-site during the operational phase of the Proposed Development.

- Fixed plant used for processing C&D Waste material
- Mobile Plant used for hauling and backfilling material on-site
- Heavy Good Vehicles used for hauling materials to and from the site

The following mobile and fixed plant will be present on-site during planned activities:

- Mobile Loading Machinery
    - Volvo 180 E wheel loader
    - 2 x Hitachi excavators 360
    - Kamatsu D65 E bulldozer (for filling)
- Macgen 250 kva Diesel Generator (existing)
- Soil Screening Plant – Soil and Stone Powerscreen MK II (proposed)
- Sand and Gravel Plant (existing)
    - 10 x 5 Powerscreen washing head
    - 10 x 5 Powerscreen commander
    - CDE size cyclone
    - Trident Mark 2 dewatering plant
    - Powerscreen 800 log washing
- Jaw Crusher Pegasus 600 x 12 (for concrete crushing) (proposed)
- Green Waste Shredder – Untha RS30/40 Shredder

Having regard to the Traffic Impact Assessment undertaken by Transport Insights, which is contained in Section 13 of this EIAR, it has been determined that there will be 50 daily HGV trips to the site and 50 daily HGV trips from the site (100 one way trips per day overall)

11.5.2.2 Noise Prediction Modelling

Noise Prediction Modelling was carried out in order to assess how noise from the proposed development will affect the three closest NSL's to the site in various cardinal directions. Results of the Noise Prediction Modelling Assessment undertaken considering planning activities at the application site are shown in the table below. Raw data and calculation data pertaining to these results are shown in Appendix 2.

Table 11-8 Noise Prediction Modelling Results

NSL/ Location	Description	Period	Specific Noise Level at NSL, LAeq (dB)	Residual Noise Level, LAeq (dB)	Ambient Noise Level at NSL (Specific Noise + Residual Noise) LAeq (dB)	Level of increase in Noise due to Planned Activities, LAeq (dB)
1	Residential Dwelling North East of Site	Morning	40.3	49.4	49.9	0.5
		Midday	40.3	45.3	46.5	1.2
		Evening	40.3	51.9	52.2	0.3
2	Residential Dwelling South of Site	Morning	43.5	49.4	50.4	1.0
		Midday	43.5	45.3	47.5	2.2
		Evening	43.5	51.9	52.5	0.6
3	Residential Dwelling South West of Site	Morning	36.2	49.4	49.6	0.2
		Midday	36.2	45.3	45.8	0.5
		Evening	36.2	51.9	52.0	0.1

Note:

1. The following assumptions have been made when predicting Ambient Noise Levels at NSL's.
   - All mobile plant (Volvo 180 E wheel loader, 2 x Hitachi excavators 360, Kamatsu D65 E bulldozer) are in operation at the closest point to each NSL for 25% of the 11 hour working day.
   - All stationary plant (Macgen 250 KVA generator, Soil and Stone Powerscreen MK II, Jaw Crusher Pegasus 600 x 12) are in constant operation at their defined locations throughout the 11 hour working day.
   - The green waste shredder is in operation at the defined location for 5% of 11 hour working day (This plant will only be used on an occasional basis).
   - Delivery trucks are in operation along the haul routes defined in the Site Layout Plan adjoining the Planning Application).
   - The attenuating effect of a 2 metre high screening mound around the northern, eastern and southern site boundaries has been taken into account (as shown on the Landscape Masterplan during Construction adjoining the Planning Application).
   - The attenuating effect of 7m high stockpiles between situated between the Soil and Stone Screening Plant and the Concrete Crushing Plant and NSL1 has been taken into account. (as shown on the Landscape Masterplan during Construction adjoining the Planning Application).
2. In practice sequencing of processes/activities and the timing and duration of the processes/activities on any given day may vary. Therefore, it is deemed that the above assumptions are representative of worst-case scenario noise on-site.

11.5.2.3 Operational Impacts

The table below shows the level of impact planned activities will have on NSL during the assumed scenario, having regard to Noise Impact Criteria defined by Guidelines for Noise Impact Assessment produced by the Institute of Environmental Management and Assessment (IEMA).

Table 11-9 Impact of Noise upon NSL's considering IEMA Noise Impact Criteria

NSL	Period	Level of Impact
NSL1	Morning	None
	Mid-day	None
	Evening	None
NSL2	Morning	None
	Mid-day	None
	Evening	None
NSL3	Morning	None
	Mid-day	None
	Evening	None

As can be seen in the table above planned activities during the assumed worst-case scenario will have a negligible impact on NSL1, NSL2 & NSL3 during all time periods.

Ambient Noise levels predicted at NSL's do not breach the EPA's prescribed day-time noise limit of 55 dB at any NSL (the facility does not operate during evening or night-time as defined by the EPA).

It is noted that the noise prediction assessment undertaken is representative of the worst-case scenario noise levels emanating from the proposed development and effects on a normal operating day will be significantly reduced.

Mitigation measures for controlling and attenuating noise emanating from the site during operations are defined below. It is considered that the adoption and implementation of these mitigation measures will ensure noise will be controlled and maintained at an acceptable level.

11.6 Mitigation Measures and Monitoring

11.6.1 Mitigation Measures during Site Preparation Works

The following good practice mitigation measures for noise control on-site during the Site Preparation Works (The Construction Phase) will be adopted and implemented in order to ensure construction noise levels are kept at an acceptable level:

- Construction operating hours shall be between 7am to 6pm Monday to Friday, and from 8am to 2pm on Saturdays. No construction activities shall take place outside of these operating hours.
- At the commencement of works all site staff are to be briefed on their responsibilities to the application of mitigation measures to minimise construction noise and the content of any planning permission.
- Brief all site staff regarding the complaints procedure and mitigation requirements and their responsibilities to register and escalate complaints received.
- Display contact details of responsible site manager as well as working hours and other site information at both site entrances.
- Limit material loading and unloading to normal working hours.
- Reduce loading / unloading heights for muck away and material movement to mitigate impact noise.
- Ensure that each item of plant and equipment complies with the noise limits quoted in the relevant European Commission Directive 2000/14/EC.
- Fit all plant and equipment with appropriate mufflers or silencers of the type recommended by the manufacturer.
- Follow manufacturer's guidance and measures to operate plant and equipment and use it in a manner which minimises noise.
- Use all plant and equipment only for tasks for which it has been designed for.
- Shut down all plant and equipment in intermittent use in the intervening periods between works or throttle it down to a minimum.
- Locate and orientate fixed or semi-static plant away from noise sensitive receptors.
- Consider concrete pour sizes and plan the start of concrete pours as early as possible within normal working hours to avoid overruns.

11.6.2 Operational Phase Mitigation Measures

The primary Mitigation Measures that will be implemented during the operational phase of the proposed development to attenuate noise emissions emanating from plant, equipment and processes on-site are as follows:

- Site operations will be restricted to between 07:00 - 18:00 Monday to Friday and 08:00 - 16:00 Saturday. No activity will take place outside these hours. The facility will operate under an EPA Waste Licence which will prescribe noise limit values to adhere to.
- A 2 metre high screening mound will be developed along the northern, eastern and southern site boundaries in order to attenuate noise emissions emanating from on-site plant and processes. These mounds will attenuate noise being directed from onsite activities toward NSL1 & NSL2 in particular.

- The Soil and Stone Screening Plant will be situated behind a 7 metre high proposed material stockpile. The presence of this stockpile will serve to impede and attenuate noise emanating from the Soil and Stone Screening Plant toward NSL1 and NSL2 in particular.
- The proposed Concrete Crusher will be located behind a 7 metre high proposed material stockpile. The presence of this stockpile will serve to impede and attenuate noise emanating from the Concrete Crushing Plant toward NSL1 & NSL2 in particular. The concrete crushing plant will be further enclosed by cantilever walls to minimize noise emanating from the operation of this plant.

In addition to the above, the following good practice mitigation measures for noise control on-site during the operational phase will be adopted and implemented in order to ensure operational phase noise levels are kept at an acceptable level:

- Chutes and hoppers will be lined with a damping layer (rubber lining) to minimize noise output from plant, where practicable. Manufacturers will be consulted in order to determine whether this is practicable.
- Drop heights will be kept to a minimum to minimize noise arising due to material handling.
- Plant and equipment will be serviced and maintained regularly and in line with manufacturer specification (e.g. lubrication of equipment, fixing loose parts, proper balancing)
- A Silencer will be used on the Macgen 250 kva generator on-site.
- The unnecessary revving of engines and the idling of mobile plant and HGV's will be avoided.
- Backfilling and C&D Processing activities will only take place during the designated day-time operating hours (07:00 - 18:00 Monday to Friday and 08:00 - 16:00 Saturday).
- Plant will be orientated in such a manner that noise is directed away from NSL's, in particular NSL1 and NSL2 which are nearest to the site.

11.6.3 Noise Monitoring

It is proposed to carry out day-time Environmental Noise Monitoring at NSL1, NSL2 and NSL3 during the operational phase of the proposed development on an annual basis to ensure the EPA prescribed day-time noise limit for mineral sites is not breached at these NSL's.

11.7 Residual Impacts

With the adoption of the above Mitigation Measures, it is deemed that noise impacts upon NSL's as a result of Proposed Development activities will be negligible.

11.7.1 Indirect Impacts

It is not anticipated that there will be any indirect adverse impact on the local noise environment as a result of the proposed activity.

11.7.2 Cumulative Impacts

No other significant existing or proposed development has been identified in the area which would result in a significant cumulative air noise impacts in combination with the subject development.

12. Material Assets

12.1 Introduction

The Draft Advice Notes for Preparing Environmental Impact Statements produced by the EPA in September 2015 state that *"Resources that are valued and that are intrinsic to specific places are called 'material assets'. They may be of either human or natural origin".* This Chapter of the EIAR, prepared by Environmental Efficiency Consultants, addresses how the proposed development will have an impact upon material assets.

The purpose of the assessment is to ensure that the impact of the proposed development on these material assets is assessed and mitigation measures are developed to control any likely significant adverse impacts on material assets as a result of the proposed development. The overall aim of this assessment is to prevent adverse impacts upon material assets and ensure these assets retain their value and are available for present and future generations.

The effects of the proposed activity on material assets within the locality have been assessed under the following headings:

- Housing and Settlement
- Built Services
- Waste Management

The impacts of the proposed development on material assets in the form of natural resources of economic and amenity value (e.g. nature, soil, groundwater, surface water, air and landscape) are assessed separately in the following chapters:

- Chapter 7 – Biodiversity
- Chapter 8 – Land and Soils
- Chapter 9 – Water
- Chapter 10 – Air
- Chapter 11 – Noise and Vibration
- Chapter 15 - Landscape

Impacts on material assets in the form of traffic and transportation infrastructure are assessed separately in Chapter 13 of this EIAR and impacts on architectural, archaeological and cultural assets are assessed separately in Chapter 14.

12.2 Methodology

This Material Assets Impact Assessment involved an evaluation of the proposed development and proposed facility operations and an evaluation of materials assets in the receiving environment. Qualitative analysis using professional judgement was carried out in order to asses and characterize impacts on material assets associated with the proposed development. Where relevant, the conclusions of other EIAR Chapter have been cross referenced in order to assess impacts on material assets. Mitigation measures were developed to minimize any potential adverse impact on material assets associated with proposed development activities. This Impact Assessment involved the following stages:

Stage 1: Characterization of the Proposed Development and Proposed Waste Activities

Further detail on proposed waste activities and plant processing capacities was provided in order to sufficiently describe and characterize proposed waste operations at the facility as well as the processing capacity of plant on-site.

Stage 2: The Baseline Assessment

Material assets in the baseline environment were identified and characterized. A site walkover and a desk-based study referring to published information from various sources was carried out to identify the location, extent and nature of material assets in the receiving environment.

Stage 2: The Assessment of Impacts

Qualitative analysis using professional judgement was carried out to assess impacts on material assets. This stage involved the identification of material assets that may be impacted upon by proposed development activities. The quality, significance, extent, probability duration, frequency and type of effects were then identified and characterized. The magnitude of impacts was assessed based on the nature of impacts and the sensitivity or value of the receiving material asset. Quantitative analysis contained in other related EIAR Chapters has been referred to where relevant.

Stage 3: Mitigation Measures

On completion of Stage 2, measures are developed, if necessary, to avoid or reduce any identified impacts on any material assets.

12.3 Proposed Development

The Planning Authority, Kildare County Council, advised the applicant and agent to provide information on the waste activity and the processing capacity of the facility within the material assets chapter. This section addresses these matters.

12.3.1 Description of the Waste Activity

In order to avoid repetition, the reader is referred to Section 5.5 of this EIAR which provides a detailed description of proposed waste activities and processes to be carried out at the facility under the proposed development, as well as the types and amount of waste material to be brought on-site and the proposed sources of these materials.

The proposed waste activities fall under the scope of the fourth schedule of the Waste Management Act as amended. In particular, the applicant will be undertaking waste activities that fall under WMA Recovery Codes 10, 5 & 3, namely:

- R10: Land treatment resulting in benefit to agriculture or ecological improvement (primary Activity)
- R5: Inorganic substance recycling/reclamation
- R3: Organic substance recycling/reclamation

It is therefore proposed to operate the facility under a Waste Licence from the EPA.

12.3.2 Processing Capacity

The following waste activities will be carried out on-site:

- Backfilling of inert soil and stone to restore worked out quarry areas on-site.
- Intake of top-soil, screening at existing screening plant and resale of such material,
- Intake of gravel and sands, washing at existing washing plant and resale of such materials,
- Intake of concrete, concrete crushing using concrete crushing equipment, mixing with sand and gravel before being fed to the washing plant to form aggregate, and resale of such material, and;
- Intake of garden waste, shredding and composting of this waste for use for agricultural land spreading.

The applicant proposes on accepting a maximum of 72,000 tonnes per annum of inert soil and stone for backfilling on-site. A topographical survey was carried out in order to determine the amount of material that could be backfilled. It was determined that there was ca. 1,054,949 m3 of space in the fill area (assuming an average imported soil density of 1.8 t/m3). As such, the applicant proposes on accepting a maximum of ca. 1.8 million tonnes of inert soil and stone material on-site for backfilling over the course of 25 years. This equates to a maximum of ca. 72,000 tonnes of soil and stone material per annum over 25 years in the ideal scenario for the applicant.

The applicant proposes on accepting a maximum of 1,500 tonnes of top-soil on-site per annum, 12,500 tonnes of sand and gravel on-site per annum and 12,500 tonnes of concrete on-site per annum.

These materials are to be processed in the existing Powerscreen Screening/Washing Plant on-site. The Powerscreen plant is capable of processing a maximum of 200 tonnes of material per hour. The site operating hours will be between 07:00 - 18:00 Monday to Friday and 08:00 - 16:00 Saturday. Assuming 253 work week working days and 52 Saturday work days, it is estimated there will be ca. 3,199 operational hours in a year. The processing capacity of the Powerscreen plant on-site in a year is therefore calculated as 639,800 tonnes maximum. As such, it can be seen that there is sufficient capacity for plant to process the proposed quantity of materials to be accepted on-site.

The proposed concrete crushing plant can process up to a maximum of 400 tonnes of concrete per hour which is sufficient for the processing of the concrete which is to be accepted on-site for crushing before being mixed with sand and gravel and fed to the screening/washing plant.

The applicant proposes on accepting 1,000 of garden waste on-site per annum. The green waste shredder is capable of processing 57 tonnes of green waste per hour. Assuming 3,199 operating hours in a year it can be concluded that the green waste shredder plant is of sufficient size for processing garden waste to be accepted on-site.

12.4 Baseline Environment

12.4.1 Site Context

The application site is located in the townland of Graney West, approximately 2 kilometres south east of the town of Castledermot and 12 kilometres west of the town of Balltinglass, in Co. Kildare. There is an established but disused sand and gravel pit at the subject site. The site is situated in rural location dominated by agriculture and interspersed with one off housing. There are a small number of residential developments in the vicinity of the site, mainly to the east, north and south of the application site. There are no significant tourism and recreational sites or areas in the local area surrounding the site. There is no commercial or industrial development in the vicinity of the site. There are no plans to develop any sites in the local area surrounding the site.

12.4.2 Housing and Settlement

A number of one off residential dwellings are situated in close proximity to the proposed development site. A total of 11 residential properties are situated within 500 metres of the application site boundary either of the L4015 Castledermot to Baltinglass Road or the L8100 situated to the east of the site. The nearest sensitive receptor is a one off house and is approximately 110 metres north east of the main site boundary. There are no other property types situated in the local area surrounding the site apart from these residences and their associated curtilages.

The nearest area of settlement is Castledermot which is approximately 2 km north west of the site. Castledermot is located in the south of County Kildare on the old N9 National Primary Route now the R448. The towns lies 32 km south of Kilcullen, 10 km north of Carlow Town and 11km south east of Athy. Castledermot is defined as a small town the Kildare County Development Plan. The town acts both as a small service centre and commuter centre.

12.4.3 Built Services

12.4.3.1 Electricity

A 110 kV electricity power line running from Stratford to Carlow runs to the east of the site. The subject site sources its electricity from this line by way of lower voltage local lines. No underground or overhead lines traverse the main body of the site. A low voltage overhead line crosses the existing site access road to the north east of the site. A branch of this same line will cross the proposed site access road to the south of the site. A map obtained from the ESB showing the local electricity network is shown in Appendix 3.

A 250 kva diesel generator will be utilized to power processing plant on-site.

12.4.3.2 Gas

The site is not connected to any public gas mains. Discussion were held with Gas Networks Ireland confirming there are no gas networks in the region surrounding the site.

12.4.3.3 Telecommunication

Telecommunication services (fixed and mobile networks) are available at the site and in the surrounding area.

12.4.3.4 Water Supply

There is no public water supply to the site. Potable water for the residence on-site and staff facilities is sourced from a groundwater well on-site.

Water for use in the sand and gravel washing plant on-site is drawn from the recycled water pond to the south east of the site via two supply lines. A 150 mm diameter line feeds the main washing plant and a 100 mm diameter line supplies the sand cyclone; both are driven by submersible electric pumps. After use in the washing plant the water is piped by gravity to primary and secondary settling ponds west of the application site for treatment, before returning to the recycled water pond via a 225 mm diameter gravity line. The primary settling pond is large with ample space for maintenance and silt storage. Make up or top up water is supplied from the Graney River via a 150 mm diameter line and submersible electric pump delivering into the recycled water pond. This supply is not continuous; being controlled by a water level device in the recycled water pond.

12.4.3.5 Wastewater Management

The site is not connected to public sewer mains. There is an existing septic tank system on-site into which all-domestic effluent from the staff toilet drains.

In addition, existing primary and secondary settling lagoons are situated on-site for the treatment of water used in the washing plant.

An effluent storage tank which serves an adjoining cattle shed is present on-site. This storage tank is 180,000 litres in size and is periodically serviced and emptied as required.

12.4.3.6 Surface Water Management

The site is not connected to any public storm sewer mains. The majority of surface water which arises on-site leaves the site by percolation through gravels to ground and underlying groundwater.

In the event of substantial rainfall and the build-up of surface water run-off, most surface water runoff from the site is directed to the existing settling lagoons currently present in at the quarry site by the natural topography of the site.

The settlement lagoons present on-site allow for the settlement of all settleable solids contained in surface water run-off. Where necessary, the water in the last of the lagoons located at the centre of the site is pumped back to the washing plant via a pump house and recycled within the process. Overflow from the last of the lagoons situated to the south west of the site is via a 300 mm diameter concrete pipe to a ditch which runs to Graney River south of the site. It is only anticipated water will overflow from the site on rare occasions during exceptional heavy rainfall periods.

Surface water run-off arising on existing and proposed non permeable areas will be directed via topography toward a drain east of the dwelling on-site which in turn will direct this water to the pond to the south east of the site.

A separate drainage system serving the proposed re-fuelling area is proposed. Surface water arising in the re-fuelling area will be captured by this drainage system and directed to a silt-trap, an oil interceptor and a soakaway.

An oil interceptor serving the proposed visitor and staff car park will also be installed. This will drain to the pond to the south east of the site.

The silt trap, oil interceptors and settlement ponds present on-site will be cleaned and serviced annually or at shorter intervals where necessary in order to ensure proper functionality.

Settlement lagoons will gradually be filled in as Land Restoration progresses. Re-contouring of the site will take place as Land Restoration progresses to ensure that any stormwater run-off generated on-site will be directed towards a drainage ditch along the western boundary of the site. Temporary settlement ponds will be used as the land restoration project progresses to protect against run-off of sediments to this ditch/the River Graney. Re-seeding of filled areas will also take place as soon as possible to minimize the run-off of sediment on-site.

The layout and operation of the site drainage system is displayed in Site Layout Plans adjoining the Planning Application (Drawing Ref: DWG Nos. 002/C1, 002/C2, 002/C3, 002/C4).

The proposed site access road will be elevated at a greater height than existing land, will have soft margins and will have a down camber on one side. Drainage ditches exist either side of the proposed site access road. Run-off on this road will drain naturally on the down camber side to a drainage ditch. A heavy duty ACO Drain and 600 mm pipe will be present at the site entrance to direct run-off here to the drainage ditches either side of the site access road. These details are shown in drawings adjoining the Planning Applications (Drawing Ref: G1210-01,G1210-02, G1210-03).

12.4.3.7 Lighting

There are no existing public lighting provisions on the L4015 road in the vicinity of the proposed site entrance.

There are no existing public lighting provisions on the L8100 in the vicinity of the existing site entrance.

12.4.4 Waste Management

The surrounding region is well serviced by domestic, commercial and skip hire waste providers, with companies such as AES, Ray Whelan Ltd and Greenstar serving the region.

A number of waste facilities which accept various waste types are situated in the region. Ray Whelan Limited's waste transfer station is based south west of Castledermot and north west of Carlow Town in Cappanaboe, Co. Laois (Licence Ref: W0158). Carlow County Council operate a small waste transfer station based in Haroldstown south east of the site and north east of Tullow (Licence Ref: W0139). Athy Civic Amenity Centre, which accepts non-hazardous municipal solid waste, is situated in the town of Athy in Co. Kildare (Licence Ref: W0175).

Sizable landfills in the region include Rampere Landfill (Licence Ref: W0066) based north of Baltinglass in Co. Wicklow and Powerstown Landfill (Licence Ref: W0025) based south of Carlow Town in Co. Carlow.

Two composting facilities are present in the Carlow region south of the site; Waddock Composting (Licence Ref: P1009) and O' Toole Composting (Licence Ref: W0284).

Generally, there is a significant shortfall in soil recovery capacity in the Greater Dublin Region. This was confirmed in an RPS report entitled *Review of Soil Waste Management in the Greater Dublin Area Market Analysis Report* (August, 2016). The report concludes 'By 2023 a capacity gap of over 2 million tonnes is estimated.'

This area of South Kildare in particular is not is not well served by soil or C&D Recovery facilities. Only one small soil recovery facility operating under a certificate of registration (COR-KE-12-0021-01) can be found in the region. This facility is situated north west of Castledermot and operated by a Mr Tom Kelly.

The nearest sizeable soil recovery facility is Walshestown Restoration Ltd (Licence Ref: W0254) based 33 km to the north east of the site outside of Naas, North Kildare. This facility is authorized to accept up to 330,000 tonnes of inert soil and stone per annum for land restoration purposes. Other sizable soil and C&D recovery facilities situated in the North Kildare region includes Drehid Waste Management Facility, Blackhall Soil Recovery Facility and Sand & Gravel Merchants.

12.5 Impact Assessment

12.5.1 The Site

The site was used as an operational quarry for many years. Quarrying activities will continue to take place in an adjacent field to the north of the site. The processing of materials for forming aggregate is continuing to take place at existing plant on-site. It is considered unlikely that proposed material recovery operations at the site will significantly change the nature and character of the site in a manner which gives rise to significant impacts on material assets over and above existing impacts associated with quarry related operations.

In the long-term, the fill area on-site will be restored through backfilling. Once final contours are reached the land will be reseeded and used as agricultural land.

The proposed short-term, medium-term and long term uses on-site are deemed to be appropriate and consistent with previously permitted development on-site. The proposes uses on-site are also consistent with Kildare County Council's Development Plan Policy Objective in relation to quarry restoration, namely objective EI12 to '*Ensure that all existing workings are rehabilitated to suitable land-uses and that extraction activities allow for future rehabilitation and proper land-use management.'*

12.5.2 Housing and Settlement

Potential exists for noise and dust emissions associated with proposed operations having an impact on residential properties situated in vicinity of the site. As outlined in the Noise and Vibration Chapter and Air and Climate Chapter, it is not anticipated these impacts will be significant once noise and dust related mitigation measures are implemented. In the long term, the fill area on-site will be backfilled and the site will be restored to agricultural grassland. Impacts associated with the existing and proposed site activities will cease.

Potential exists for exterior lighting on-site affecting nearby properties. It is considered that light spill and glare from exterior lighting could have a slight to moderate impact on nearby properties. It is recommended that mitigation measures are developed to minimize any light pollution.

As previously mentioned the nearest significant settlement to the site is the town of Castledermot which is 2 km north west of the site. It is not envisaged the proposed development will have any adverse impact on this settlement given the large separation distance between the town and the subject site as well as the presence of various lines of vegetative screening between the site and the town preventing visual effects.

12.5.3 Built Services

12.5.3.1 Electricity, Gas and Water

No high voltage overhead or underground electricity powerlines traverse the site. No lower voltage power lines or telecommunication lines traverse working areas (C&D Recovery Area or Fill Area) on-site. There is therefore no potential for mobile plant or earthworks on-site damaging such lines. HGV's travelling to and from the site using the L4015 road present no risks to lower voltage power lines crossing roads given the height and ground clearance of the overhead lines. There is a risk that high reach plant may come into contact with overhead lines crossing site access roads during construction or road surfacing works. Mitigation measures should be put in place to prevent such an occurrence.

A 250 kva diesel generator will be utilized to power processing plant on-site. As such, there will be no additional demand on the local mains electricity supply associated with processing operations.

No gas or water supply lines are present within the vicinity of the site therefore there is no risk of striking such lines.

12.5.3.2 Wastewater and Surface Water Management

The potential for fuel spills or the increase in suspended solids or nutrients in run-off present a risk to material assets in the form of groundwater underlying the site or receiving surface waters and may result in the deterioration of groundwater or surface water quality. The potential impact of aqueous discharges from the site is dealt with in the Water Chapter.

Existing wastewater infrastructure (i.e. septic tank, effluent storage tank, settlement lagoons) and proposed surface water management infrastructure (i.e. oil interceptors, silt trap) are deemed sufficient for treating anticipated wastewater and surface water discharges from the site to an acceptable level. A Site Percolation test has been carried out confirming that septic tank soak holes are suitable for accommodating wastewater discharges from the site.

It is proposed to develop a re-fuelling pad on-site in order to capture any fuel spills associated with refilling. Run-off from this area will drain to a proposed silt trap and oil interceptor before being discharged towards the settlement lagoons on-site. A fuel storage bund is present on-site which will serve to retain any spillage from fuel tanks or oil containers on-site.

It is considered unlikely there will be any significant impact upon receiving groundwater or surface water bodies as a result of aqueous discharges from the site given existing and proposed water treatment systems and risk control measures on-site.

In the long-term, the backfilling of inert impermeable, cohesive soil in the fill area on-site to a depth at least greater than 3 metres from the groundwater table will reduce the vulnerability of underlying groundwater to contamination risks associated with accidental fuel spills or agricultural or animal wastes.

12.5.3.3 Lighting

The site operating hours will be between 07:00 - 18:00 Monday to Friday and 08:00 - 16:00 Saturday. During winter, operating activities may be carried out in dark conditions during dusk. Exterior lighting will be provided on-site to ensure traffic enters and leaves the site safely and operating activities on-site are carried out safely. It is proposed to install 48 x 6 metre high lights and 12 x 16 metre high lights on-site. This exterior lighting will provide light to site entrances, site access roads and the Material Recovery Area on-site during darker conditions.

12.5.4 Waste Management

The development of this soil & C&D recovery facility will increase the soil and C&D recovery capacity in the wider region, improving regional waste infrastructure and promoting the recycling of C&D waste across the Kildare region and the wider Greater Dublin region.

The development of the facility will align with principals and policies regarding the recycling and recovery of wastes defined in the following policy documents:

- Kildare County Development Plan 2017 – 2023.
- Eastern-Midlands Regional Waste Management Plan (WMP) 2015-2021.
- Regional Planning Guidelines for the Greater Dublin Area 2010-2022.

Considering the above, it is considered the development of the facility will have a long-term, significant, positive impact on regional waste infrastructure.

12.6 Mitigation Measures

Mitigation measures proposed to control noise and dust emissions thereby minimizing impacts upon nearby properties are detailed in the Noise and Vibration and Air and Climate Chapters respectively.

Mitigation measures to minimize and control impacts on material assets in the form of nature, soil, groundwater, surface water and landscape are detailed in the following relevant EIAR Chapters.

- Chapter 7 – Biodiversity
- Chapter 8 – Land and Soils
- Chapter 9 – Water
- Chapter 15 – Landscape

The following measures are proposed in order to minimize light pollution which may affect nearby properties:

- Visors will be provided on exterior lighting in order to minimize light spill in sensitive areas. Flat glass type luminaires with full cut off will be provided. There will be no tilt on the luminaires.
- The site lighting will be switched off doing non-operational hours.
- Sensor controlled lighting will be provided. Each lighting pole will be fitted with a movement detector and only activated when it detects a hum approaching.
- Luminaires will be lower intensity LED. A warm white spectrum (less than 2700K) will be used to reduce the blue light component.

- Lighting on the access road and at the site entrances/junctions with public roads will be dimmable. All fittings will be mounted on poles 6 m or less.

Finally, exclusion zones and no-tip zones will be maintained around low voltage overhead lines crossing site access roads during any construction or road resurfacing works to prevent line strikes in accordance with the minimum safety controls defined in the ESB's Code of Practice for Avoiding Danger from Overhead Lines.

12.7 Residual Impacts

It is considered unlikely that the proposed development will have any significant adverse impact on material assets in the surrounding, receiving environment given the mitigation measures proposed.

The development of this sizable soil and C&D waste facility will have a long-term, significant, positive impact on regional waste infrastructure, increasing soil and C&D waste recovery capacity in the region.

12.7.1 Indirect Impacts

Noise and dust emissions may affect the noise and air environment surrounding the site, which in turn may affect material assets in the form of property near to the site. Noise and dust mitigation measures have been proposed to control and minimize noise and dust impacts.

Considering the impact assessments carried out, as well as proposed mitigation measures, it is considered unlikely the proposed development will have a significant effect on the surrounding environment, directly or indirectly.

12.7.2 Cumulative Impacts

There are no existing or proposed activities in the local area surrounding the site that may increase the magnitude of impacts upon material assets associated with the proposed development. The site is located in a rural area and is surrounded on all sides by agricultural land interspersed with one off housing. There are no sizable commercial or industrial facilities in the vicinity of the site apart from farms.

13. Traffic and Transport

13.1 Introduction

13.1.1 Background

Transport Insights has been commissioned by Sancom Limited to prepare an Environmental Impact Assessment Report (EIAR) Traffic and Transport Chapter in relation to a proposed development at Graney West, Castledermot, County Kildare.

The proposed development comprises creation of a waste recovery facility on lands that were up until recently (ca. 2017) used as a quarry. The site is located circa 4 kilometres to the southeast of Castledermot, Co. Kildare.

13.1.2 Competency of Chapter Authors

The Traffic and Transportation Chapter of the EIAR was prepared by Ciaran McKeon as Project Director, Eoin Munn as Project Manager and Gabriela Iha as Graduate Transport Engineer (all of Transport Insights Limited). Details of their experience and qualifications are provided within the following table (Table 13-1 Competency of Chapter Authors).

Table 13-1 Competency of Chapter Authors

Reviewer	**Ciaran McKeon**
Title	Project Director
Relevant Experience and Qualifications	Experience: Transport consultant with over 20 years' experience having advised a range of public and private sector clients, including central government, local government, transport agencies, transport operators and developers. He has extensive experience of developing transport projects, plans and programmes; public transport network and service planning; development planning; and EIAR reports and stakeholder engagement. Recent experience of EIAR reports includes acting as Project Director for preparation of Traffic and Transport Chapters for a Biopharmaceutical Development in West Dublin, and a proposed film studios' development in County Wicklow. Qualifications: • BE (Hons), Civil Engineering, University College Dublin, 1998 • P. Grad. Dip. Project Management, Trinity College Dublin, 2001
Professional Membership	• Member, Chartered Institute of Highways and Transportation (MCIHT) • Member, Engineers Ireland (EI) • Member, Transport Planning Society (MTPS)
Principal Author	**Eoin Munn**
Title	Project Manager
Relevant Experience and Qualifications	Experience:

	9 years' experience working within Transport Planning and Engineering, including project management of a variety of small to medium sized projects from feasibility to detailed design stage. Recent EIAR experience includes undertaking Traffic and Transport Assessments for an anaerobic digestion facility in Co. Meath and an infill development in Co. Wicklow. Eoin is currently preparing an EIAR Traffic and Transport Chapter for an anaerobic digestion facility in Co. Waterford. Qualifications: • BSc Transport Operations, Dublin Institute of Technology (2003-2007) • MSc Management Science, University College Dublin (2007-2008)
Professional Membership	• Member, Chartered Institute of Highways and Transportation (MCIHT) • Member, Transport Planning Society (MTPS)
Other Author	**Gabriela Iha**
Title	Graduate Transport Planner
Relevant Experience and Qualifications	Experience: 2 years' experience working within Transport Planning and Engineering, on a variety of public and private sector projects including traffic engineering support for a Medical Technology Development in Enniscorthy, Co. Wexford and several quarry developments at Co. Wicklow and Co. Kildare. Recent EIAR experience includes preparing Traffic and Transport Chapter for an expansion of salt cake disposal cell in Co. Limerick. Qualifications: • BSc Civil Engineering, Centro Universitario da FEI (2017)
Professional Membership	• Member Transport Planning Society (MTPS)

13.1.3 Characteristics of the Proposed Development

The proposed development consists of a waste recovery facility which will be operated within a quarry site, which is not currently operational. The principal waste activity will involve the use of imported sub-soil and overburden, sourced from construction sites, to backfill and restore an existing void within the site created by previous extraction of materials. The total application area is 19.2 hectares, and Sancom Ltd intends accepting a maximum of approximately 1.8 million tonnes of soil and stone material on-site for backfilling over the course of 10 to 25 years, depending on market demand for disposal services.

In addition to the principal waste activity (soil for backfilling) outlined above, it is anticipated that 12,500 tonnes of sand and gravel, 12,500 tonnes of concrete, 1,500 tonnes of topsoil and 1,000 tonnes of organic waste will be accepted on-site per annum over the lifetime of the development i.e. 27,500 tonnes in total per annum over the 10-year period for resale (concrete) and land spreading (organic waste).

Access to the site will be via a proposed new priority-controlled site access junction with L4015.

13.1.4 Local Authority Scoping

A Traffic and Transport Scoping Note was issued to Kildare County Council's Roads, Transportation & Public Safety Department on 16 January 2019. The Scoping Note set out the proposed development including site access arrangements and associated scale of assessment to be included within the EIAR Traffic and Transport Chapter. Following consideration of the Scoping Note, Kildare County Council (KCC) responded by email on 28 February 2019, setting out the following comments:

> *"Some of the things that would also be of interest and that we would look for would be the following:*
>
> *(a) a pavement design for the new access road;*
> *(b) longitudinal section showing vertical alignment;*
> *(c) Stone Mastic Asphalt (SMA) Type Finish with a cross section with carriageway width to be 7 metres;*
> *(d) details of road markings;*
> *(e) of interest would be security/ setback from the carriageway so that there would be no queuing on the main roads.*
> *(f) kerbing and a drainage details/ treatment.*
> *(g) a condition survey of the existing roads on the haul routes"*

Further clarification was received from KCC on 08 March 2019, clarifying that Item (g) above referred to a Falling Weight Deflectometer (FWD) test which would be required to be undertaken in support of the planning application.

Items (a), (b), (c), and (f) and above are addressed within Roads Report prepared by Declan Kearns & Associates adjoining this Planning Applications Item (d), details of road markings, are shown at Figure 4.1 of this Chapter. Item (e), setback of security gate, is also illustrated within Figure 4.1. Item (g) is addressed within a Falling Weight Deflectometer Survey prepared by Milestone Pavement Technologies adjoining this Planning Application.

13.1.5 Contents

The remainder of the Chapter is set out as follows:

- Section 2 outlines the methodology pursued in undertaking the study;
- Section 3 describes the proposed development's receiving environment;
- Section 4 outlines potential impacts arising from the development;
- Section 5 investigates potential mitigation measures; and
- Section 6 addresses residual impacts.

13.2 Assessment Methodology

This study examines the operation of the existing road network and the potential traffic impacts of the proposed development. If necessary, suggested mitigation of identified development related impacts shall also be detailed.

This chapter has been prepared taking into account the following policy documents:

- The requirements of EU Directives and national legislation (primary and secondary) concerning Environmental Impact Assessment (especially having due regard to the revised provisions of Directive 2014/52/EU);
- EPA (2002) Guidelines on the Information to be Contained in Environmental Impact Statements;
- EPA (2003) Advice Notes on Current Practice in the Preparation of Environmental Impact Statements;
- EPA (September 2015) Advice Notes for Preparing Strategic Environmental Assessments;
- EPA (August 2017) Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- DHPCLG (15/05/17) Circular Letter PL 1/2017 Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on Administrative Provisions in Advance of Transposition;
- DHPCLG (May 2017) Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems: Key Issues Consultation Paper;
- KCC (2017) Kildare County Development Plan, 2017-2023;
- Transport Infrastructure Ireland (TII) (2014) Traffic and Transport Assessment Guidelines, referred to hereafter as the TTA Guidelines;
- TII (2016) Project Appraisal Guidelines for National Roads Unit 16.1 – Expansion Factors for Short Period Traffic Counts;
- TII (2019) Unit 5.3 Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections;
- TII (2017) Rural Road Link Design DN-GEO-03031;
- TII (2017) Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated and compact grade separated junctions) DN-GEO-03060-02; and
- Other relevant TII Publications (Standards).

The proposed Traffic and Transport Chapter approach and methodology has been agreed in principle with KCC's Roads, Transportation & Public Safety Department.

13.3 Baseline Environment

An understanding of the site's receiving environment was informed by a site assessment undertaken by Transport Insights in order to confirm facilities and operating conditions for all road users on the adjoining road network, and by a 24-hour traffic and speed survey undertaken on L4015 to ascertain background traffic volumes and speeds. The local area is mostly agricultural with a limited number of residential dwellings within the site's vicinity.

13.3.1 Site Location

The proposed development site at Graney West is illustrated in Figure 13-1which follows and is located approximately 4 kilometres to the southeast of Castledermot, Co. Kildare.

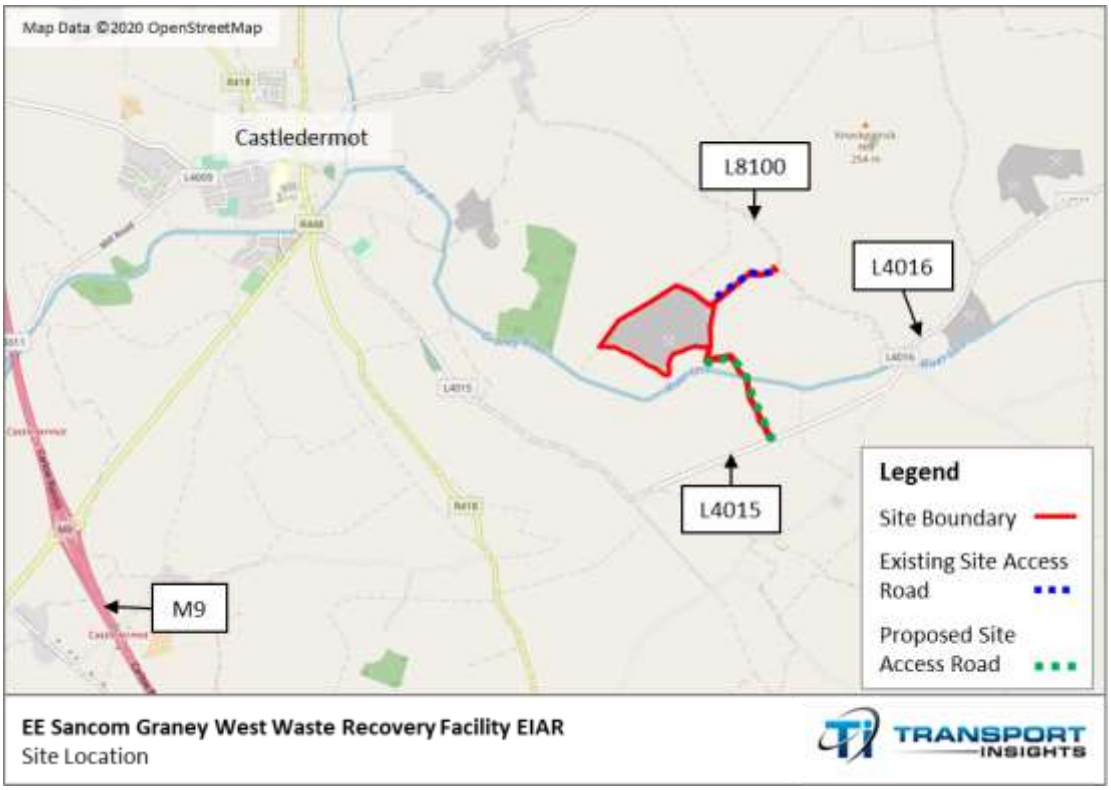


Figure 13-1 Site Location

The site, which is not currently in use, is bounded by agricultural land in all directions. Access to the site is currently from L8100 to the east of the site, with the access junction located on the outside curve of a minor change in the road's horizontal alignment.

13.3.2 Existing Site Access

The existing site access road (illustrated by the blue dashed line in the preceding Figure 13-1), is an unmade gravel road, and is approximately 450 metres long with an average width of approximately 4 metres. It is used for access to the site by both light vehicles (LVs) and heavy goods vehicles (HGVs), and features numerous small changes to its horizontal alignment throughout its length. The site access road flares to approximately 25 metres at its intersection with the L8100.

13.3.3 Site Layout

The existing quarry layout comprises 10 no. buildings (including a portable cabin, farm store, dwelling, pump house, covered bunded fuel tanks, racking area, shed, outhouse and cattle shed), a concreted area, internal access roads and an access route to the L8100. The existing site layout is shown at Figure 13-2 which follows.

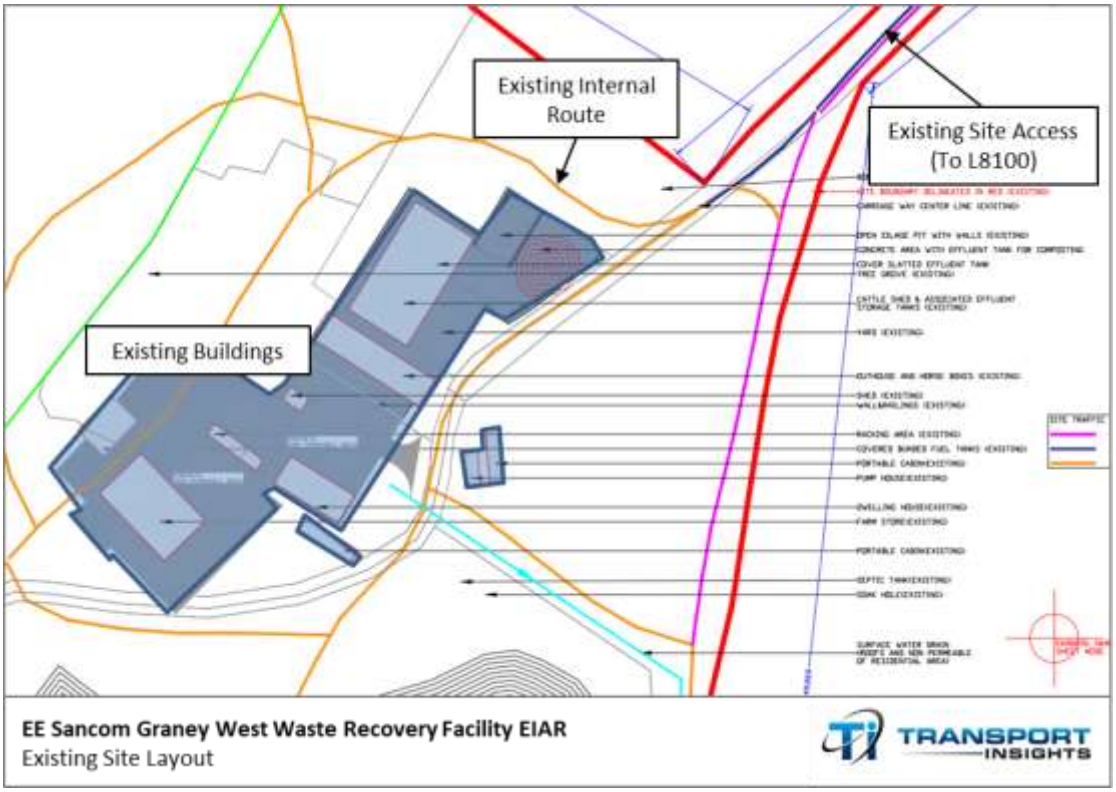


Figure 13-2 Existing Site Layout

13.3.4 L8100

As outlined above, the site is currently accessed from a local road, L8100, which is a two-way road that connects L8095 to the northwest with L4016 to the southeast with a speed limit of 80 km/ h. No road markings are present on L8100 and as a local rural road, no street lighting or footpaths are provided. L8100 is approximately 5 metres wide in the vicinity of the site, although the road width varies throughout its length. L8100 features a series of small changes to both its horizontal and vertical alignments throughout its length. The road's width does not facilitate the transit of concurrent two-way HGV traffic.

13.3.5 L4015

L4015 is a two-way local road that connects Castledermot to the west with L4016 (which is effectively a continuation of L4015) to the east (L4015 becomes L4016 at the approximately location of the junction between L4015 and L8100). L4015 is ca. 7 metres wide and has a straight horizonal alignment and flat vertical alignment in the vicinity of the proposed site access junction. Notable changes in the road's horizontal alignment are however noted ca. 900 metres to the east and ca. 800 metres to the west of the proposed site access. L4015 has a posted speed limit of 80 km/ h in the vicinity of the proposed site access, with lower speed limits applicable closer to Castledermot to the west. No footpaths or street lighting are provided on L4015 in the vicinity of the site.

13.3.6 Survey Data Collection

As per KCC requirements and corresponding to key access routes to/ from the site and the regional and national road network, a 24-hour traffic and speed survey was undertaken on L4015 to ascertain background traffic volumes on Thursday 05 October 2017. The survey location on L4015 is indicated in Figure 13-3 which follows. Although some time has passed since this survey was undertaken, a new traffic survey has not been feasible due to the current significant drop in traffic volumes arising from ongoing Covid-19 pandemic and related travel restrictions.

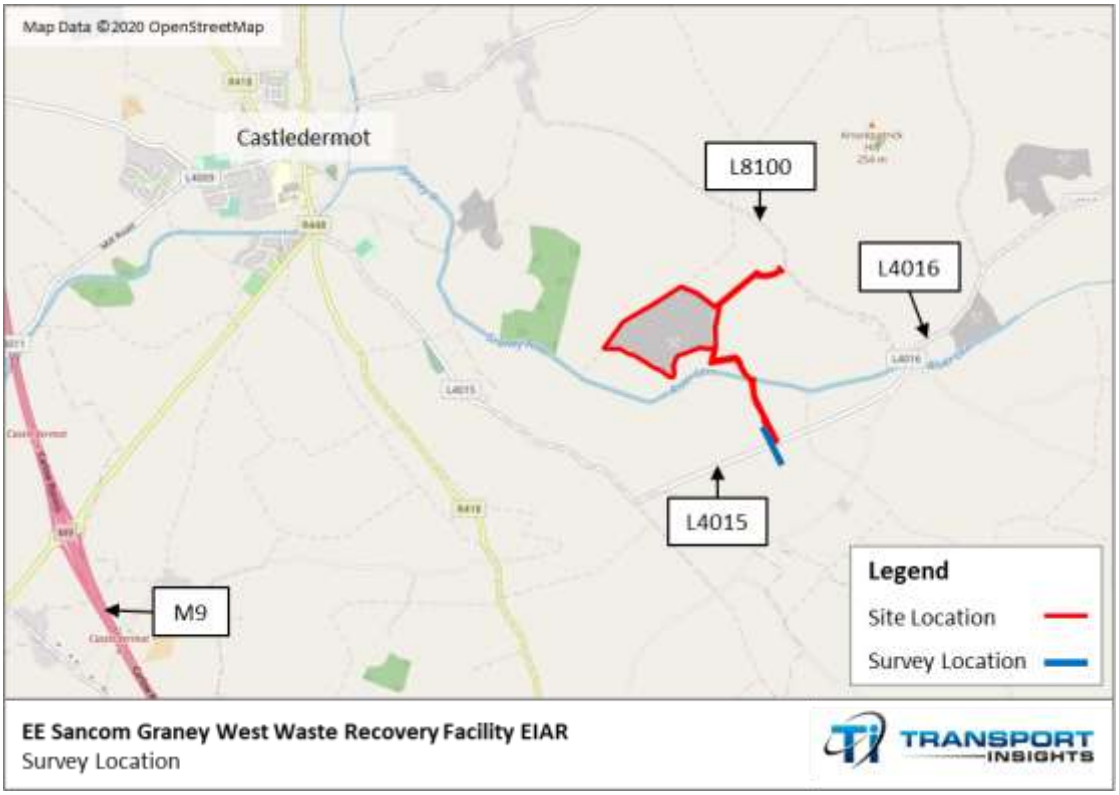


Figure 13-3 Survey Location

A summary of the survey results for both the morning and evening network peak periods and the full 24-hour survey period is provided in the following Table 13-2 for light vehicles (LVs) and heavy vehicles (HVs).

Table 13-2 L4015 Traffic Survey Results

Time Period	Eastbound		Westbound	
	LVs	HVs	LVs	HVs
08:00-08:59hrs	123	15	67	11
17:00-17:59hrs	82	12	116	11
Total, 00:00-23:59hrs	1,075	153	1,053	149

Total two-way traffic movements of 2,430 vehicles were recorded on L4015 within the 24-hour survey period, indicating low levels of vehicular traffic using the road.

13.3.7 Annual Average Daily Traffic (AADT)

The traffic survey data set out in Tables 3.1 was expanded in accordance with Transport Infrastructure Ireland's Project Appraisal Guidance for National Roads Unit 16.1 – Expansion Factors for Short Period Traffic Counts, October 2016, to derive annual average daily traffic (AADT). Table 13-3, below outlines the factors used to expand the survey data.

Table 13-3 AADT Expansion Factors – Region: Mid-East (incl. Kildare)

Variable	Day of Week	Month of Year
Data Recorded	Thursday	October
Factor	0.94	0.99

Based on the short-period traffic survey data presented in Table 3.1, weekly average daily traffic (WADT) and annual average daily traffic (AADT) values were calculated. The outputs of these calculations are presented in the following Table 13-4.

Table 13-4 Local Road Network AADT Calculation

L4015	Two-way Traffic
24-hour Traffic Flow	2,430
Weekly Average Daily Traffic (WADT)	2,284
Annual Average Daily Traffic (AADT)	2,261

As can be seen from Table 3.3 above, AADT on the local road network connecting the site to the regional and national road network has been estimated at 2,261 vehicles.

13.3.8 Traffic Speed Survey

As per the traffic survey data collection, vehicle speeds were recorded over a 24-hour period between the hours of 00:00hrs and 23:59hrs on Thursday 05 October 2017. A summary of the speed survey results for L4015 are presented in Table 13-5 which follow.

Table 13-5 L4015 Traffic Speed Survey Results

Direction	Total Vehicles	Average Speed (km/h)	Maximum Speed (km/h)	Minimum Speed (km/h)	85th Percentile Speed (km/h)
Eastbound	1,051	84.5	130-135	15-20	97.6
Westbound	1,202	82.2	135-140	20-25	94.0

As can be seen from Table 13-5, and reflective of the conservative positioning of the ATC speed survey, i.e. on a straight section of L4015, 85th percentile vehicle speeds are noted to be 97.6 km/ h in the eastbound direction and 94.0 km/ h in the westbound direction.

13.3.9 Collision Data Analysis

Data from the Road Safety Authority (RSA) road traffic collision database was reviewed to assess the safety performance characteristics of the local road network. The database contains information on all reported collisions by severity of injury incurred (i.e. fatal, serious or minor) and by year the collision occurred. The following Figure 13-4 illustrates the location of all collisions in the vicinity of the site for the twelve-year period from 2005 to 2016 inclusive. As can be seen from this figure, only one serious collision was reported in 2006 on the L8100 close to the L8100/ L4016 junction. No collisions were recorded on the L4015 in the vicinity of the proposed site access.

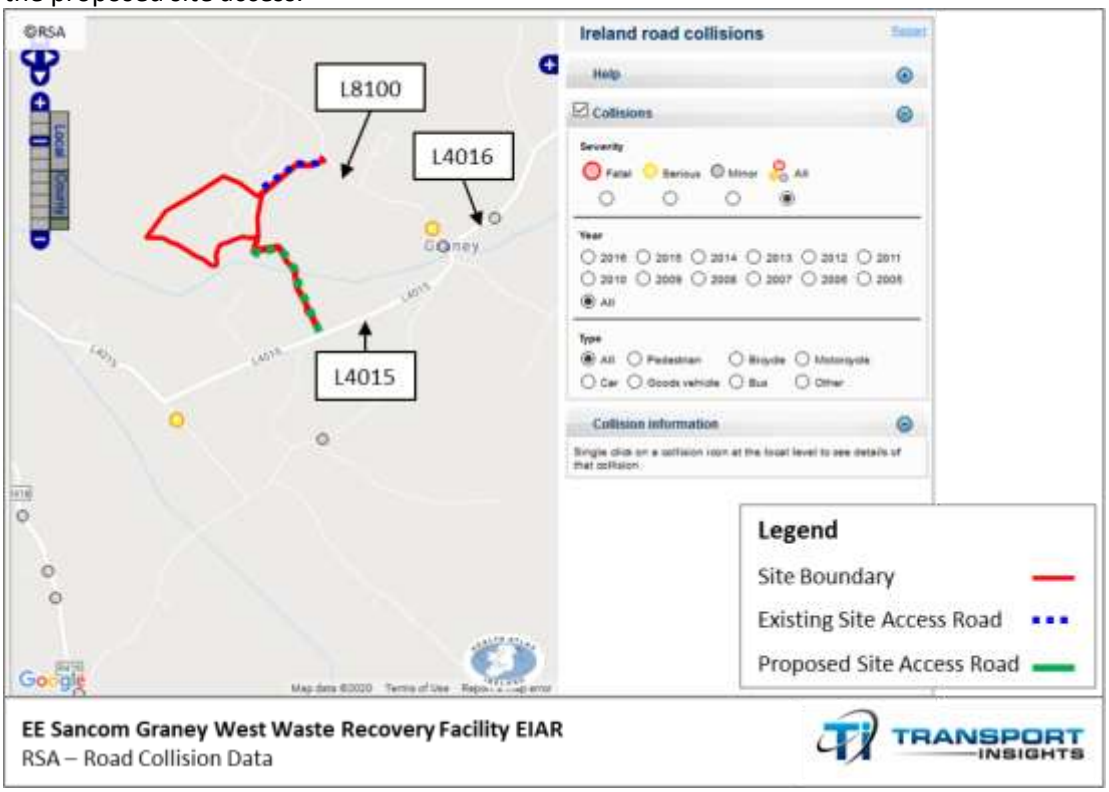


Figure 13-4 Road Collision Data

13.3.10 Traffic Characteristics of Proposed Development

The proposed development's traffic generation will primarily consist of HGVs associated with the transportation of material to and from the site, and staff trips. A very small number of visitor trips is also envisaged.

A variety of HGV types will access the application site however the majority are anticipated to be soil and stone trucks with a maximum gross vehicle weight of 46 tonnes, and a maximum payload of 32 tonnes.

Development traffic generation is assessed within Section 4 of this Chapter and has been determined to result in a maximum of 50 no. inbound and 50 no. outbound HGV trips per day. 4 no. staff members are envisaged to operate the facility and are anticipated to arrive on-site prior to 07:00hrs and depart after 18:00hrs, i.e. outside of the AM and PM local road network peak hours. Visitor trips are anticipated to be very low, with only very occasional visitors travelling to the site.

13.3.11 Haul Route

The majority of traffic accessing and egressing the site is anticipated to originate from the west of the site and use the extensive regional and national road network located in that direction (R418, R448 and M9). To a lesser extent, some traffic will be anticipated to access the site from the east, utilising the N81 national road. Indicative haul routes to/ from the site from the regional and national road network are presented in the following Figure 13-5.

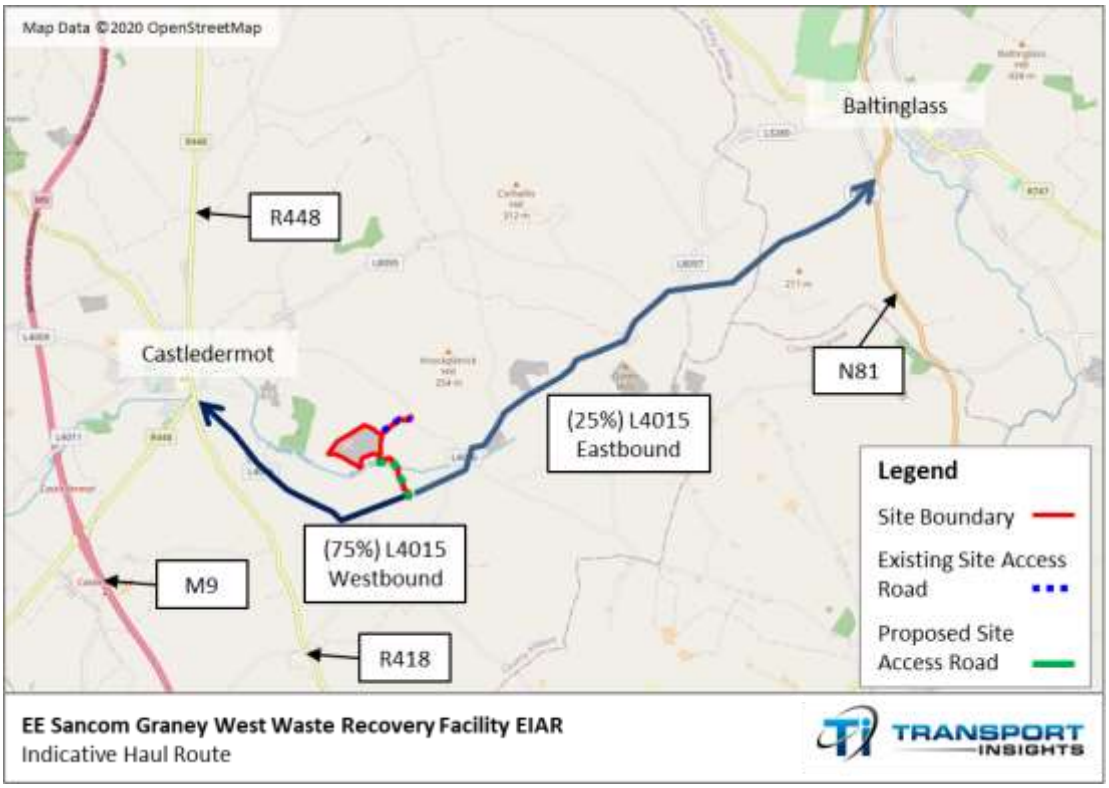


Figure 13-5 Haul Route to Site

13.4 Impact Assessment

13.4.1 Traffic Impact Assessment

This section of the Chapter sets out the traffic impact of the proposed development on the local road network. It includes traffic growth forecasting for the local road network linking the site to the regional and national road network, and development traffic generation and assignment, to determine the extent to which the proposed development is likely to result in an increase in traffic on local roads.

13.4.1.1 Construction Phase

Construction phase impacts will be short term in duration, with a construction programme of less than 6 months envisaged. It is anticipated that on average ca. 10 construction workers will be employed on the site, with peak numbers rising to ca. 12 over a limited period of time. As part of the construction phase, it is also envisaged that there will be an average of 5 no. HGV movements to and from the site each day, with peak HGV movements rising to 10 no. for a limited period of time. There will be no abnormal loads as part of the construction programme. It is intended that all construction staff vehicles and HGVs will be fully contained within the proposed development site.

Working hours will be 08:00-18:00hrs Monday to Friday. Therefore, construction personnel will generally arrive before the AM peak and depart after the PM peak periods. Working hours on Saturdays and public holidays will be 08:00-13:00hrs with no extended working outside of this period envisaged.

13.4.1.2 Operational Phase

13.4.1.2.1 Assessment Years and Scenarios

Three assessment years, i.e. year of opening, year of opening + 5 years and year of opening + 10 years have been considered for the operational phase impact assessment. Based on an assumed current year of opening, the assessment years are therefore 2020, 2025 and 2030. In each assessment year, two scenarios are assessed, i.e. without development or do-nothing, and with development or do-something.

13.4.1.2.2 Background Traffic Forecasting: 'Do Nothing' Scenario

Background future traffic on the local road network has been determined using growth factors from TII's Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections, May 2019. Information within these guidelines is provided for County Kildare from 2016-2030, from 2030-2040 and from 2040-2050 for low, central and high sensitivity growth scenarios. Growth factors are provided for LVs and HVs and have been applied to expanded AADT data (from Table 3.3) to derive future year background traffic flows for the local road network. Central growth factors are set out in Table 13-6 which follows.

Table 13-6 TII Traffic Growth Factors (Central) – County Kildare

Year	Annual Growth Factor – LV	Annual Growth Factor – HV
2016-2030	1.0197	1.0378
2030-2040	1.0062	1.0155

Forecast background traffic levels has been derived in accordance with TII's TTA Guidelines (2014) for:

- year of opening (YoO), assumed to be 2020;
- year of opening +5 (YoO + 5), i.e. 2025; and
- year of opening +10 (YoO + 10), i.e. 2030.

It should be noted that as the site is conservatively anticipated to operate for 10 years i.e. as a worst-case scenario in traffic terms, a horizon year YoO+10 years has been included within the assessment. The following Table 13-7 sets out future year background traffic for the Do Nothing scenario.

Table 13-7 Do Nothing Scenario: Background Future Year Traffic (AADT)

Year	Background AADT
2017 (Base Year)	2,261
2020 (YoO)	2,414
2025 (YoO +5)	2,693
2030 (YoO + 10)	2,964

13.4.1.2.3 Development Traffic Generation

It is anticipated that 1,800,000 tonnes of soil and stone, from construction sites to backfill, will be accepted on-site to achieve the improvement and development of land and site restoration over the lifetime of the development (over an estimated 10-year duration for the purpose of this analysis). As such, the yearly tonnage accepted on-site for this task will be 72,000 tonnes. In addition to the principal waste activity, it is proposed that the following annual tonnages shall be accepted on-site over the lifetime of the development:

- 12,500 tonnes of sand and gravel;
- 12,500 tonnes of concrete;
- 1,500 tonnes of topsoil; and
- 1,000 tonnes of organic waste.

Sand and gravel, concrete, topsoil and organic waste will therefore result in an additional 27,500 tonnes in total per annum.

The following table, Table 13-8 presents the expected traffic generation associated with the proposed development, presented for both LVs and HVs, and is based on the following assumptions:

- a total of 99,500 tonnes imported to site each year;
- a total of 9,950 tonnes of recycling material exported from the site each year utilising a proportion of the HGVs used to import the above material;
- for laden vehicles, an average payload of 30 tonnes per truck; and
- 260 working days per year.

It is also assumed that 4 light vehicle trips (staff car) will occur each day. No visitor trips are included within the analysis as such trips are anticipated to very infrequent.

Table 13-8 Proposed Development Traffic Generation

Type	Daily Trips (Two-Way)	Daily Trips (One-Way)
Light Vehicle	4	8
Heavy Vehicle	13	26
Total (Light + Heavy Vehicles)	**17**	**34**

13.4.1.2.4 Trip Distribution

An impact analysis of L4015 from where the site shall be accessed has been undertaken. In the absence of an existing profile of turning movements at the site access junction and in order to provide a robust assessment, it is assumed that 75% all traffic shall access/ egress from L4015 from/ to the west, and 25% along L4015 from/ to the east. This is consistent with the indicative haul routes illustrated Figure 13-5 of this Chapter. Staff and visitor trips are also envisaged to follow the trip distribution pattern set out for HGV traffic, with LV traffic accessing and egressing the site via L8100 to avoid internal site conflict with HGV traffic.

13.4.1.2.5 'Do Something' Scenario

The Do Something Scenario is the traffic associated with the proposed development activities described in Section 13.4.1.2.3 in addition to the background traffic. Table 13-9 below shows the forecast traffic on L4015 to the west of the site access (including both HV and LV traffic), due to the higher percentage of traffic anticipated to travel to/ from the west as described in Section 13.4.1.2.4.

Table 13-9 Do Something Scenario: Forecast Future Year Traffic (AADT)

Year	Development Traffic – (L4015 West)	'Do Something' Forecast AADT
2020 (YoO)	25.5	2,439
2030 (YoO + 10)	25.5	2,989

13.4.1.2.6 Traffic Impact

The traffic impact of 'Do Something' scenario on L4015 (West) is shown in Table 13-10 below.

Table 13-10 Proposed Development Traffic Impact – L4015 West to Site Access Junction

Year	Scenario	'Do Nothing' AADT Traffic	'Do Something' Forecast AADT	% Increase
2020	YoO	2,414	2,439	1.0%
2030	YoO +10	2,964	2,989	0.8%

As can be seen from the table above, in the Do Something Scenario, traffic on L4015 (to the west of the proposed site access junction) is anticipated to increase by 1.0% % in 2020, and 0.8% in 2030 compared to the Do Nothing Scenario, representing a small increase in traffic on the road. Furthermore, the theorical capacity of this road for level of service D is 5,000 AADT[7] and the projected traffic for 2030 is 2,989 AADT (includes background traffic and total development traffic). As a result of the proposed development's low traffic generation potential, L4015 is anticipated to continue to operate in a satisfactory manner in all three analysed assessment years.

13.4.2 Proposed Development Site Access and Internal Layout

13.4.2.1 Site Access Arrangements

It is proposed the site will be accessed via a new site access junction directly onto L4015. The existing site access junction provides access to a narrow local road (L8100), with numerous changes to its vertical and horizontal alignment (see Section 13.3.4for more details), whereas L4015's geometric characteristics are suitable in accommodating two-way HGV traffic flows. In order to segregate LV and HGV traffic internally within the site, it is proposed that the new access from L4015 shall exclusively accommodate all HGV traffic accessing and egressing the development site, with the existing site access junction retained for staff and visitor uses only (i.e. all LVs).

The new site access road will be 7.0 metres wide and have corner radii of 13.0 metres at its junction with L4015, which is in accordance with corner radii recommendations, illustrated in Figure 5.19: *'Design of Corner Radii for Rural Simple Junctions, Ghost Island Junctions & Simple Staggered Junctions'* TII Publication Geometric Design of Junctions (DN-GEO-03060-02). Road markings are proposed – Stop Line (RRM 017 and M114) and indicative turning arrows (M 124 and M 125) in accordance with Traffic Signs Manual (2010), Chapter 7. Additionally, a security gate and fencing are proposed to be set back ca. 40 metres from L4015, thus ensuring uninhibited entry of HV traffic into the development site from the adjoining L4015.

The layout of the proposed site access junction is shown in Figure 13-6 which follows, and a to-scale drawing within this Planning Application.

[7] Extracted from Table 6.1 Recommended Rural Road Layouts, from TII Publication Rural Road Link Design (DN-GEO-03031), June 2017

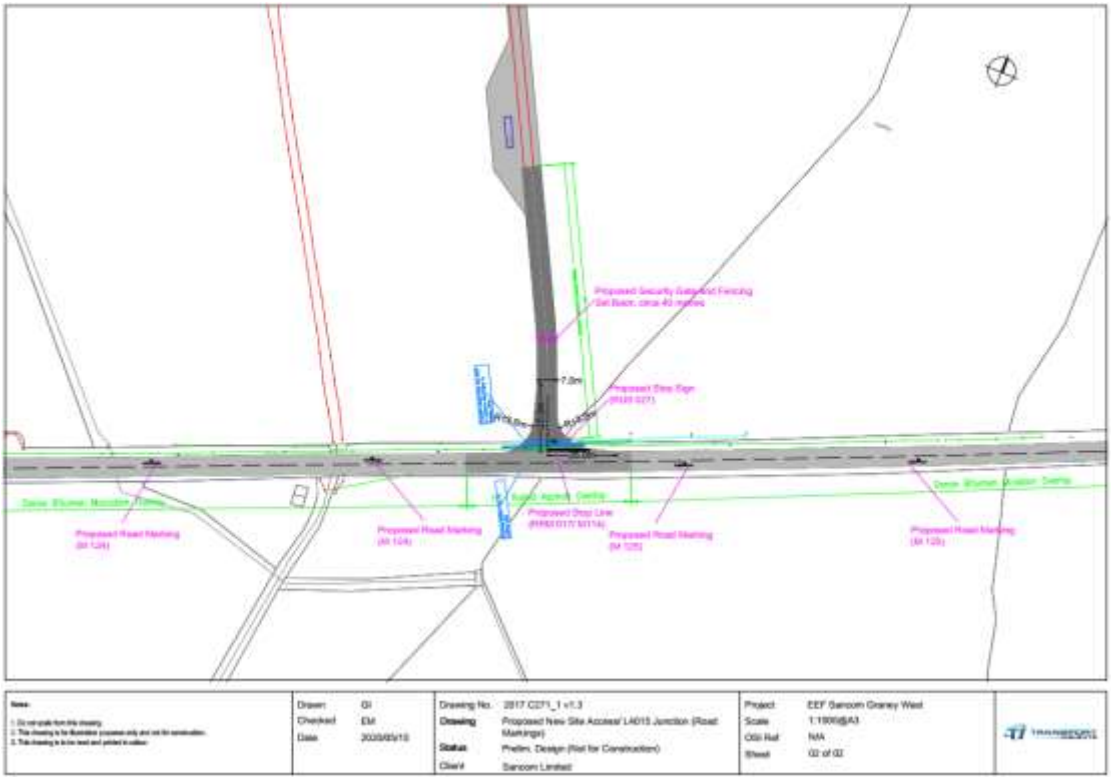


Figure 13-6 Proposed Site Access Junction

A swept path analysis of this junction, demonstrating its suitability for HGV traffic is provided in a drawing adjoining this planning application (Drawing Ref: C271_2 2017 TR01)

Visibility splays of 160 metres in each direction, measured from a distance of 2.4 metres from the edge of the L4015 carriageway are achievable at the site access junction, in accordance with TII Publications Geometric Design of Junctions DN-GEO-03060-02. However, the existing hedge shall be set back outside of the envelope of visibility for a distance of ca. 55 metres to the west and ca. 20 metres to the east of the proposed site access junction. A visibility splay drawing is provided at Figure 13-7 which follows, with a to-scale drawing provided within the Planning Application (Drawing Ref: 2017 C271_2/ 2 v1.3)

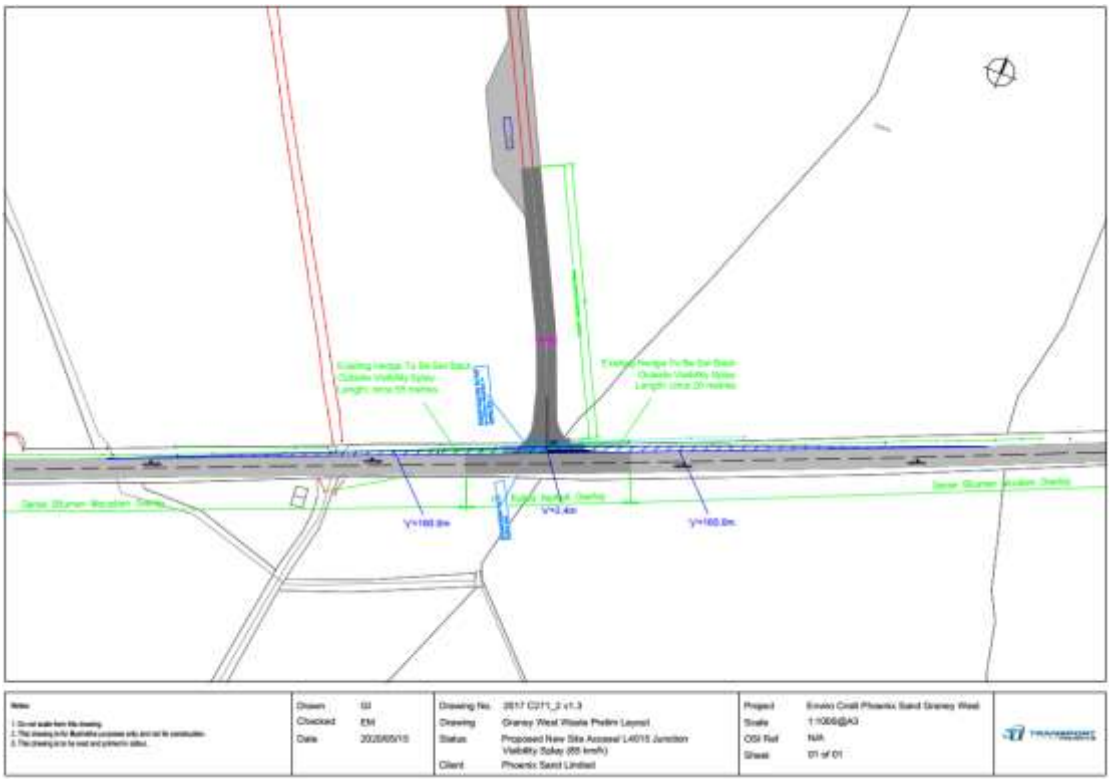


Figure 13-7 Proposed Site Access Visibility Splay

13.4.2.2 Internal Layout

The main traffic related changes to the site layout as a result of the proposed development include:

- a new internal road which links the site to the new site access onto L4015 to the south of the site;
- a new wheel wash and passing bay located along the new access road;
- a new HGV queuing area for vehicles waiting to deliver material on-site;
- 5 no. HGV parking bays located on the western side of the site for Sancom vehicles; and
- 8 no. car parking bays (including 1 no. disabled bay) for staff and visitors located on the eastern side of the site.

The proposed site layout is shown in Figure 13-8 which follows. A swept path analysis of the internal site layout is provided in a drawing adjoining this Planning Application (Drawing Ref: C271_2 2017 TR01).

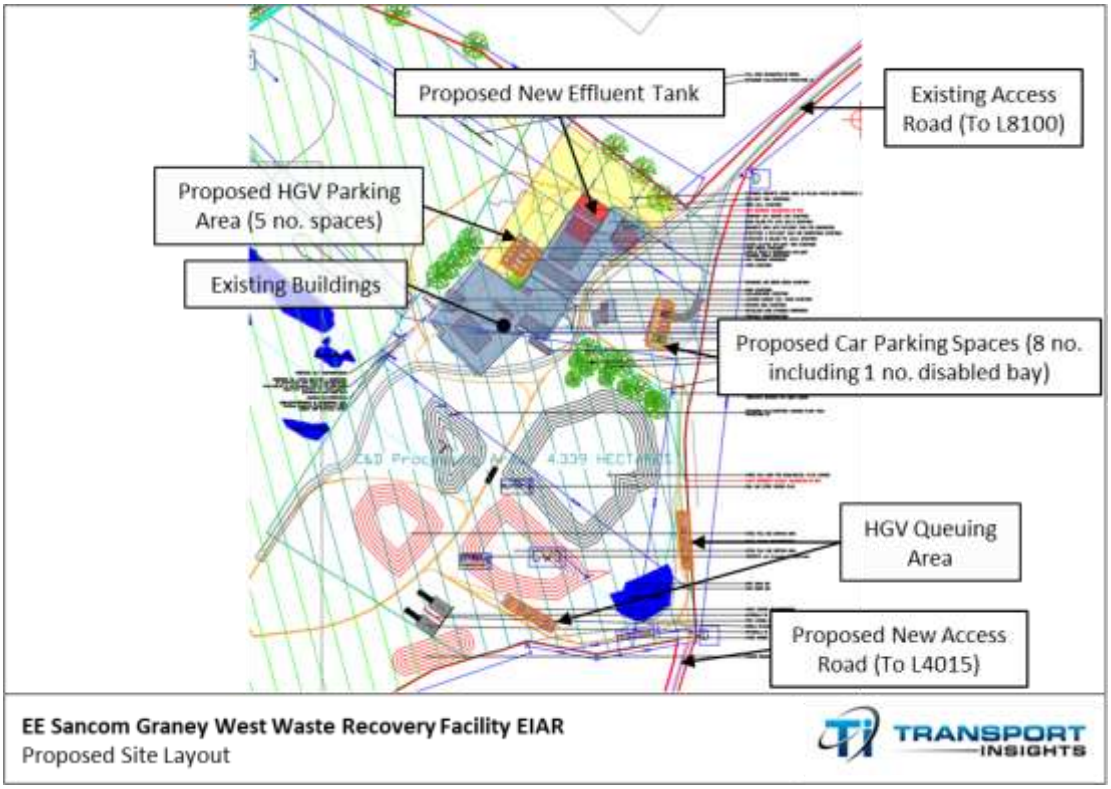


Figure 13-8 Proposed Site Layout

13.4.2.3 Car Parking

It is proposed to provide 8 no. car parking bays on-site, including 1 no. disabled car parking bay, which will be used by staff and occasional visitors, with such car parking facilities accessed via L8100. Each car parking bay measures 2.4 metres in width by 5.0 metres in length.

13.4.2.4 Stage 1 Road Safety Audit (RSA)

A Stage 1 RSA has been undertaken by a certified independent auditor – Road Safety Matters (RSM). The purpose of the Stage 1 RSA is to examine road safety implications arising from the proposed development and the scope includes site access arrangements and the proposed internal layout. The full Stage 1 RSA Report adjoins this Planning Application.

The Stage 1 RSA was undertaken in May 2020, with the audit being informed by draft proposed layout plan drawings available at that time (6 no. drawings prepared by Kehoe Architectural Design and Gordon White Consulting Engineers, detailed within Table 1 of the Stage 1 RSA Report and a Roads Report from Declan Kearns & Associates).

The Audit comprised of a site assessment (undertaken on Thursday the 07th May 2020 during daylight hours), and a review of the proposed site layout plans. Thereafter the RSM Audit Team compiled a report outlining issues identified in the Stage 1 RSA together with accompanying recommendations across 12 categories to be considered, summarised as follows:

- 2.1.4 problem/ recommendation – Drainage at Site Access and on Access Road;
- 2.1.5 problem/ recommendation – Existing Unprotected Hazards in Clear Zone;
- 2.1.6 problem/ recommendation – Pavement Design;
- 2.1.7 problem/ recommendation – Location of Access Gate;

- 2.1.8 observation/ recommendation – Traffic Volumes and Cumulative Impact on Junction;
- 2.2.1 problem/ recommendation – Proposed Junction Geometry;
- 2.2.2 problem/ recommendation – Proposed Internal Link Geometry;
- 2.2.3 problem / recommendation – Visibility and Boundary Treatment at Proposed Access;
- 2.2.4 problem / recommendation – Proposed Internal Link Geometry and Cross Section;
- 2.3.1 observation/ recommendation – Vulnerable Road User (VRU) Provision;
- 2.4.1 problem / recommendation – Lighting Generally; and
- 2.4.2 problem / recommendation – Signing and Lining Generally.

The issues and recommendations raised were then reviewed and responded to by Transport Insights as part of the 'Road Safety Audit Feedback Form' in which an opportunity was afforded to agree in-full or in-part or disagree on items raised within the Stage 1 RSA. This was completed by Transport Insights and is contained within Appendix D of the Stage 1 RSA adjoining this Planning Application.

The Road Safety Audit Feedback Form addresses concerns raised within the Stage 1 RSA. A number of the issues and recommendations relate to items that will be addressed at the detailed design stage following a successful planning application, with a number of other items resolved following further updates to the site layout plans. Following this, the RSM Audit Team completed a recognition of agreement (Appendix D of the Stage 1 RSA) of "Alternative measures or reasons accepted by auditors" that were provided, thus accepting the designer's response.

13.5 Mitigation Measures

The proposed development is anticipated to have minimum impact upon the operation of the local road network during both construction and operational phases. The L4015 is forecast to operate far below its theoretical capacity with 3,045 AADT anticipated to use the road in 2030 Do Something Scenario. This is far below its operating capacity for Level of Service (LoS) D of 5,000 vehicles AADT, according to TII Publication DN-GEO-03031 (Rural Road Link Design).

Notwithstanding the above, the following mitigation measures are proposed as part of the proposed development.

13.5.1 New Site Access Junction

A new site access junction is proposed along the L4015 to accommodate all HGVs accessing and egressing the site. The new site access junction was designed in accordance with best practice guidance, namely TII Publication DN-GEO-03060-02 (Geometric Design of Junctions).

13.5.2 Signage Plan

Prior to construction works commencing, it is recommended that a site signage plan be developed and implemented, providing advance warning of HGV vehicles along the haul route to/ from the site. The signage will warn motorists on public roads of slow-moving turning traffic on L4015 at the new site access junction.

13.6 Residual Impacts

The predicted residual impact of the proposed development in terms of traffic and transportation is that there will be a slight increase in both LVs and HVs on the adjoining road network due to the operation of the proposed development.

14. Cultural Heritage

14.1 Introduction

14.1.1 General

Irish Archaeological Consultancy Ltd has prepared this assessment on behalf of Sancom Ltd to assess the impact, if any, on the archaeological and cultural heritage resource of a proposed quarry extension at Graney West, Castledermot, Co. Kildare (ITM 680376/684201). The assessment was undertaken by Faith Bailey of Irish Archaeological Consultancy Ltd.

This study determines, as far as reasonably possible from existing records, the nature of the cultural heritage resource in and within the vicinity of the development site using appropriate methods of study. Desk-based assessment is defined as a programme of study of the historic environment within a specified area or site that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage assets (CIfA 2014). This leads to the following:

- Determining the presence of known archaeological heritage sites that may be affected by the proposed development;
- Assessment of the likelihood of finding previously unrecorded archaeological remains during the construction programme;
- Suggested mitigation measures based upon the results of the above research.

The study involved detailed interrogation of the archaeological and historical background of the development area. This included information from the Record of Monuments and Places of County Kildare; the County Development Plan; the topographical files of the National Museum of Ireland and cartographic and documentary records. Aerial photographs of the study area held by the Ordnance Survey of Ireland and Google Earth were also consulted. A field inspection was carried out in an attempt to identify any known cultural heritage sites and previously unrecorded features, structures and portable finds within the proposed development area.

An impact assessment and a mitigation strategy have been prepared. The impact assessment is undertaken to outline potential adverse impacts that the proposed development may have on the cultural heritage resource, while the mitigation strategy is designed to avoid, reduce or offset such adverse impacts.

14.1.2 The Development

Sancom Ltd propose on establishing and operating a Material Recovery Facility at a worked out quarry situated in Graney West, Co. Kildare.

The principal activity will involve the use of imported, uncontaminated soil and stone, sourced from construction sites, to backfill and restore the worked out quarry.

The Fill Area is c. 13.65 Hectares. The area of the entire operational site is 19.2 Hectares.

The material accepted on-site will be inert and will comprise subsoil, clay, gravels, topsoil, stone and mixtures of such. These materials will be sourced from construction sites in the Greater Dublin Area.

The proposed activity will include the placement of cover soils and seeding and return to use as agricultural grassland

In addition to the principal waste activity described above, it is proposed to carry out the following secondary waste recovery activities:

- Intake of top-soil, screening at existing screening plant and resale of such material,
- Intake of gravel and sands, washing at existing washing plant and resale of such materials,
- Intake of concrete, concrete crushing using concrete crushing equipment, mixing with sand and gravel before being fed to the washing plant to form aggregate, and resale of such material, and;
- Intake of garden waste, shredding and composting of this waste for use for agricultural land spreading.

14.1.3 Definitions

In order to assess, distil and present the findings of this study, the following definitions apply: 'Cultural Heritage' where used generically, is an over-arching term applied to describe any combination of archaeological and cultural heritage features, where –

- the term 'archaeological heritage' is applied to objects, monuments, buildings or landscapes of an (assumed) age typically older than AD 1700 (and recorded as archaeological sites within the Record of Monuments and Places)
- the term 'cultural heritage', where used specifically, is applied to other (often less tangible) aspects of the landscape such as historical events, folklore memories and cultural associations.

14.1.4 Impact Definitions

Imperceptible Impact
An impact capable of measurement but without noticeable consequences

Not Significant
Effects which causes noticeable changes in the character of the environment but without noticeable consequences

Slight Impact
An impact which causes changes to the character of the environment which are not significant or profound and do not directly impact or affect an archaeological feature or monument.

Moderate Impact
An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends. A moderate effect arises where a change to the site is proposed, which although noticeable, is not such that the archaeological integrity of the site is compromised and which is reversible. This arises where an archaeological feature can be incorporated into modern day development without damage and that all procedures used to facilitate this are reversible.

Significant Impact
An impact which, by its magnitude, duration or intensity, alters an important aspect of the environment. An impact like this would be where part of a site would be permanently impacted upon, leading to a loss of character, integrity and data about the archaeological feature/site.

Very Significant
Effects which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.

Profound Impact
Applies where mitigation would be unlikely to remove adverse effects. Reserved for adverse, negative effects only. These effects arise when an archaeological site is completely and irreversibly destroyed by a proposed development.

Impacts as defined by the EPA 2017 Guidelines (pg. 23).

14.2 Assessment Methodology

Research has been undertaken in two phases. The first phase comprised a paper survey of all available archaeological, historical, and cartographic sources. The second phase involved a field inspection of the proposed development area.

14.2.1 Guidance and Legislation

The assessment has been carried out in accordance with Environmental Protection Agency (EPA) Guidelines and advice notes (2003 & 2017).

The following legislation, standards and guidelines were also consulted as part of the assessment.

- National Monuments Act 1930 to 2014;
- The Planning and Development Acts 2000 to 2017;
- Heritage Act, 1995, as amended;
- Guidelines on the information to be contained in Environmental Impact Statements, 2003, EPA;
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements), 2003, EPA;
- Draft Advice Notes on Current Practice (in preparation of Environmental Impact Statements), 2015, EPA;
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (Draft August 2017), EPA;
- Frameworks and Principles for the Protection of the Archaeological Heritage, 1999, (formerly) Department of Arts, Heritage, Gaeltacht and Islands; and
- Kildare County Development Plan 2017-2023

A summary of the relevant legislation and planning policy is given in Appendix 4.

14.2.2 Paper Survey

- Record of Monuments and Places for County Kildare;
- Sites and Monuments Record for County Kildare;
- Monuments in State Care Database;
- Preservation Orders;
- Register of Historic Monuments;
- Topographical files of the National Museum of Ireland;
- Cartographic and written sources relating to the study area;
- Kildare County Development Plan 2017-2023;
- Place name analysis;
- Aerial Photographs; and
- Excavations Bulletin (1970–2018).

Record of Monuments and Places (RMP) is a list of archaeological sites known to the National Monuments Section, which are afforded legal protection under Section 12 of the 1994 National Monuments Act and are published as a record.

Sites and Monuments Record (SMR) holds documentary evidence and field inspections of all known archaeological sites and monuments. Some information is also held about

archaeological sites and monuments whose precise location is not known e.g. only a site type and townland are recorded. These are known to the National Monuments Section as 'un-located sites' and cannot be afforded legal protection due to lack of locational information. As a result, these are omitted from the Record of Monuments and Places. SMR sites are also listed on the Department of Culture, Heritage and the Gaeltacht (DoCHG) website – www.archaeology.ie.

National Monuments in State Care Database is a list of all the National Monuments in State guardianship or ownership. Each is assigned a National Monument number whether in guardianship or ownership and has a brief description of the remains of each Monument.

The Minister for the DoCHG may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister.

Preservation Orders List contains information on Preservation Orders and/or Temporary Preservation Orders, which have been assigned to a site or sites. Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

Register of Historic Monuments was established under Section 5 of the 1987 National Monuments Act, which requires the Minister to establish and maintain such a record. Historic monuments and archaeological areas present on the register are afforded statutory protection under the 1987 Act. The register also includes sites under Preservation Orders and Temporary Preservation Orders. All registered monuments are included in the Record of Monuments and Places.

The topographical files of the National Museum of Ireland are the national archive of all known finds recorded by the National Museum. This archive relates primarily to artefacts but also includes references to monuments and unique records of previous excavations. The find spots of artefacts are important sources of information on the discovery of sites of archaeological significance.

Cartographic sources are important in tracing land use development within the development area as well as providing important topographical information on areas of archaeological potential and the development of buildings. Cartographic analysis of all relevant maps has been made to identify any topographical anomalies or structures that no longer remain within the development area. These include:

- William Petty's Down Survey, Map of Kildare, c. 1655
- Noble and Keenan's Map of Kildare, 1752
- Alexander Taylor's Map of the County of Kildare, 1783
- Ordnance Survey maps of County Kildare 1838 and 1909

Documentary sources were consulted to gain background information on the archaeological and cultural heritage landscape of the proposed development area.

Aerial photographic coverage is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its likely potential for archaeology. A number of sources were consulted including aerial photographs held by the Ordnance Survey and Google Earth.

Place Names are an important part in understanding both the archaeology and history of an area. Place names can be used for generations and in some cases have been found to have their root deep in the historical past.

Development Plans contain a catalogue of all the archaeological sites within the county. The Kildare County Development Plan (2017-2023) was consulted to obtain information on cultural heritage sites in and within the immediate vicinity of the proposed development.

Excavations Bulletin is a summary publication that has been produced every year since 1970. This summarises every archaeological excavation that has taken place in Ireland during that year up until 2010 and since 1987 has been edited by Isabel Bennett. This information is vital when examining the archaeological content of any area, which may not have been recorded under the SMR and RMP files. This information is also available online (www.excavations.ie) from 1970–2018.

14.2.3 Field Inspection

Field inspection is necessary to determine the extent and nature of archaeological and historical remains and can also lead to the identification of previously unrecorded or suspected sites and portable finds through topographical observation and local information.

The archaeological field inspection entailed:

- Inspecting the proposed development area and its immediate environs.
- Noting and recording the terrain type and land usage.
- Noting and recording the presence of features of archaeological or cultural heritage significance.
- Verifying the extent and condition of any recorded sites.
- Visually investigating any suspect landscape anomalies to determine the possibility of their being anthropogenic in origin.

14.3 Baseline Environment

14.3.1 Archaeological Background

The proposed development area is located in Graney West, Castledermot, Co. Kildare in the townlands of Coltstown and Graney West, Parish of Graney, and Barony of Kilkea and Moone. The site is situated c. 1.8km southeast of Castledermot. Much of the site is currently occupied by a quarry with an access road travelling northeast to a local road that forms the townland boundary between Graney West and Knockpatrick. A proposed access road will travel southeast from the quarry through open fields to the L4015.

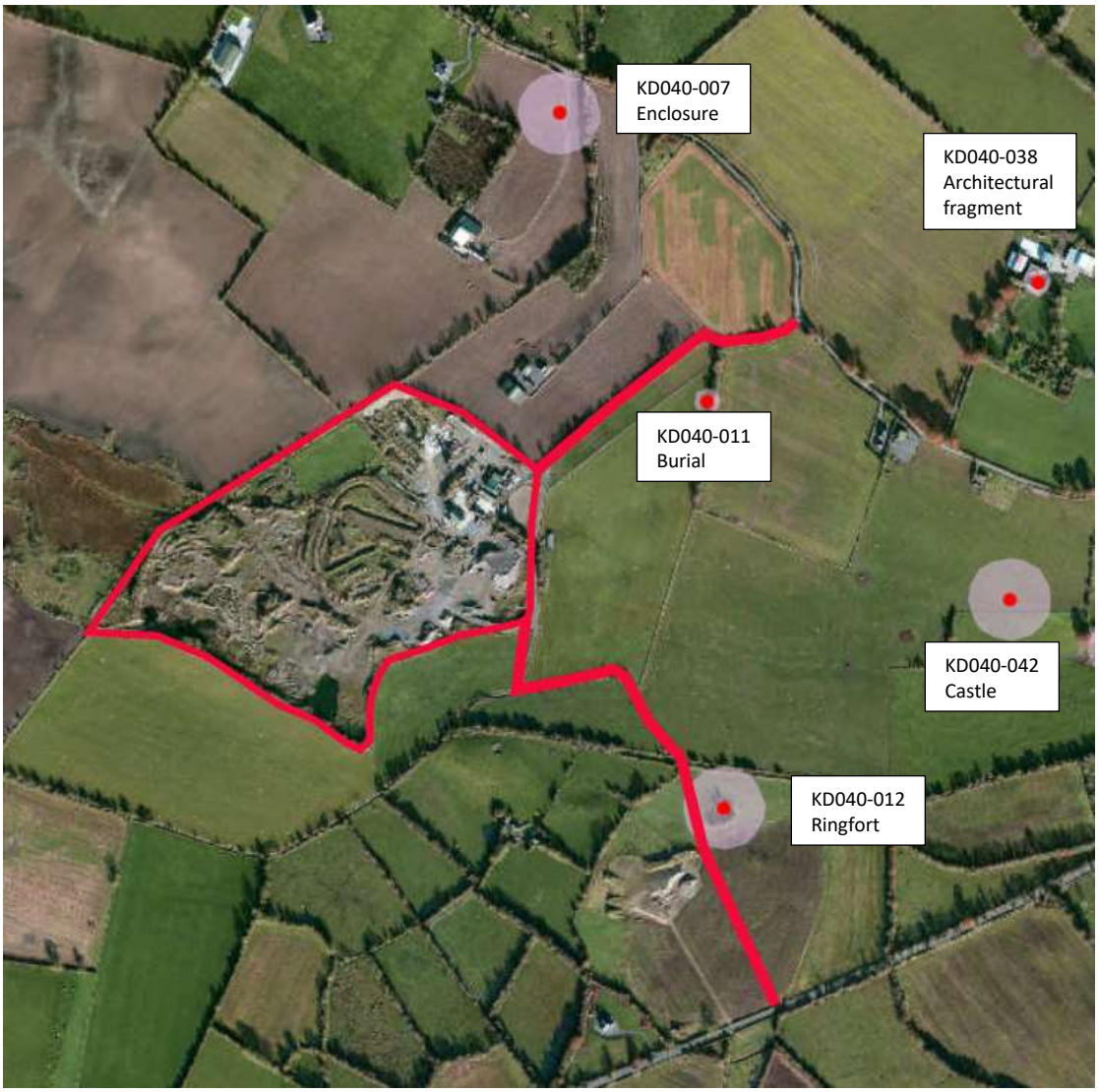


Figure 14-1 Extract from archaeology.ie showing the proposed development area

The townland boundary between Graney West and Davidstown (Pilsworth) forms the northwest limit of the site. The Graney River winds east-west c. 130-230m south of the main part of the site and will be crossed by the proposed access road. There are five recorded monuments within the study area, the closest consists of a ringfort (KD040-012), c. 10m east of the proposed access road in the townland of Coltstown (Figure 1)

14.3.1.1 Prehistoric Period (6000 BC-AD 400)

There are no sites dating to the Mesolithic or Neolithic period within the study area of the proposed development. However, evidence of Bronze Age activity (2500-500 BC) is recorded in the form of a probable Bronze Age burial site identified in the 1950s c. 80m southeast of the existing quarry access (KD040-011). A cremation and two crouched inhumations were identified during the works. In the wider vicinity of the study area, an early Bronze Age flat axe (NMI E186:19) and a later Bronze Age sword (NMI 1945:304) have been recorded c. 1.8km to the northwest in Castledermot. A cist site (KD040-041) is recorded c. 1.7km to the east at Knockfield and a standing stone (KD040-040) located c. 2.6km to the east in Ballyraggan.

14.3.1.2 Early Medieval Period (AD 400–1169)

The early medieval period saw the introduction of Christianity to Ireland and with it the arrival of churches into the Irish landscape. Castledermot originated from the monastic community of
Diseart Diarmada, founded c. 812 AD by Diarmait or St. Dermot, a grandson of *Aed Ron*, King of Ulster (KD040-002003). The site of Diarmait's church lies beneath the current Church of Ireland church of St. James. The choice of location may have been influenced by its proximity to Killeen Cormac, 5km to the west, a site with a strong connection to Palladius, the first Roman bishop in Ireland. Palladius was believed to have left belongings at Killeen Cormac, including his library and a fragment of the true cross. The site itself has yet to be identified on the ground; however, there are numerous mentions of it in the annals. Also c. 5km to the west of Castledermot was the seat of the O'Tooles, modern day Kilkea, and centre of their territory called *Hy Muiredhaigh* (Comerford 1896, 367). The 'Annals of the Four Masters' records Diarmait's death in 823, describing him as 'an anchorite, and a distinguished doctor' (Fitzgerald 1892, 66).

The settlement's importance is attested to by the fact that it was raided twice by Vikings in 841 (O' Donovan 1854, vol. I, 463) and 867 (ibid., 511). After the destruction wrought by the Norse, *Diseart Diarmada* appears to have enjoyed around 230 years of relative peace, until 1037, when it became embroiled in the blinding and killing of Dunchadh, king of Leinster (O' Donovann 1854, vol. II, 835). It was subsequently plundered by the Ui Ceinnseallaigh and prisoners were taken (ibid., 839). Further violence was visited upon the settlement in 1043 by the Ui Baillain and 1076 by the Ua Lorcain (ibid., 843, 911). The final pre-Norman reference to the site in the annals records its destruction by fire in 1106 (MacCarthy 1892, vol. II, 77). Although it takes almost another 100 years for the Anglo-Normans to arrive, the turmoil of the 11th century must have taken its toll on *Diseart Diarmada*, and we have no further references to the community in the annals post 1106. Perhaps patronage dried up; its functions were diminished and hence its importance within the wider church had lessened. Whatever the case, the prominence it had enjoyed in the 9th and 10th centuries had disappeared.

The early medieval period is depicted in the surviving sources as entirely rural characterised by the basic territorial unit known as *túath*. Byrne (1973) estimates that there were probably at least 150 kings in Ireland at any given time during this period, each ruling over his own *túath*. During this sometimes-violent period, roughly circular defensive enclosures known as ringforts were constructed to protect farmsteads. Although most of the ringforts that have been excavated are shown to date to this period, some have earlier origins and may have been originally constructed during the Iron Age, or even earlier. The massacres and raids subjected on the monastic settlement, *Diseart Diarmada*, resulted in the need for a large number of defended settlements in the landscape as attested to by the high number of ringforts in the

wider vicinity of the development. The nearest is located c. 10m to the east of the proposed access route in Coltstown (KD040-012).

14.3.1.3 Medieval Period (AD 1169–1600)

The beginning of the medieval period was characterised by political unrest that originated from the death of Brian Borumha in 1014 at the Battle of Clontarf. *Diarmait MacMurchadha*, deposed King of Leinster, sought the support of mercenaries from England, Wales and Flanders to assist him in his challenge for kingship. Norman involvement in Ireland began in 1169, when Richard de Clare and his followers landed in Wexford to support *MacMurchadha*. Two years later de Clare (Strongbow) inherited the Kingdom of Leinster and by the end of the 12th century the Norman settlement was effective over the whole county, as marked by the beginning of the rule of the Fitzgerald family as Earls of Kildare (Stout and Stout 1997, 53). The arrival of the Anglo-Normans and ensuing social upheaval led to the significant changes in land ownership and settlement.

There are no recorded medieval sites within the immediate vicinity of the existing quarry. The site of an Augustinian Nunnery is located c. 1.2km to the east (KD040-015). Walter de Riddlesford founded a nunnery here c. 1200, for either the Order of St Augustin or the Order of St Brigid (OS Letters 1837, 84). The extensive complex of low earthworks visible from the ground presumably relate to the nunnery and its associated graveyard, which cannot now be precisely located. The possible site of a castle is recorded c. 660m east of the existing quarry (KD040-042). The structure was demolished prior to 1783 but up until recently was used as a source for building materials (SMR file).

14.3.1.4 Post-Medieval Period (AD 1600–1900)

The 17th century saw dramatic rise in the establishment of large residential houses around the country. The large country house was only a small part of the overall estate of a large landowner and provided a base to manage often large areas of land that could be located nationwide. Lands associated with the large houses were generally turned over to formal gardens, which were much the style of continental Europe. A small 17th century house (KD040-013) with a T-shaped plan, gable ends, chimney stacks, and traces of garden walls is located in Graney Cross c. 800m to the east of the existing quarry.

Gradually the style of formal avenues and geometric gardens designs that accompanied the large houses of the landed gentry, was replaced during the mid-18th century by the adoption of parkland or demesne landscapes – which enabled the viewing of a large house within a designed 'natural' setting. Although the creation of a parkland landscape involved working with nature, rather than against it, considerable constructional effort went into their creation. Earth was moved, field boundaries disappeared, streams were diverted to form lakes and quite often roads were completely diverted to avoid travelling anywhere near the main house or across the estate. Several houses and demesne landscapes are evident in the environs of the proposed development. These included Knockpatrick House, c. 340m to the east, and Coltstown House, c. 410m to the south. These buildings were accompanied by naturalised demesne landscapes of which only Knockpatrick's survives.

The 18th century witnessed a more pacified Ireland and during this time industry was developed in the landscape. In the area of Graney Cross the water power of the River Graney was utilised and fed a millrace to operate a flour mill. The River Graney was utilised in the post-medieval period. The flour mill (KD040-043) and mill race at Graney Cross, c. 650m to the east of the development was constructed repurposing materials from the nearby castle (KD040-042) and nunnery (KD040-015). The mill contains a date stone of 1799 though the

structure incorporates the lower ten courses of an earlier mill and the foundation courses of an even earlier building. The earlier mill is depicted on both Noble and Keenan's Map of Kildare, 1752 and Alexander Taylor's Map of the County of Kildare, 1783. The first edition OS map of 1838 describes the mill as in ruins and it is unclear if a mill was later reopened on the spot.

Throughout the majority of the 20th century Graney Cross was a quiet, rural village. However, this changed on 24th October 1922 when three Free State soldiers were killed in a Republican ambush on Graney Bridge (www.irishmedals.ie).

14.3.2 Record of Monuments and Places

The Kildare County Development Plan (2017–2023) recognises the statutory protection afforded to all RMP sites under the National Monuments Legislation (1930–2014). The development plan lists a number of aims and objectives in relation to archaeological heritage (Appendix 4).

It is a policy of the Kildare County Development Plan (2017–2023) to promote the in-situ preservation of archaeology as the preferred option where development would have an impact on buried artefacts. Where preservation in situ is not feasible, sites of archaeological interest shall be subject to archaeological investigations and recording according to best practice, in advance of redevelopment.

There are five recorded monuments located within the study area for the proposed development (See Appendix 5 for details). The nearest consist of a ringfort c. 10m to the east of the proposed access route (KD040-012).

Table 14-1 Recorded Archaeological Sites

RMP No.	Location	Classification	Distance to site
KD040-012	Coltstown	Ringfort - Rath	c. 10m east
KD040-011	Graney West	Burial	c. 80m east
KD040-038	Knockpatrick	Architectural Fragment	c. 340m east
KD040-007	Davidstown (Pilsworth)	Enclosure	c. 370m north
KD040-042	Graney West	Castle - Unclassified	c. 500m east

14.3.3 Cartographic Analysis

14.3.3.1 William Petty's Down Survey, Map of Kildare, c. 1655

The county map for Kildare depicts the barony of 'Killeah and Moone'. Castledermot is depicted to the west of the proposed development as three structures; however no features are shown within the development area.

14.3.3.2 Noble and Keenan's Map of Kildare, 1752

As opposed to Petty's map the environs and town of Castledermot are drawn in greater detail within this map (Figure 14-2). A charter school is now annotated to the south of the Castledermot and to the northwest of the proposed development. A 'burying place' (KD040-010001) is depicted on a hill to the northeast of the proposed development. A river is drawn leading southeast from the town through the proposed development to a mill (KD040-043),

17th century house (KD040-013), nunnery (KD040-015), and graveyard (KD040-051) at a crossroads named 'Grany'.

Figure 14-2 Extract from Noble and Keenan (1752) showing the approximate area of the proposed development

14.3.3.3 Alexander Taylor's Map of the County of Kildare, 1783

Taylor's map depicts the area of the proposed detail with more accuracy than Noble and Keenan's, roads and topographical features are depicted and townlands are named (Figure 14-3). The Graney River is still shown leading to the same features at Graney, now including a mill race. However, these features are now correctly depicted to the east of the development on this mapping.

Figure 14-3 Extract from Taylor (1783) showing the approximate area of the proposed development

14.3.3.4 First Edition Ordnance Survey Map, 1838, scale 1:10560

This is the first accurate historic mapping coverage of the area containing the proposed development (Figure 14-4). The development lies in part or all of 22 open fields. There are two structures around a yard located within the eastern half of the main portion of the development. A ringfort (KD040-012) is depicted to the east and an enclosure (KD040-007) can be seen to the north. A house with landscaped garden is depicted c. 340m to the east. The flour mill seen on previous cartographic sources is marked as in ruins. To the east of the mill in Graney, a nunnery, graveyard, and pound are marked.

14.3.3.5 25-Inch Ordnance Survey Map, 1907, scale 1:2500

By the time of the 25-inch OS map the proposed development is now comprised of all or parts of 13 fields (Figure 14-5). A track is now depicted running northeast from the farmyard structures within the development, noted on the six-inch OS map, to the townland boundary with Knockpatrick. A third structure and pump have been added to the farm buildings within the site. A well is annotated within the main portion of the site in the northern corner, as is a fox covert in the western corner. The house noted to the east on the previous mapping is now named Knockpatrick House. The nunnery at Graney Cross is now in ruins and the graveyard is no longer marked suggesting it is no longer in use. The village now contains a dispensary, well, and smithy.

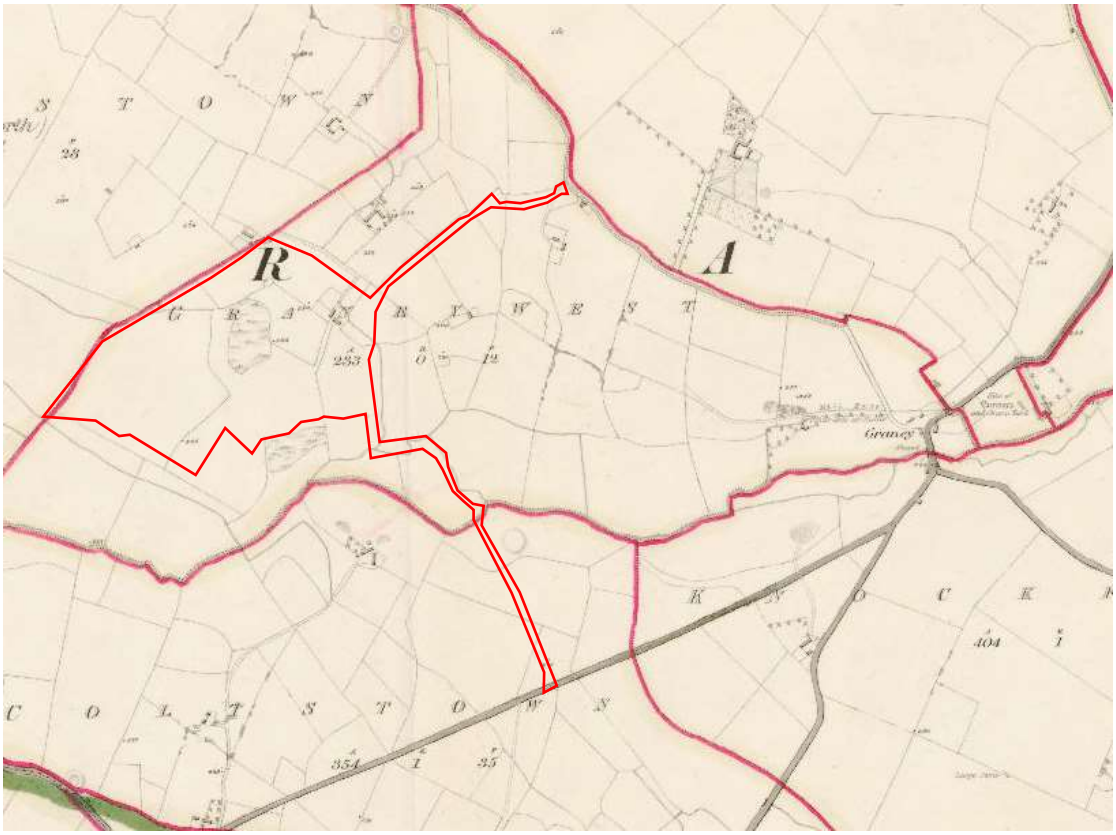


Figure 14-4 Extract from the first edition OS map (1838) showing the proposed development

Figure 14-5 Extract from the 25-inch OS map (1907) showing the proposed development

14.3.4 Aerial Photographic Analysis

Inspection of the aerial photographic coverage of the proposed development area held by the Ordnance Survey (1995, 2000, and 2005), Bing Maps, and Google Earth (2003-2016) was undertaken as part of this assessment. This revealed that the main parcel of the development has been heavily disturbed since at least 1995 when it was in use as a quarry. By 2000 the main parcel of land appears to have been repurposed for a motor cross track. It contains nine structures situated in the approximate location as the farmyard structures on the OS maps.

The ringfort (KD040-012), enclosure (KD040-007), and mill (KD040-043) are all visible on the aerial photography. The route to the main parcel from the unnamed road in the northeast is an existing road, visible on the 25-inch OS map. The proposed site entrance and road leading from the L4015 partially passes through a quarry, that used to occupy most of the field bordering the L4015. The remainder of the site is located in open fields and along field and townland boundaries. No previously unrecorded archaeological or cultural heritage features were noted during the inspection.

14.3.5 Summary of Previous Archaeological Fieldwork

A review of the Excavations Bulletin (1970-2017) has shown that no previous archaeological investigations have been carried out within the proposed development area. However, there was one archaeological investigation within the study area. This consisted of monitoring pipe-trench excavations for the Castledermot Water-Improvement Scheme from Castledermot to Graney Cross (Licence Ref.: 02E1696, Bennett 2002:0879). No archaeological features were noted except for three sherds of medieval pottery to the north of the River Lerr.

14.3.6 Place Name Analysis

Townland and topographic names are an invaluable source of information on topography, land ownership and land use within the landscape. They also provide information on history; archaeological monuments and folklore of an area. A place name may refer to a long-forgotten site and may indicate the possibility that the remains of certain sites may still survive below the ground surface. The Ordnance Survey surveyors wrote down townland names in the 1830's and 1840's, when the entire country was mapped for the first time. Some of the townland names in the study area are of Irish origin and through time have been anglicised. The main reference used for the place name analysis is *Irish Local Names Explained* by P.W Joyce (1870). A description and possible explanation of each townland, parish, and barony name in the environs of the proposed development are provided in the below table.

Table 14-2 List of townlands, parishes, and baronies in the study area

Name	Derivation	Possible Meaning
Graney West	Greannaidhe	Gravelly or stoney, originally relating to the River Graney
Coltstown	Likely Anglo-Norman in origin.	-
Davidstown (Pilsworth)	Likely Anglo-Norman in origin.	-
Knockpatrick	Cnoc Phadraig	Patrick's Hill
Knockfield	Cnoc	A hill and the English field
Graney	Greannaidhe	Gravelly or stoney, originally relating to the River Graney

Name	Derivation	Possible Meaning
Kilkea and Moone	Cill Chá agus Maoin	Chá's church and property

14.3.7 Townlands

The townland is an Irish land unit of considerable longevity as many of the units are likely to represent much earlier land divisions. However, the term townland was not used to denote a unit of land until the Civil Survey of 1654. It bears no relation to the modern word 'town' but like the Irish word *baile* refers to a place. It is possible that the word is derived from the Old English *tun land* and meant 'the land forming an estate or manor' (Culleton 1999, 174). The proposed development area is located within the townlands of Graney West and Coltstown.

Gaelic land ownership required a clear definition of the territories held by each sept and a need for strong, permanent fences around their territories. It is possible that boundaries following ridge tops, streams or bog are more likely to be older in date than those composed of straight lines (*ibid.* 179). Graney, Knockpatrick, and Knockfield may relate to this period.

The vast majority of townlands are referred to in the 17th century, when land documentation records begin. Many of the townlands are mapped within the Down Survey of the 1650s, so called as all measurements were carefully 'laid downe' on paper at a scale of forty perches to one inch. Therefore, most are in the context of pre-17th century landscape organisation (McErlean 1983, 315).

In the 19th century, some demesnes, deer parks or large farms were given townland status during the Ordnance Survey and some imprecise townland boundaries in areas such as bogs or lakes, were given more precise definition (*ibid.*). Larger tracts of land were divided into a number of townlands, and named Upper, Middle or Lower, as well as Beg and More (small and large) and north, east, south and west such as Graney East and West (Culleton 1999, 179). By the time the first Ordnance Survey had been completed a total of 62,000 townlands were recorded in Ireland.

14.3.8 Cultural Heritage Sites

The term 'cultural heritage' can be used as an over-arching term that can be applied to both archaeology and architectural features. However, it also refers to more ephemeral aspects of the environment, which are often recorded in folk law or tradition or possibly date to a more recent period. Two of the structures within the development appear to have survived from at least the 25-inch OS map, if not the 6-inch OS map. As a result, these buildings would be classified as cultural heritage. Within the surrounding environs the recorded monuments, listed in Table 1, would constitute as cultural heritage sites. Further cultural heritage sites in the area consist of the demesne landscape associated with Knockpatrick House, c. 340m to the east, and Coltstown House, c. 410m to the south, of which only the small demesne of Knockfield survives today.

14.3.9 Field Inspection

The field inspection sought to assess the proposed development area, its previous and current land use, the topography and any additional information relevant to the report.

The existing access road that runs from the local road to the quarry is well established and has been in use for a considerable amount if time. The main element of the site was previously in use as a quarry and has been subject to significant quarrying (Plate 1). It contains a number of modern structures. At the northern end of the site there is a single storey vernacular cottage in poor condition (Plate 2). It has a modern tiled roof and is finished with modern render. To the north of the structure is a range of modified stone outbuildings currently in used as stables (Plate 3). These structures are all that remains of the buildings marked in this located within the historic OS maps.

A new proposed access route will run from the southeast corner of the quarry to the regional road. A portion of the road has already been established. The remained crosses a pasture field before crossing the River Graney. This section of the river was subject to considerable straightening during the later part of the 19th century. Today a modern culvert has been installed at the located where the proposed success road will travel to the former quarry (Plate 4).

The new proposed access road runs southeast from the river, up a gradual slope and c. 5m to the west of recorded ringfort KD040-012 (Plate 5). No previously unrecorded sites of archaeological potential were noted during the field inspection. It remains possible that such sites exist but do not possess surface expression.

Plate 1: Existing quarry, facing south

Plate 2: Vernacular cottage, facing southwest

Plate 3: Vernacular outbuildings, facing northwest

Plate 4: Culvert on the River Graney, facing northwest

Plate 5: Recorded ringfort (KD040-012), facing southeast

14.3.10 Conclusions

There are five recorded monuments located within the vicinity of the proposed development that provide evidence of activity from the Bronze Age through to the medieval period. A recorded ringfort (KD040-012) is located to the immediate east of the proposed access route associated with the proposed works at the former quarry.

Analysis of the cartographic sources revealed that the study area to the east of Graney Cross and southwest of Castledermot remained largely undeveloped throughout the early post-medieval period. Graney Cross first began with the establishment of a nunnery in the 13th century which was in ruins by the 19th century. A mill with associated mill race was constructed in the 18th century off the River Graney, which will be crossed by the proposed success route. This section of the river was significantly straightened during the latter part of the 19th century. It was at this time that the area of the proposed development is first shown as being occupied by farmyard buildings and open fields. The development has been heavily disturbed in parts due to the presence of the existing quarry, as seen on the aerial photography. A poorly preserved vernacular cottage is located within the quarry area, along with a range of vernacular outbuildings, which are now in use as a stable.

A field inspection has been carried out as part of the assessment. This confirmed the quarried-out nature of the existing quarry site. The proposed access road crosses a portion of greenfield to the south of the quarry. The road will pass to the immediate west of a recorded ringfort but no previously unrecorded features of archaeological potential were noted along its route.

14.4 Impact Assessment

Impacts can be identified from detailed information about a project, the nature of the area affected and the range of archaeological resources potentially affected. Archaeological and cultural heritage sites can be affected adversely in a number of ways: disturbance by excavation, topsoil stripping; disturbance by vehicles working in unsuitable conditions; and burial of sites, limiting access for future archaeological investigation. Upstanding archaeology and cultural heritage can be affected adversely by direct damage or destruction arising from development, from inadvertent damage arising from vibration, undermining etc. and also by indirect impacts to a building's visual setting, view or curtilage.

- The existing quarry and access road have been in use for a considerable amount of time. It is likely that ground disturbances were the establishment and working of same has led to the removal of any archaeological remains. No potential impact are predicted upon the archaeological or cultural heritage resource as a result of any proposed activities in this portion of the site.

- It is proposed to upgrade the current access road to the main parcel of land from a regional road to the south. This road passes in close proximity to a recorded ringfort (KD040-012). It is possible that ground disturbances associated with the construction of the road may have a direct and negative impact on previously unrecorded archaeological remains that have the potential to survive beneath the current ground level, with no surface expression.

- The vernacular cottage and range of outbuildings will remain in-situ are part of the proposed works. As such no negative impacts are predicted upon these structures.

14.5 Mitigation Measures

We recommend the following actions in mitigation of the impacts above.

- It is recommended that all topsoil stripping associated with the proposed development within greenfield areas be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation *in-situ* or by record. Any further mitigation will require approval from the National Monuments Service of the DoCHG.

It is the developer's responsibility to ensure full provision is made available for the resolution of any archaeological remains, both on site and during the post excavation process, should that be deemed the appropriate manner in which to proceed.

Please note that all recommendations are subject to approval by the National Monuments Service of the Heritage and Planning Division, Department of Culture, Heritage and the Gaeltacht.

14.6 Residual Impacts

If the above mitigation measures are carried out, there will be no residual impacts upon the archaeological or cultural heritage resource.

14.7 Bibliography

Bennett, I. (ed.) 1987–2017 *Excavations: Summary Accounts of Archaeological Excavations in Ireland*. Bray. Wordwell.

Byrne, F. J. 1973 *Irish Kings and High Kings*. London.

Chartered Institute for Archaeologists 2014a *Standards & Guidance for Archaeological Excavation*.

Chartered Institute for Archaeologists 2014b *Standards & Guidance for an Archaeological Watching Brief (Monitoring)*.

Chartered Institute for Archaeologists 2014c *Standards & Guidance for Field Evaluation*.

Chartered Institute for Archaeologists 2014d *Standards & Guidance for Desk Based Assessments*.

Comerford, M. 1896 Castledermot: its history and antiquities. *Journal of the Kildare Archaeological Society* 1 (6).

Connolly, P. (ed.) 2002 *Statute rolls of the Irish Parliament*, Dublin.

Department of Arts, Heritage, Gaeltacht and the Islands. 1999a *Framework and Principles for the Protection of the Archaeological Heritage.* Dublin. Government Publications Office.

Department of Arts, Heritage, Gaeltacht and the Islands. 1999b *Policy and Guidelines on Archaeological Excavation.* Dublin. Government Publications Office.

Environmental Protection Agency. 2015 (Draft) *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)*. Dublin. Government Publications Office.

Environmental Protection Agency. 2017 (Draft) *Guidelines on the Information to be Contained in Environmental Impact Statements.* Dublin. Government Publications Office.

Fitzgerald Lord W. 1892 The Round Tower of Castledermot. In *Journal of the Royal Society of Antiquaries of Ireland.* Vol. XXII, 66-69.

Joyce, P. W. 1870. *Irish Local Names Explained*. Sydney: Wentworth Press.

Kildare County Development Plan 2017-2023.

MacCarthy, B. (ed.) 1892 (reprint 1998) *The Annals of Ulster*, Dublin.

National Monuments Service, Department of Culture, Heritage and The Gaeltacht. *Sites and Monuments Record*, County Kildare.

National Museum of Ireland. *Topographical Files*, County Kildare.

O' Donovan, J. (ed.) 1854 (reprint) *The Annals of Ireland. Volumes I, II and III*, Dublin and New York.

Sayles, G.O. 1976 *The Parliaments and Councils of Medieval Ireland*, Dublin.

Sayles, G.O. 1979 *Documents of the Affairs of Ireland before the King's Council*, Dublin.

Stout, G & Stout, M 1997 'Early Landscapes: from Prehistory to Plantation' in Aalen, F.H.A et al (eds) 1997 *Atlas of the Irish Rural Landscape* Cork University Press.

Sweetman, H.S. 1895 (reprint 1974) *Calendar of documents relating to Ireland 1171–1251. Volumes I – VI*, London.

Cartographic Sources

William Petty, Down Survey, Map of Kildare, c. 1655.

Noble and Keenan, A Map of Kildare, 1752.

Alexander Taylor, A Map of the County of Kildare, 1783.

Ordnance Survey maps of County Kildare 1838, 1907.

Electronic Sources

www.archaeology.ie – DoCHG website listing all SMR sites.

www.booksulster.com/library/plnm/placenamesC.php – Contains the text from Irish Local Names Explained by P.W Joyce (1870).

www.excavations.ie – Summary of archaeological excavations from 1970–2018.

www.googleearth.com – Satellite imagery of the proposed development area.

www.bingmaps.com – Satellite imagery of the proposed development area.

www.heritagemaps.ie – The Heritage Council web-based spatial data viewer which focuses on the built, cultural and natural heritage.

www.logainm.ie – Placenames Database of Ireland launched by Fiontar agus Scoil na Gaelige and the DoCHG.

www.osiemaps.ie – Ordnance Survey aerial photographs dating to 1995, 2000, & 2005.

www.irishmedals.ie – The Civil War, National Army Killed.

15. Landscape

15.1 Introduction

JBA Consulting has been commissioned by Environmental Efficiency Consultant (Ireland) Ltd, to provide environmental consultancy services in relation to a proposed soil recovery facility at a worked-out quarry in Graney West, County Kildare. This chapter relates to the potential landscape and visual impacts of the proposed works on the landscape and visual amenity of the site and environs.
This chapter covers two distinct but related areas:

1) Landscape Impact Assessment (LIA) which relates to the assessment of effects on the landscape as a resource in its own right and is concerned with how the proposal will affect the physical elements that make up the landscape and its distinctive character; and

2) Visual Impact Assessment (VIA) which relates to the assessment of effects on specific views and on the general visual amenity experienced by people. This deals with how the surroundings of individuals, or groups of people, may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the landscape and/or introduction of new elements. Visual impacts may occur from; Visual Obstruction (blocking of a view, be it full, partial or intermittent) or; Visual Intrusion (interruption of a view without blocking).

Photomontages have been produced for the proposed development; they are included within the Planning Application The photomontages have been selected to coincide with four key viewpoints around the site, they illustrate four stages of visibility:

- existing views
- corresponding images of the proposed development during construction i.e. infilling/soil recover
- during construction with temporary mitigation i.e. surrounding tree planting and
- with full mitigation i.e. restoration comprising land contouring and permanent planting as shown in the landscape masterplan.

The Landscape Masterplan which has been produced for the proposed development illustrates the restoration plan. Phased measures to mitigate landscape and visual impacts during construction are also described and illustrated in the Landscape Masterplan.

15.2 Propose development

The proposed project includes the construction phase with the principal activity of backfilling a worked-out quarry using waste soil and stone from construction, renovation and demolition sites, to backfill and restore existing voids onsite.
In addition to the principal waste activity described above, it is proposed to carry out the following secondary waste recovery activities:

- Intake of top-soil, screening at proposed screening plant and resale of such material,
- Intake of gravel and sands, washing at existing washing plant and resale of such materials,
- Intake of concrete, concrete crushing using concrete crushing equipment, mixing with sand and gravel before being fed to the washing plant to form aggregate, and resale of such material, and;

- Intake of garden waste, shredding and composting of this waste within a silage pit draining to an underground effluent storage tank, for use for agricultural land spreading.

Water treatment measures on-site are as follows:

- Septic tank will be in place to manage domestic wastewater on-site
- Surface Water Settlement Lagoons will be in place for managing run-off from site and from gravel washing process
- Effluent tank will be in place to manage run-off from composting area.
- Silt trap, Class 1 Full Retention Interceptor and Soakaway will be in place to deal with run-off from concrete hard standing areas
- Class 1 Interceptor will be in place serving the car parking area
- Integrated Oil Interceptor will serve the wheel wash along the site access road.

The site is 19.2 hectares in size and the area for backfilling is 13.65 hectares. The expected amount to backfill is 1.8 million tonnes to restore the profile of the land and the construction period is expected to be 10-25 years. Traffic will access the site from the south east via a proposed new access road.

The operational phase is the use of the site as an agricultural field for grazing. The site is located approximately 2km east of Castledermot town, Co. Kildare, and approximately 8 km west of Baltinglass village (see Location plan below). Road L8100 is located north of the site and road L4015 is located to the south. River Graney is running south of the proposed development.

Figure 15-1 Location Plan

15.3 Assessment Methodology

15.3.1 Relevant Guidance Documents

The assessment is based on the recommendations in the Guidelines for Landscape and Visual Impact Assessment (GLVIA) as published by the Landscape Institute (UK) and the Institute of Environmental Management and Assessment (3rd Edition, 2013).

The landscape and visual assessment which was carried out over 12 months between 2019 and 2020, was undertaken through a combination of desk studies and field surveys by a chartered Landscape Architect.

The site-work stage involves the verification of four views from the initial desk-based study, analysis of same by annotated photographs and the capture of additional photography from each Residential/Commercial property and Open Space facility which has the potential to be impacted. Photomontage for the proposed development are included within a separate volume due to file size. The photomontages accurately represent the way in which the future development will be perceived within its surroundings. Field notes are recorded in relation to the likes of topography, land use, significant landscape features and overall landscape character. This process is used to inform the proposed project specific landscape character assessment that is the basis of landscape impact appraisal.

15.3.2 Landscape Impact Assessment Criteria

When assessing the potential impacts on the landscape resulting from a proposed project, the following criteria are considered:

- Landscape character sensitivity;
- Magnitude of likely impacts; and
- Significance of landscape effects.

The significance of the landscape impact will be the combination of the sensitivity of the landscape against the magnitude of the change. It is summarised in below.
below.

Table 15-1 Significance of Landscape and Visual effects based on Magnitude and Sensitivity.

	MAGNITUDE				
SENSITIVITY	Very high	High	Medium	Low	Negligible
High	Significant	significant	moderate	slight	slight
Medium	significant	moderate	slight	slight	imperceptible
Low	moderate	slight	slight	imperceptible	imperceptible
Negligible	slight	slight	imperceptible	imperceptible	imperceptible
Neutral	imperceptible	imperceptible	imperceptible	imperceptible	imperceptible
Positive	positive	positive	positive	positive	imperceptible

15.3.3 Sensitivity of the Landscape

The sensitivity of the landscape to change is the degree to which a particular Landscape Character Area (LCA) can accommodate changes or new elements without unacceptable detrimental effects to its essential characteristics. Landscape Sensitivity often referred to as 'value' is classified using the following criteria which have been derived from a combination of industry guidelines8 from the Landscape Institute for Landscape and Visual Impact Assessment and professional judgement.

- High - Areas where the landscape character exhibits a low capacity for change in the form of development. Examples of which are high value landscapes, protected at a national level e.g. National Park, where the principal management objectives are likely to be protection of the existing character.
- Medium - Areas where the landscape character exhibits a medium capacity for change in the form of development. Examples of which are medium value landscapes, protected at a Local or Regional level e.g. Open space areas mentioned within a County Development Plan, where the principal management objectives are likely to be protection of the existing character.
- Low - Areas where the landscape character exhibits a high capacity for change and has very few or no designated landscapes or open space areas.
- Negligible - Areas of landscape character that include derelict, mining, industrial land or are part of the urban fringe where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of landscape improvements and/or restoration to realise a higher landscape value.

15.3.4 Magnitude of Likely Landscape Impacts

The magnitude of a predicted landscape impact is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed project. The magnitude considers whether there is a direct physical impact resulting from the loss of landscape components and/or a change that extends beyond the boundary of the proposed project that may have an effect on the landscape character of the area.

- Very high - Change that would be large in extent and scale with the loss of critically important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality.
- High - Change that would be more limited in extent and scale with the loss of important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality.
- Medium - Changes that are modest in extent and scale involving the loss of landscape characteristics or elements that may also involve the introduction of new

[8] Landscape Institute and Institute of Environmental Management & Assessment, 2002 *Guidelines for Landscape and Visual Impact Assessment 2nd Edition* and Landscape Institute. Taylor and Francis and Landscape Institute and Institute of Environmental Management & Assessment, 2013 *Guidelines for Landscape and Visual Impact Assessment 3rd Edition.* Routledge

uncharacteristic elements or features that would lead to changes in landscape character, and quality.

- Low - Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements.
- Neutral - Changes that do not involve the loss of any landscape characteristics or elements and will not result in noticeable changes to the prevailing landscape character.
- Positive - Changes that restore a degraded landscape or reinforce characteristic landscape elements.

15.3.5 Significance of landscape effects

The significance of the landscape impact will be the combination of the sensitivity of the landscape against the magnitude of the change. It is summarised in Table 15-1.

15.3.6 Sensitivity of Visual Receptors

Unlike landscape sensitivity, the sensitivity of visual receptors has an anthropocentric (or human-centric) basis. It considers factors such as the perceived quality and values associated with the view, the landscape context of the viewer, the likely activity they are engaged in and whether this heightens their awareness of the surrounding landscape.
Visual receptors most susceptible to changes in views and visual amenity are;

- High - Residents at home and travellers on a Scenic route where awareness of views is likely to be heightened plus people, whether residents or visitors, who are engaged in outdoor recreation including use of public rights of way, whose attention or interest is likely to be focussed on the landscape and on particular views, and those on a scenic route where the view is not specifically in the direction of the proposed development.
- Medium - Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience, and communities where views contribute to the landscape setting enjoyed by residents in the area.
- Low - People engaged in outdoor sport or active recreation on a local scale, which does not involve or depend upon appreciation of views of the landscape; and people at their place of work whose attention may be focussed on their work or activity, not their surroundings and where the setting is not important to the quality of working life, and people travelling in vehicles where their view is limited to a few minutes at any view point.
- Negligible - Changes affecting restricted viewpoints.
- Neutral - Changes that do not affect any viewpoints.
- Positive - Changes that restore visual amenity.

15.3.7 Magnitude of Visual Impact

The magnitude of a visual effect is determined on the basis of several factors: the relative numbers of viewers, the distance from the viewpoint, the visual dominance of the proposed development within a view and its effect on visual amenity, as follows:

- Very high - The proposal intrudes into a large proportion or critical part of the available vista and is without question the most noticeable element. A high degree of visual clutter or disharmony is also generated, strongly reducing the visual amenity of the scene.

- High - The proposal intrudes into a significant proportion or important part of the available vista and is one of the most noticeable elements. A considerable degree of visual clutter or disharmony is also likely to be generated, appreciably reducing the visual amenity of the scene.
- Medium - The proposal represents a moderate intrusion into the available vista, is a readily noticeable element and/or it may generate a degree of visual clutter or disharmony, thereby reducing the visual amenity of the scene. Alternatively, it may represent a balance of higher and lower order estimates in relation to visual presence and visual amenity.
- Low - The proposal intrudes to a minor extent into the available vista and may not be noticed by a casual observer and/or the proposal would not have a marked effect on the visual amenity of the scene.
- Negligible - The proposal would be barely discernible within the available vista and/or it would not detract from, and may even enhance, the visual amenity of the scene.

Magnitude can also be described as:

- Neutral - Changes that are not discernible within the available vista and have no bearing the visual amenity of the scene.
- Positive - Changes that enhance the available vista by reducing visual clutter or restoring degraded features.

15.3.8 Visual Impact Significance

As stated above, the significance of visual impacts is a function of visual receptor sensitivity and visual impact magnitude. This relationship is expressed in the same significance matrix as used earlier in respect of landscape impacts, see Table 15-1.

15.4 Baseline Environment

15.4.1 Context of the Study Area

The site is wholly located within the administrative area of Kildare County Council and land use designations are shown within the Kildare County Development Plan 2017- 2023[9]

15.4.2 Landscape Character

The County Development Plan[2] includes a Landscape Character Assessment (LCA). The proposed development site is included within the southernmost part of the 'Eastern Transition' character area of the LCA.

For the purposes of this study the landscape character will be assessed by definition of a Broad landscape character area and a Detailed landscape character area.

15.4.3 Broad landscape character area

The broad landscape character area is as defined by the 'Eastern Transition' character area of the LCA. The Eastern Transition character area is described in the LCA as Class 2 Medium sensitivity- Areas with the capacity to accommodate a range of uses without significant adverse effects on the appearance or character of the landscape having regards to localised sensitivity factors. The proposed development is within the southern most section of this

[9] Kildare County Council (2017) *Kildare County Development Plan 2017-2023*

character area. The character area is generally defined by Corballis Hill (258m OD) to the north and Knockpatrick Hill (254mOD) to the south, these two hills are approximately 2km apart. The landscape is gently undulating in-between the two hills, sloping downhill in a westerly direction towards the River Graney to the south of the site and River Lerr (part of the River Barrow and Nore SAC) to the west (passing through Castledermot).

Corballis Hill comprises a mix of commercial forestry with a significant broadleaved fringe and an open summit and is a major ridgeline enclosing the character area from lands to the north. The Hill includes a series of recreation walks and long-distance views towards the SW corner of the hills of Wicklow such as Tinoran and Baltinglass which are mentioned in the Mountain Views website[10]. Knockpatrick Hill is less of a landscape feature although is a prominent ridge directly east of the proposed site.

The land use within the wide valley to the west of Corballis Hill and Knockpatrick Hill is agricultural grazing land and mineral extraction site and is generally flat and open but with mature field boundary and road side hedgerow restricting long distance views.

[10] Mountain Views website https://mountainviews.ie/summit/1207/

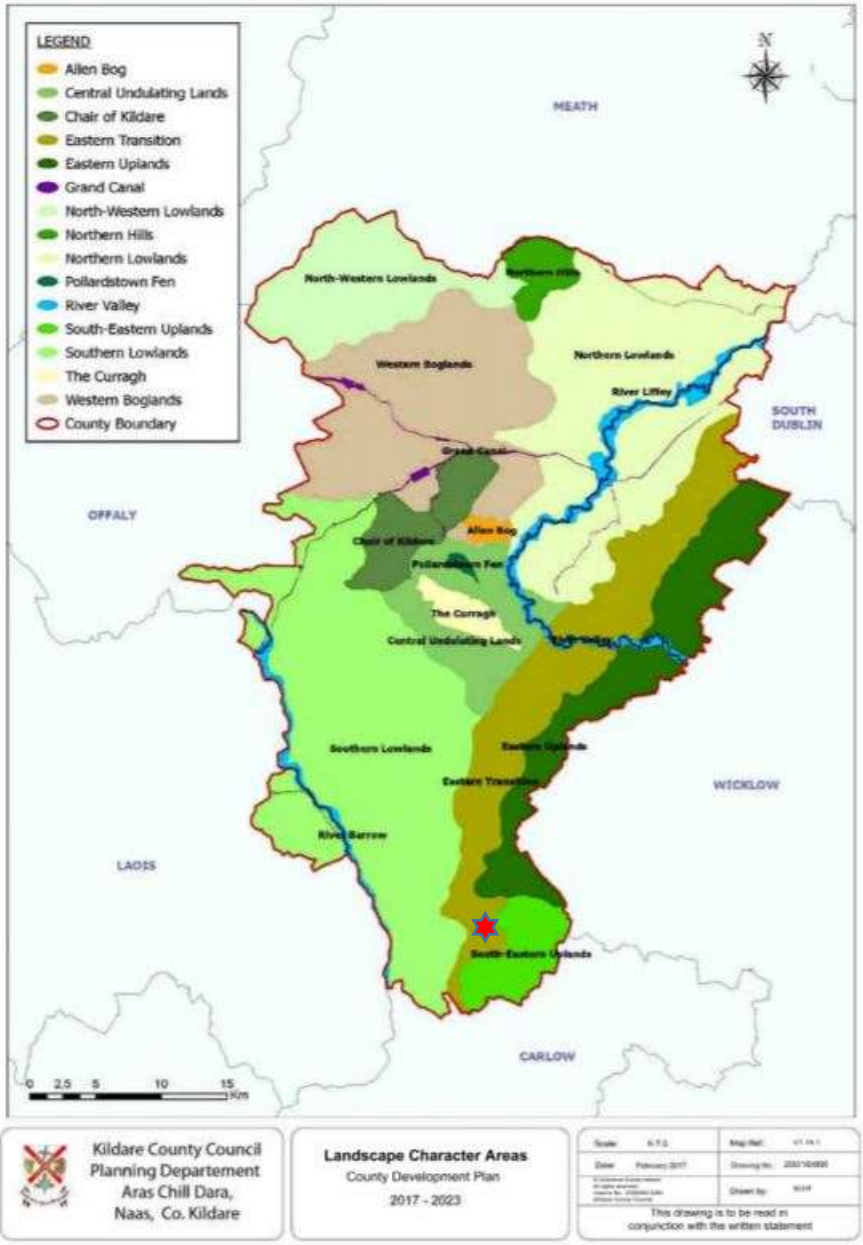


Figure 15-2 Site location shown as Eastern Transition Landscape Character Area

Policies in the LCA which relate to the Eastern Transition area are:

- **TA 1** Maintain the visual integrity of areas which have retained an upland character.
- **TA 2** Recognise that the lowlands in the transitional area are made up of a variety of working landscapes that are critical resources for sustaining the economic and social well-being of the county.
- **TA 3** Continue to permit development that can utilise existing infrastructure, whilst taking account of local absorption opportunities provided by the landscape, landform and prevailing vegetation.
- **TA 4** Continue to facilitate appropriate development, in an incremental and clustered manner, where feasible, that respects the scale, character and sensitivities of the local landscape, recognising the need for sustainable settlement patterns and economic activity within the count.

15.4.4 Detailed landscape character area

The boundary of the detailed landscape character area within which the proposed development sits is defined by landform and mature tree lines within 0.5 km radius of the site boundary. The detailed landscape area for this project can also be referred to as the visual envelope which is the area within which the proposed development will be clearly visible during construction without mitigation, this is shown on Figure 15-8. The visual envelope is formed by the local ridge formed by Knockpatrick Hill (254mOD) to the east of the site, Local road L8100 on the western side of Knockpatrick Hill from where views over the site and to the broad landscape valley are visible.

The mature vegetation along the L4015 road to the south of the site and the R418 beyond and the mature field boundaries in between form an enclosing feature for the site. Within the site the mineral extraction process has been completed and the site comprise a series of depressions which have been naturally colonised by grass and scrub. Boundary hedge and scrub is intact around the site perimeter. The Figures below illustrate the detailed landscape area.

Figure 15-3 View within the site of extraction/filling area and Knockpatrick Hill /ridgeline beyond

Figure 15-4 View along the southern boundary of the site showing mature scrub and hedgerow

Figure 15-5 showing mature hedgerow along local road L8100 to the north west of the site at the foot of Knockpatrick Hill which restricts views into the proposed development area.

Figure 15-6 Elevated view over broad valley including the proposed development site from residential property on Knockpatrick Hill to the east of the site

15.5 Visual Amenity

15.5.1 Location of Visually sensitive receivers

Home owners, community facilities, and public open space are referred to as Visually Sensitive Receivers. They are sensitive to changes to the environment which affect views, visibility of the landscape character and use of private or recreational land. Individual residential properties are located throughout the surrounding landscape and primarily along the rural roads to the north and east of the site. The scale, boundary treatment and positioning of the residential properties in relation to the public roads affects the landscape character and wider visibility close to the proposed site. The amenity value of the lands close to residential properties within which the properties sit is also sensitive to the change.

The nearest residential property is located approximately 80m north of the site boundary, the majority of properties with clear visibility of the site are located between 0.5 – 1.0km to the east and west of the site boundary. The location of Visually Sensitive Receivers/residential properties is shown on Figure 15-8.

15.5.2 Scenic Routes. Hilltop views and Scenic Viewpoints

Views that are identified for protection and preservation are identified in the LCA of the County Development Plan. These are divided in to 3 categories: Scenic Routes, Hilltop Views and Scenic Viewpoints.

The nearest Scenic Route to the proposed development is:

- View 21 (distance from proposed development 2.8km) -Views to and from Corballis Hills; county roads from Carrigeen to Sherrifhill Cross Road Location: Corballis, Tankardstown, Ballynacarrick Upper/ Lower, Sherrifhill, Alymerstown Local roads throughout and in the vicinity of Corballis Hills provide scenic vistas of the adjacent hilltops and surrounding undulating lowlands. The generally smooth terrain is interrupted by low and well-trimmed hedgerows intertwined with some mature trees and vegetation, which add complexity to the vistas. Although these partially screen vistas along the designated routes, open and long-distance views are available for long sections along the scenic roads. Large concentrations of scattered housing occur along the local roads, affecting the quality of the vistas.
- View 26-(distance from proposed development 4km) Views to and from Hughestown Hill (L8052). Location: Hughestown, Carrigeen Hill, Ballynacarrick Lower, Davidstown Long distance views of the lowlands to the east are available from the L8052 local road that runs on the western slopes of Hughestown Hill. Although the elevated nature of the road provides for long-distance visibility over the agricultural plains, views are limited due to the generally mature hedgerows along the road, which screen potentially scenic vistas. Local roads provide scenic views onto Hughestown Hill, which - together with Corballis Hill - defines the skyline and presents a local landscape focal point. Although scattered housing is located throughout the countryside the vistas available along hedgerow openings on this road remain highly scenic.

The nearest Hilltop view to the proposed development is:

- To the east of View 21 and on Corballis hill is a hilltop view (2.8km) in a westerly direction.
- To the east of View 26 and on Hughestown Hill is a hilltop view in an easterly direction.

There are no Scenic viewpoints in the broad landscape around the site for the proposed development.

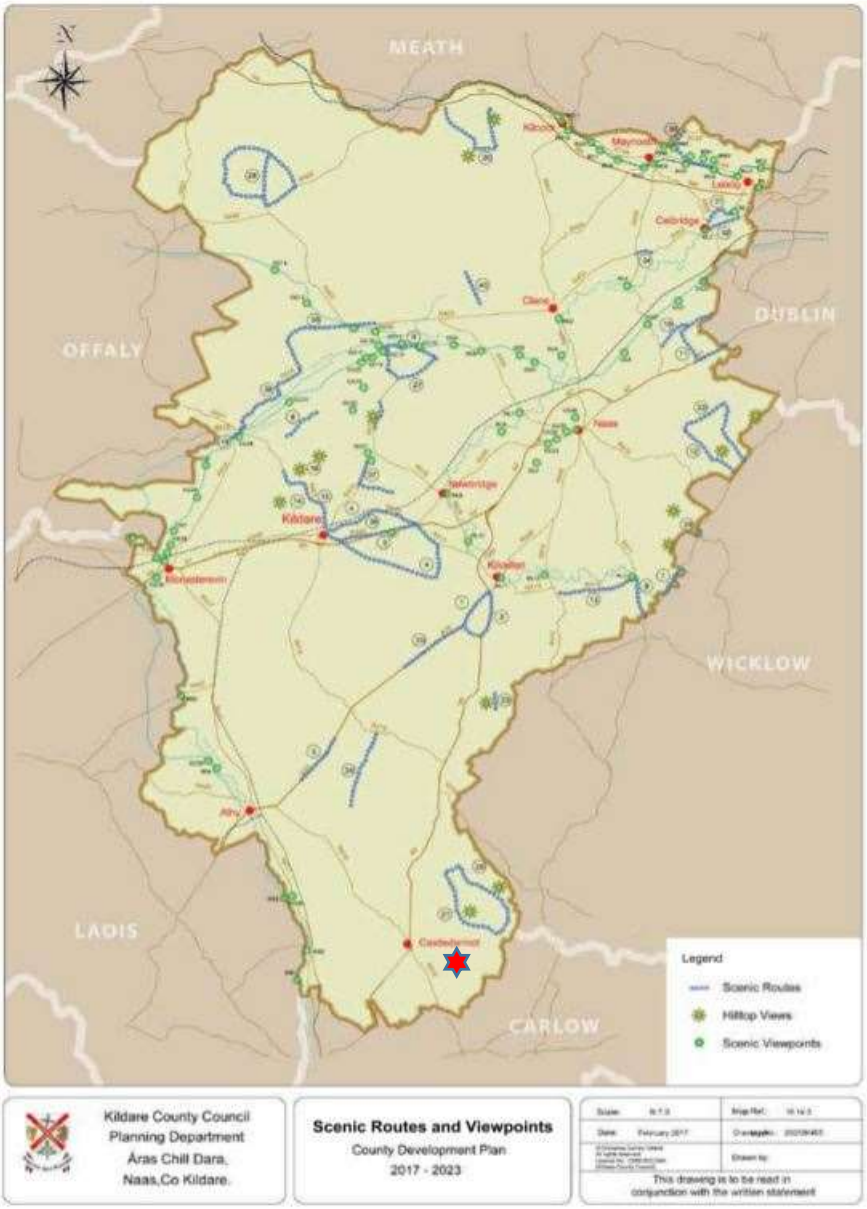


Figure 15-7 Site location show in proximity to nearest Scenic Views

15.6 Impact Assessment

15.6.1 Landscape Character Impacts

Landscape impacts result from alteration (removal of or adding to) the physical elements of the landscape of the site and its immediate surrounds affecting the character of the area. The proposed development which will infill a disused quarry, create an elevated, undulating landform to be used for agricultural grazing will require:

- the removal of an area of improved grassland in north west corner currently used as a field for grazing;
- the removal of a linear stretch of improved grassland and lands used for arable farming and a temporary bridge over the Graney River for creation of the southern access road off the L4015 road to the south of the site;
- removal of an area of scrub and colonised ground in the western corner of the site; and
- temporary changes to the quiet, inactive, rural character of the area during construction stage primarily vehicular activity on the site and on the L4015 road to the south.

15.6.2 Broad landscape character area

In terms of impact of a particular development on the landscape, the potential impact is considered against the sensitivity of the area. The LCA identifies the likely compatibility between a range of land-uses and proximity of less than 300m to the principle Landscape Sensitivity Factors.

The Eastern Transition area with Sensitivity class 2 (Medium)[11] is shown as High compatibility with Extraction (sand and gavel and rock). In accordance with the project methodology in section 2.2 it is necessary to establish the magnitude of likely impacts of the development.
The magnitude of the soil recovery facility within the broad landscape is Negligible i.e. *Changes that do not involve the loss of any landscape characteristics or elements and will not result in noticeable changes to the prevailing landscape character.*

In accordance with Table 15-1 of the project methodology the impact of the proposed development on the broad landscape is a combination of sensitivity (Medium) and magnitude (Neutral) which results in an impact classified as **Imperceptible and hence Not Significant** within the broad landscape.

[11] Kildare County Council (2017) *Kildare County Development Plan 2017-2023*

15.6.3 Detailed landscape character area

The sensitivity of the detailed landscape area in accordance with the methodology outlined in section 2 is Negligible i.e. *Areas of landscape character that include derelict, mining, industrial land or are part of the urban fringe where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of landscape improvements and/or restoration to realise a higher landscape value.*

The magnitude of the impact is considered in relation to the physical changes to the detailed landscape area which comprise the removal of improved grassland, lands used for arable farming, an area of scrub and colonised ground around the perimeter of the site. The magnitude is therefore Low i.e. *Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements.*

In accordance with Table 15-1 of the project methodology the impact of the proposed development on the detailed landscape character area is a combination of sensitivity (Negligible) and magnitude (Low) which results in an impact classified as **Imperceptible hence Not Significant** within the detailed landscape.

15.7 Visual Impacts

Visual impacts result from aspects of the proposed development which could cause Visual Obstruction (blocking of a view, be it full, partial or intermittent) or Visual Intrusion (interruption of a view without blocking) as experienced from residences, work places, tourist routes and viewpoints.

The aspects of the proposed development which will cause Visual Obstruction or Visual Intrusion are:

- Dust arising on the site from the infilling process during construction stage which will intrude upon the wider views across the landscape;
- Visibility of vehicular activity on the site and on the L4015 road to the south which will intrude upon the wider views across the landscape;
- Tall plant including aggregate Screeners (8-9m in height); and
- Stockpiles (7m in height) of fill material (concrete, gravel, sand, top-soil, garden waste) for washing, crushing, shredding and composting (as appropriate) and resale.

Visual receptors are referenced and listed (Appendix 6) in numerical order as R-Residential, B-Business/Industry and T-Transport/Road.

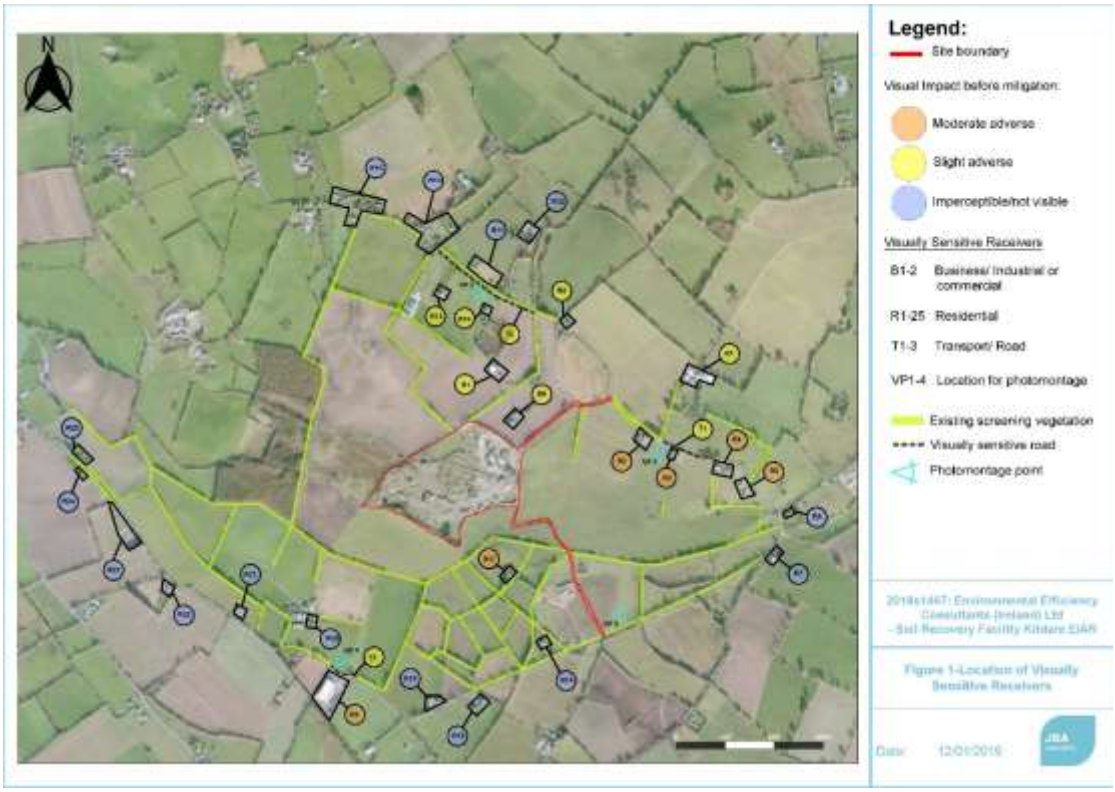


Figure 15-8 Location of Visually Sensitive Receivers

Residents living in properties generally are most likely to have close views to the proposed industrial development will experience the highest levels of visual intrusion to their existing views. Walkers, cyclist and people using the rural roads and surrounding countryside for recreation will also experience visual intrusion, although for shorter durations than residential properties. People working and travelling through the site who have a view of the proposed development and will experience low levels of visual intrusion.

As with the landscape impact, the visual impact of the proposed development will be assessed as a function of sensitivity versus magnitude as shown in Table 15-1. In this instance the sensitivity of the visual receptor, weighed against the magnitude of the visual effect.
Potential visibility of the proposed development within the broad and detailed study area was assessed during the site visit.

15.7.1 Visual Receptor Sensitivity, Magnitude and Significance of Impact within the Broad and Detailed Study area

The landscape of the broad and detailed study area relative to the proposed development rises gently to the east towards Corballis Hill and Knockpatrick Hill. The presence of these hill restricts long distance visibility on the eastern side. Mature hedgerow either side of the narrow roads and within the undulating agricultural lands generally restricts views over the country side. However, glimpse short and middle-distance views in a westerly direction over the site and towards Castledermot and beyond will be possible during good weather conditions from certain properties and roadside locations. Locations where views will be possible are include:

- 25No Residential properties in elevated areas;
- 2No Business/industrial properties; and
- 3No Transport/road side locations.

The visual impact prior to mitigation is summarised below.

No properties will experience Significant adverse visual impacts. Moderate adverse visual impacts will be experienced by a total of seven residential properties and one business property as described below:

- R2 Two storey residential property with south facing views towards with west facing views towards with site and on elevated on ground level;
- R3 Two storey residential property with south facing views towards with west facing views towards with site and on elevated on ground level;
- R4 Two x Two storey residential property with west facing views towards with site and on elevated on ground level;
- R5 Two x Two storey residential property with west facing views towards with site and on elevated on ground level; and
- B2 One Business Property with north facing views and from a similar ground level.

15.7.2 Visual Impact on Scenic Views

The site is not distinguishable from the designated scenic views and hilltop views and due to the wide, open undulating landscape within which the site sits, the proposed development will not intrude upon the view.

15.8 Mitigation Measures

Mitigation measure will be put in place at the commencement of the construction phase. These are shown on the Landscape Masterplan adjoining the Planning Application and attached in a reduced size in the figure overleaf. The mitigation comprises:

- Mounding 2m high along the eastern boundary of the development site where the site is visible from residential properties; and
- Semi mature tree planting on the northern, western and eastern (double row) boundaries to supplement retention of existing boundary hedgerow around the entire perimeter of the site.

The result of the mitigation will be to reduce visibility into the site at the commencement of the construction phase. This will reduce the Moderate adverse visual impacts which is predicted to result for seven residential properties and one business property to Slight adverse impact with immediate effect.

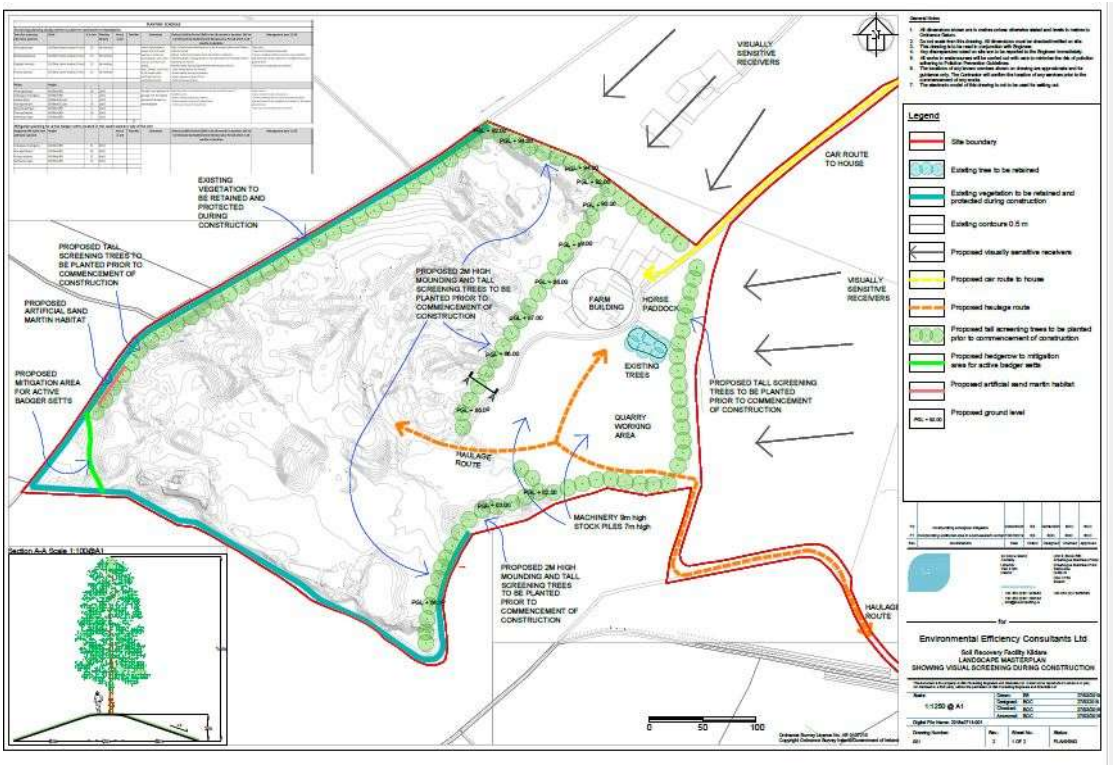


Figure 15-9 Visual Screening during construction

15.9 Photomontages

Visual impacts at four viewpoints were assessed using the Photomontages generated for the project which adjoin the Planning Application. The location of the viewpoints is shown on Figure 15-8. The photomontages were created in March 2020 before the leaves appear on the deciduous trees around the site and hence represents the worst case scenario. The photomontages illustrate four-five stages of visibility:

1) existing views;
2) corresponding images of the proposed development during construction i.e. infilling/soil recover;
3) during construction with temporary mitigation i.e. surrounding tree planting; and
4) 5) with full mitigation i.e. restoration comprising land contouring and permanent planting as shown in the landscape restoration plan (Figure 6.1).

Viewpoint 1 (VP01) - Viewpoint 1 is located along a local access road to the east of the site on an elevated section of road on Knockpatrick Hill in-between Residential properties R2 and R3 (see Figure 4.1). The viewpoint is looking through a roadside post and wire fence, in a westerly direction and approximately 610m from the eastern boundary of the proposed development.

Existing View - The existing view shows westerly views over the wider valley including glimpse view of the site with the area of woodland creating a backdrop to the rear. Residential properties R2 is shown to the right of the view. The exposed embankments within the worked out quarry site are visible from this view but they do not intrude upon the wider view of the valley nor do they obstruct the sky line.

Construction phase view – This view shows the construction plant and likely extent of dust arising from the site to a height of approx 20m above ground level during filling, the effect is a slight obstruction of the view but this does not result in obstruction of the ridge line in the background of the viewpoint. The visual impact during construction is **temporary moderate negative.**

Construction phase view with mitigation comprising tree planting and earth mounding - This view shows the likely extent of dust arising from the site to a height of approx 20m above ground level during filling, the effect is a slight obstruction of the view but this does not result in obstruction of the ridge line in the background of the viewpoint. The ground level workings and movement of machinery are screening by the earth mounding and tree planting which will be in place at the commencement of construction. The visual impact during construction is **temporary slight negative**.

Completion of restoration proposals - on completion of the land contouring to create a natural curved low hill with natural grass mix and hedgerow and trees planting remaining in place then effect will be an assimilation into the landscape. The finished ground levels will be raised from +83mOD to +90mOD in the south of the site, total increase of approx 7m and the north the finished ground levels will be raised from +88mOD to +95m OD which is also an increase in approx 7m. Within this wide valley setting with gently undulating landscape the creation of a wide mound for the restored site will not change the landscape character and will not create a significant visual impact particularly from this elevated viewpoint. The proposal intrudes to a minor extent on the view and may not be noticed by a casual observer and does not have a marked effect on the visual amenity of the scene. The impact from this elevated view point will be **permanent, slight negative**.

Viewpoint 2 (VP02) - Viewpoint 2 is located at the private access road on a local access road to the north of the site and approximately 570m from the northern boundary. The viewpoint is in a southerly direction and on a flat section of road at approximately the same ground level as the proposed development and located close to Residential properties R10 and R11 (see Figure 4.1).

Existing View - The existing view shows southerly views towards the site over the wider valley including glimpse view of the site. Residential properties R13 is shown to the right of the view. The elements within the existing worked out quarry site are not noticeable.
Construction phase view – This view shows the construction plant and likely extent of dust arising from the site to a height of approx 20m above ground level during filling, the effect is a slight obstruction of the view but this does not result in obstruction of the ridge line in the background of the viewpoint. The visual impact during construction is **temporary moderate negative.**

Construction phase view with mitigation comprising tree planting and earth mounding - This view shows the likely extent of dust arising from the site to a height of approx 20m above ground level during filling, the effect is a slight obstruction of the view but this does not result in obstruction of the ridge line in the background of the viewpoint. The ground level workings and movement of machinery are slightly screening by the tree planting along the western boundary which will be in place at the commencement of construction. The visual impact during construction is **temporary slight negative**.

Completion of restoration proposals - on completion of the land contouring to create a natural curved low hill with natural grass mix and hedgerow and trees planting remaining in place then effect will be an assimilation into the landscape. The finished ground levels will be raised from +83mOD to +90m OD in the south of the site, total increase of approx 7m and the north the finished ground levels will be raised from +88mOD to +95m OD which is also an increase in approx 7m. Within this wide valley setting with gently undulating landscape the creation of a wide mound for the restored site will not change the landscape character and will not create a significant visual impact. The proposal intrudes to a minor extent on the view and may not be noticed by a casual observer and does not have a marked effect on the visual amenity of the scene. The impact from this elevated view point will be **permanent, slight negative**.

Viewpoint 3 (VP03) - Viewpoint 3 is located on the L4015 road looking in a north-westerly direction towards the proposed development site over an existing low deciduous hedge and approximately 650m from the southern boundary. The viewpoint is on a flat section of road at approximately the same ground level as the proposed development and located close to Residential property R16 (see Figure 4.1).

Existing View - The existing view shows north-westerly views towards the site over the wider valley including the start of Knockpatrick Hill to the north. The elements within the existing worked out quarry site do not intrude upon the wider view of the valley nor do they obstruct the sky line. In the foreground are the tailings from another development which is not part of the current proposal. Three sections of mature hedgerow and the tailings from the adjacent workings part screen the southern part of the proposed development.

Construction phase view – This view shows the likely extent of dust arising from the site to a height of approx 20m above ground level during filling, the effect is a slight obstruction of the view but is not noticeable against the sky and does not obstruct any key viewpoints or features. Construction plant is slightly visible in this view point. The visual impact during construction is **temporary slight negative**.

Construction phase view with mitigation comprising tree planting and earth mounding - This view shows the likely extent of dust arising from the site to a height of approx 20m above ground level during filling, the effect is a slight obstruction of the view but this does not result in obstruction of the ridge line in the background of the viewpoint. The tree planting which will be in place at the commencement of construction screens visibility of the plant from the road. The visual impact during construction is also **temporary slight negative**.

Completion of restoration proposals - on completion of the land contouring to create a natural curved low hill with natural grass mix and hedgerow and trees planting remaining in place then effect will be an assimilation into the landscape. The finished ground levels will be raised from +83mOD to +90m OD in the south of the site, total increase of approx 7m and the north the finished ground levels will be raised from +88mOD to +95m OD which is also an increase I approx 7m. Within this wide valley setting with gently undulating landscape the creation of a wide mound for the restored site will not change the landscape character and will not create a significant visual impact. The proposal intrudes to a minor extent on the backdrop in the distance but it may not be noticed by a casual observer and does not have a marked effect on the visual amenity of the scene. The impact from this elevated view point will be **permanent, slight negative**.

Viewpoint 4 (VP04) - Viewpoint 4 is also on the L4015 road looking in a north-easterly direction towards the proposed development site through an existing concrete post and rail fence and approximately 700m from the southern boundary. The viewpoint is on a flat section of road at approximately the same ground level as the proposed development and located close to Business property B2 (see Figure 4.1).

Existing View - The existing view shows north-easterly views towards the site over the wider valley including the start of Knockpatrick Hill to the north. The elements within the existing worked out quarry site do not intrude upon the wider view of the valley nor do they obstruct the sky line. In the foreground the existing undulating landform and field boundary hedgerow part screen the southern part of the proposed development.

Construction phase view – This view shows the likely extent of dust arising from the site to a height of approx 20m above ground level during filling, the effect is a slight obstruction of the view but is not noticeable against the sky and does not obstruct any key viewpoints or features. Construction plant is slightly visible in this view point. The visual impact during construction is **temporary slight negative**.

Construction phase view with mitigation comprising tree planting - This view shows the likely extent of dust arising from the site to a height of approx 20m above ground level during filling, the effect is a slight obstruction of the view but this does not result in obstruction of the ridge line in the background of the viewpoint. The tree planting which will be in place at the commencement of construction screens visibility of the plant from the road . The visual impact during construction is also **temporary slight negative**.

Completion of restoration proposals - on completion of the land contouring to create a natural curved low hill with natural grass mix and hedgerow and trees planting remaining in place then effect will be an assimilation into the landscape. The finished ground levels will be raised from +83mOD to +90m OD in the south of the site, total increase of approx 7m and the north the finished ground levels will be raised from +88mOD to +95m OD which is also an increase in approx 7m. Within this wide valley setting with gently undulating landscape the creation of a wide mound for the restored site will not change the landscape character and will not create a significant visual impact. The proposal will not be noticed by a casual observer and does not have a marked effect on the visual amenity of the scene, neither does it obstruct the important ridgeline of Knockpatrick Hill to the north. The impact from this view point will be **permanent, imperceptible**.

15.10 Residual Impacts

Residual landscape and visual impacts on restoration of the Soil Recovery Site will be slight to imperceptible. The establishment of proposed perimeter tree planting (on embankment along the eastern side) will ensure that when restoration is completed potentially 25 years after commencement of construction that the trees will fully assimilate the development into the landscape. The final contouring of the site finished ground levels (Dwg Nn. 002/E2 and 002/E3) will be raised from +83mOD to +90m OD in the south of the site, total increase of approx 7m and in the north the finished ground levels will be raised from +88mOD to +95m OD which is also an increase in approx 7m. The wide, undulating, wooded landscape within which the site sits has capacity to accommodate a new gentle mound surrounded by native trees resulting in an imperceptible visual impact in the long term.

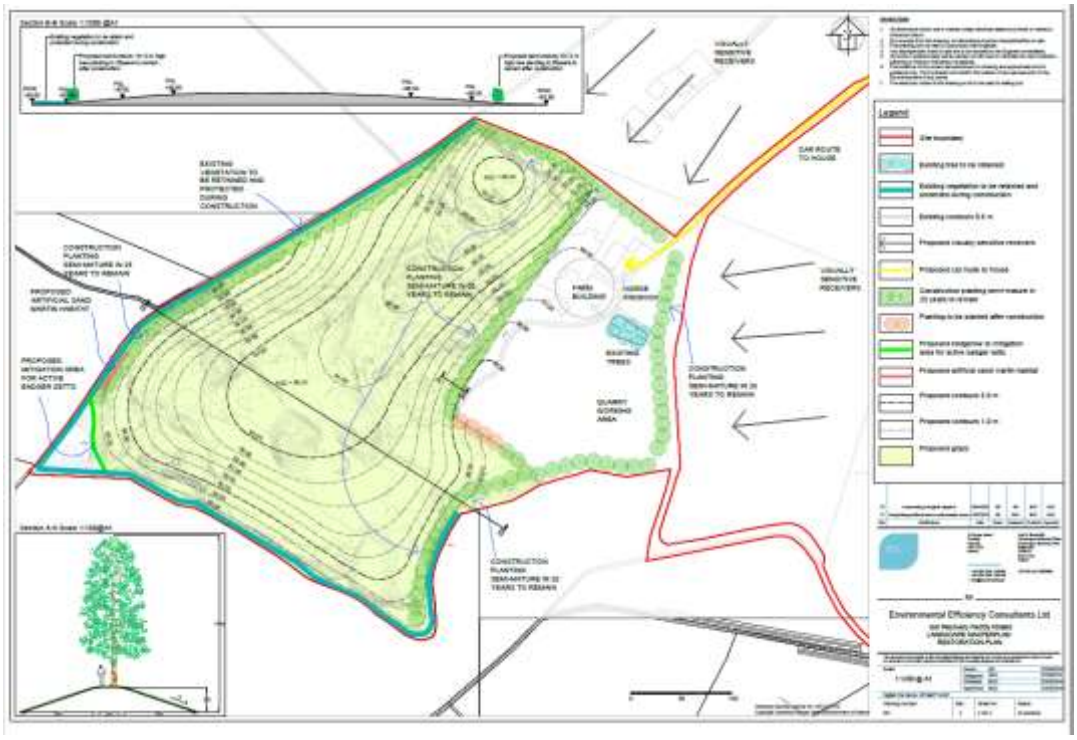


Figure 15-10 Landscape Restoration Plan

16. Indirect Impacts, Cumulative Impacts and Interactions

16.1 Introduction

This section addresses indirect impacts, cumulative impacts and interaction between impacts associated with environmental topic headings considered in this EIAR. The approach taken in this section is guided by the EIA Directive (Directive 2011/92/eu amended by 2014/52/eu).

16.2 Methodology

The potential for indirect impacts, cumulative impacts and interaction between impacts was considered during the screening and scoping stages of the EIA. Where the potential for significant indirect impacts and cumulative impact and interactions were identified, such impacts and interaction of impacts were included in the scope of the EIA and addressed in the baseline and impact assessment studies carried out under each environmental topic heading.

Regard was has to the following guidance documents when identifying and evaluating indirect and cumulative impacts an interactions.

- EPA Guidelines on Information to be contained in EIAR's (2017) (Draft)
- EPA Advice Notes for preparing Environmental Impact Statements (2015)
- European Commission Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (1999)

The matrix and expert opinion approaches, as outlined in European Commission's Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions, where used to identify and evaluate potential significant cumulative and indirect impacts and interactions.

16.3 Definitions

The following definitions, as prescribed in European Commission *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions*, were referred to when completing this section.

- Indirect Impacts: Impacts on the environment, which are not a direct result of the project, often produced away from or as a result of a complex pathway. Sometimes referred to as second or third level impacts, or secondary impacts.

- Cumulative Impacts: Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project.

- Impact Interactions: The reactions between impacts whether between the impacts of just one project or between the impacts of other projects in the areas.

16.4 Indirect and Cumulative Impacts

Indirect and cumulative impacts on the environment associated with the proposed activity are addressed in the EIAR within relevant Environmental Topic Chapters under the relevant '*Indirect Impacts'* and '*Cumulative Impacts'* headings.

It has been determined that there will be no significant adverse indirect or cumulative impacts on the environment as a result of the proposed activity.

16.5 Impact Interactions

Table 16-1 below has been developed to identify potential interrelationships between proposed development impacts considered under the environmental topic chapters in the EIAR. The table is presented as a matrix which identifies the potential for impact interrelationships between topics listed in the left-hand column and topics listed in the top row. A brief overview of potential impact interactions is shown below the table. Potentially significant impact interactions are addressed throughout the EIAR in relevant Environmental Topic Chapters.

Table 16-1 Impact Interactions

Interaction	Population and Human Health		Biodiversity		Land and Soils		Water		Air and Climate		Noise		Material Assets		Traffic and Transport		Cultural Heritage		Landscape	
	Const.	Op.	Const.	Op.	Const.	Op.	Const.	Op.	Const.	Op.	Const.	Op.	Const.	Op.	Constr.	Op.	Const.	Op.	Const.	Op.
Population and Human Health			✓	✓	X	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X	✓	✓
Biodiversity					✓	✓	✓	✓	✓	✓	✓	✓	X	X	✓	✓	X	X	X	X
Land and Soils							✓	✓	X	X	X	X	X	X	X	X	X	X	✓	✓
Water									X	X	X	X	✓	✓	X	X	X	X	X	X
Air and Climate											X	X	✓	✓	✓	✓	X	X	X	X
Noise													✓	✓	✓	✓	X	X	X	X
Material Assets															✓	✓	X	X	X	X
Traffic an Transport																	X	X	✓	✓
Cultural Heritage																			X	X
Landscape																				

16.5.1 Potential Interactions

16.5.1.1 Water, Biodiversity, and Population and Human Health

Aqueous emissions associated with the proposed development potentially impacting upon the water quality of receiving waters may lead to an adverse impact upon aquatic ecology and consequently an impact upon the amenity value, namely people's enjoyment of receiving water bodies.

16.5.1.2 Air, and Population and Human Health

Fugitive dust emissions associated with the proposed development adversely impacting the ambient air quality environment may in turn have an impact on human health and well-being in the local area.

16.5.1.3 Noise, and Population and Human Health

Noise emissions associated with the proposed development adversely impacting the local noise environment may in turn have an impact on human health and well-being in the local area.

16.5.1.4 Air, Noise, Material Assets, and Population and Human Health

The proposed development, in particular noise and dust emissions associated with site preparation works and facility operations could potentially adversely impact upon residential and commercial properties in the local environ of the site. This in turn could affect human health and well-being in the local area.

16.5.1.5 Traffic and Transport, Material Assets, and Population and Human Health

Increased HGV traffic associated with the proposed development may result in increased traffic congestion, increased road safety risks and may adversely impact the integrity of local roadways, potentially leading to adverse impacts on Population and Human Health. Road improvements associated with the proposed development may reduce road safety risks, leading to a positive impact on population and human health.

16.5.1.6 Landscape, and Population and Human Health

Impacts on landscape character and visual impacts associated with the proposed development may adversely affect visual amenity for people in the local area who may have views onto the site. Landscape improvement will have a positive impact upon visual amenity for people in the local area.

16.5.1.7 Land and Soils, and Biodiversity

Earthworks and groundworks associated with the proposed may have an impact upon the characteristics of habitats and species present on-site.

16.5.1.8 Air and Climate, and Biodiversity

Fugitive dust emissions associated with site preparation works and facility operations may adversely impact upon flora in close proximity to where operations will be taking place.

16.5.1.9 Noise, and Biodiversity

Noise emissions associated with proposed development activities may adversely impact upon sensitive ecological receptors in close proximity to working areas.

16.5.1.10 Water, and Material Assets

A deterioration of water quality as a result of proposed aqueous discharge to the receiving environment could affect natural resources, namely the assimilative capacity of receiving water bodies.

16.5.1.11 Water, and Land and Soils

Earthworks and groundworks associated with the proposed development may alter surface water drainage characteristics on-site and may lead to an increase in sediment in surface water run-off.

16.5.1.12 Traffic and Transport, and Air and Climate

Increased HGV movements associated with the proposed development will result in greenhouse gas emissions to air. This will have a very minor, negligible climate impact.

16.5.1.13 Traffic and Transport, Noise, population and Human Health, and Biodiversity

Traffic movements on-site will create noise along haul route which may adversely impact upon sensitive human and ecological receptors.

16.5.1.14 Traffic and Transport, and Material Assets

GV movements associated with the proposed development may have an impact on the integrity of the public roadway used by HGV's to access the site.

16.5.1.15 Landscape, Population and Human Health, and Traffic and Transport

Traffic movements along the site access road and internal circulation routes may affect visual amenity in the local area.

16.5.1.16 Land and Soils, and Landscape

Earthworks and groundworks associated with the backfilling/land restoration activities may have an adverse impact upon landscape character and visual amenity surrounding the site.